ENVIRONMENTAL ENGINEERING, INC
2680 Bishop Drive • Suite 203 • San Ramon, CA 94583
TEL (925) 244-6600 • FAX (925) 244-6601

Second Quarter 2001
Groundwater Monitoring Report
Former Glovatorium Facility

3815 Broadway

Oakland, California

July 5, 2001

Project 01-2510

Prepared for

Smiland and Khachigian

601 West Fifth Street, 7th Floor

Los Angeles, California 90071-2004

Prepared by

SOMA Environmental Engineering, Inc.

2680 Bishop Drive, Suite 203

San Ramon, California 94583

ENVIRONMENTAL ENGINEERING, INC
2680 Bishop Drive • Suite 203 • San Ramon, CA 94583
TEL (925) 244-6600 • FAX (925) 244-6601

JUL 1 0 2001

July 5, 2001

Mr. Scott Seery, CHMM
Alameda County Department of
Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Project: 01-2510

Subject: Site Located at 3815 Broadway, Oakland, California
Former Glovatorium Facility

Dear Mr. Seery:

A copy of SOMA's "Second Quarter 2001 Groundwater Monitoring Report" for the subject property is enclosed.

Thank you for your time in reviewing our report. Please do not hesitate to call me at (925) 244-6600, if you have any questions or comments.

Sincerely,

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

Enclosure

cc: Mr. Stuart Depper, Clean Tech Machinery
Mr. Albert M. Cohen, Smiland & Khachigian
Ms. Betty Graham, Regional Water Quality Control Board
Dr. Bruce Page, Bruce W. Page Consulting

JUL 1 0 2001

Certification

This report has been prepared by SOMA Environmental Engineering, Inc. for Smiland & Khachigian, to comply with Alameda County Department of Environmental Health's requirements for the Second Quarter 2001 groundwater monitoring event.

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

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 INTRODUCTION

This report has been prepared by SOMA Environmental Engineering, Inc. (SOMA) for the Law Offices of Smiland and Khachigian on behalf of their client, the owners of the former Glovatorium. The site is the former Glovatorium property located at 3815 Broadway Avenue, Oakland, California (the "Site"), as shown in Figure 1. The Site is located in an area consisting primarily of commercial and residential uses.

This report summarizes the results of the second quarter 2001 groundwater monitoring event conducted on April 26 and 27, 2001 by SOMA at the Site, including the results of the laboratory analyses of the groundwater samples, which were analyzed for:

- Total petroleum hydrocarbons as gasoline (TPH-g), and as Stoddard solvents (TPH-ss) using modified 8015
- Volatile organic compounds (VOCs) using EPA Method 8260B (with the listing of compounds from the 8010 analytical method)
- Benzene, toluene, ethylbenzene, total xylenes (collectively referred to as BTEX) and methyl tertiary butyl ether (MtBE) using EPA Method 8021B.

In addition to the above laboratory analysis, the natural attenuation study which was initiated by LFR in the third quarter of 2000 continued during this monitoring event. The objective of the natural attenuation study was to evaluate whether or not tetrachloroethylene (PCE) and other VOCs found in groundwater are biodegrading. Therefore, the groundwater samples collected during this monitoring event were analyzed for common electron acceptors and other geochemical indicators, and the results are described in this report.

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 work is needed to determine the nature and extent of environmental contamination, and thus whether contamination is affecting the neighboring Thompson property. This information is needed to defend against the claim that Mr. Thompson brought against Glovatorium and the Deppers. This work may also provide data that could help determine when releases occurred, which is also significant to defending against the claims brought by a former owner of the property, Ms. Johnson.

1.1 Site Description

The Site is located between Manila Avenue and Broadway, near the intersection of 38th Street in Oakland, California. The ground surface at the Site is covered with concrete and asphalt and slopes gently southwest, with surface elevations ranging from approximately 78 to 84 feet above mean sea level (msl).

A 54-inch inside-diameter storm drain culvert passes under the property, from Manila Avenue on the west to 38th Street on the South (see Figure 2). The depth of the storm drain invert is approximately 8.5 feet under the sidewalk on the eastern side of Manila Avenue and approximately 13.2 feet bgs at the far end approximately 60 feet south of GW-4.

In addition to a storm drain system, a 10-inch diameter cast iron sanitary sewer conduit runs in a westerly direction from the on-site building and discharges into the sanitary sewer line, which runs north to south along Manila Avenue. The floor drain inside the building is less than 2 feet bgs. However, the depth of the sanitary sewer line inside the building gradually increases and then slopes more steeply downward near the western wall of the building, where it plunges

underneath the 54-inch storm drain (LFR, January 2001).

Reportedly, there were six underground storage tanks (USTs) at the Site. Two USTs were located under the sidewalk on 38th Street and four USTs were located inside the building. The volumes of the USTs have been variously reported as ranging from 800 gallons up to 5,000 gallons. They reportedly contained Stoddard solvent, fuel oil and possibly waste oil. In August 1997, the six USTs were abandoned in-place by backfilling with either cement-sand slurry or pea gravel. In addition, there are three USTs owned by Earl Thompson, Sr., under the sidewalk on 38th Street, see Figure 2.

The surrounding properties are primarily commercial, businesses and residential housing. A TOSCO Marketing Company (TOSCO) site is located north and upgradient of the Site, at 40th Street and Broadway and contains a number of groundwater monitoring wells. Figure 2 shows the location of the main building, fuel tank areas, and the on-site and off-site groundwater monitoring wells. The groundwater monitoring wells are currently monitored on a quarterly basis. Past groundwater monitoring events have indicated the presence of VOCs and petroleum hydrocarbons in the groundwater beneath the Site. The source of VOCs and Stoddard Solvent is believed to be the former underground storage tanks (USTs), which were used to store Stoddard solvents and VOCs at the Site. The source of petroleum hydrocarbons in the groundwater is believed to be the upgradient TOSCO facility. This report includes both the results of historical groundwater monitoring events and the results of the second quarter 2001 groundwater monitoring event.

1.2 Background

The following is a brief description of previous site investigations conducted by different environmental firms:

In August 1997 Geosolv, LLC (Geosolv) initiated the first soil and groundwater

investigation at the Site. Geosolv drilled fourteen soil borings to approximate depths of 10 to 24 feet below ground surface (bgs) using the direct push method. Seven of the soil borings (B-2, B-3, B-7 through B-10 and B-13; see Figure 2) were converted into temporary groundwater monitoring wells where grab groundwater samples were collected. In September 1998, Geosolv conducted further soil and groundwater investigation by drilling twelve additional soil borings to an approximate depth of 19 to 25 feet bgs. All of the twelve soil borings were converted into temporary groundwater sampling points, and are labeled E-15 through E-26 in Figure 2. After collecting grab groundwater samples from the "E" temporary sampling points, they were abandoned and grouted.

In July 1999, based on the request of ACEHS, an investigation of potential groundwater preferential flow paths was initiated by LFR. LFR drilled ten soil borings (GW-1 through GW-8, GW-5A, and GW-6A) primarily along the 54-inch diameter storm drain and sanitary sewer systems to depths ranging from 8 to 20 feet bgs using a direct push drilling method. During drilling operations, soil samples were collected from various depth intervals. In August 1999, LFR collected grab groundwater samples from seven of nine "GW" wells.

In January and April 2000, LFR conducted quarterly groundwater monitoring events at the Site. During the groundwater monitoring events, groundwater elevations were measured in the temporary sampling points installed by LFR and Geolsolv, and in off-site wells MW-8, MW-9 and MW-11 owned by TOSCO. Groundwater samples were collected from the temporary sampling points installed by LFR and from the off-site well MW-11.

In July and August 2000, LFR installed four groundwater monitoring wells, namely LFR-1 through LFR-4, and conducted the third quarter 2000 groundwater monitoring event. This was the first sampling event in which bioattenuation parameters were collected. The measured bioattenuation parameters included:

dissolved oxygen (DO), nitrate (NO_3^{-1}), sulfate (SO_4^{-2}) ferrous iron (Fe^{+2}), total iron, methane, oxidation reduction potential (ORP), alkalinity, chloride, carbon dioxide, nitrite, sulfide, ethene, and ethane. The bioattenuation parameters provided a baseline for these parameters and a means to compare their concentrations at locations within the apparent source area against surrounding upgradient, down-gradient, and cross-gradient locations. During this monitoring event, groundwater elevations were measured and groundwater samples were collected from the newly installed groundwater monitoring wells LFR-1 through LFR-4, from the temporary sampling points installed by LFR and Geosolv, and from off-site monitoring wells MW-8, MW-9, and MW-11 owned by TOSCO. No groundwater sample was collected from MW-8 or MW-9.

In late October and early November 2000, LFR conducted the fourth quarter 2000 groundwater monitoring event, including another bioattenuation study. During the fourth quarter monitoring event, LFR sampled nine groundwater monitoring wells and temporary groundwater sampling points and measured groundwater elevations in nineteen groundwater monitoring wells and temporary sampling points (LFR, January 2001).

Well completion details for the LFR wells and the Geosolv sampling points are presented in Table 1.

In late January LFR conducted the first quarter 2001 groundwater monitoring event. However, SOMA prepared the first quarter 2001 monitoring report (SOMA May 2001). The results of the first quarter 2001 groundwater monitoring event suggested the occurrence of strong anaerobic biodegradation activities and dechlorination of PCE beneath the Site.

During the current groundwater monitoring event, the collection of certain bioattenuation data, which have proved to be less useful was terminated.

1.3 Site Geology and Hydrogeology

The Site is located on the alluvial plain between the San Francisco Bay shoreline and the Oakland hills. Surface sediments in the Site vicinity consist of Holocene alluvial deposits that are representative of an alluvial fan depositional environment. These deposits consist of brown, medium dense sand that fines upward to sandy or silty clay. The pattern of stream channel deposition results in a three-dimensional network of coarse-grained sediments interspersed with finer grained silts and clays. The individual units tend to be discontinuous lenses aligned parallel to the axis of the former stream flow direction (LFR, 2001).

According to LFR, sediments encountered in soil borings at the Site are typical of those encountered in an alluvial fan depositional environment. The sediments are predominantly fine-grained, consisting of clay, silty clay, sandy clay, gravelly clay and clayey silt. Discontinuous layers of coarse-grained sediments (clayey sand, silty sand, and clayey gravel) generally also contain relatively high percentages of silt and clay, which tend to reduce their permeability. Based on LFR (2001), during previous investigations conducted by Geosolv and LFR, a relatively coarse-grained layer of silty sand, clayey sand, and clayey gravel was encountered in soil borings E-23, E-25, E-26, GW-2, GW-3, GW-7, and GW-8 at depths of approximately 4.5 to 14 feet bgs. A discontinuous layer of silty to clayey sand was encountered at depths of 17 to 21 bgs in borings B-11, E-23, E-25, GW-7 and GW-8.

According to the results of historical groundwater monitoring activities, groundwater occurs at 4 to 14 feet bgs. Based on the current and the previous groundwater monitoring reports, groundwater flows from northeast to the southwest with an approximate groundwater flow gradient of 0.019 ft/ft to 0.035 ft/ft. Assuming that the water-bearing zone consists of silty sand with an average hydraulic conductivity of 1×10^{-4} cm/sec and porosity of 0.35, it is estimated that

the average groundwater flow velocity is approximately 0.022 ft/day (8 feet per year).

2.0 FIELD ACTIVITIES

Field activities were conducted on April 26 and 27, 2001, during which nine groundwater monitoring wells were sampled and water levels were measured in 19 groundwater monitoring wells and temporary sampling points. GW-4 was not accessible for sampling during this monitoring event. Figure 2 shows the location of groundwater monitoring wells and temporary sampling points. Appendix A includes SOMA's site-specific field activities during the current groundwater monitoring event.

On April 26, 2001, SOMA's field crew measured the depths to groundwater in the monitoring wells and temporary groundwater sampling points from the top of casings to the nearest 0.01 feet using an electrical sounder. The depth to groundwater and top of casing elevation data at each groundwater monitoring well were used to calculate the groundwater elevation.

Groundwater sampling was conducted on April 26 and 27, 2001. During the groundwater sampling activities, certain biodegradation groundwater parameters such as dissolved oxygen, oxidation reduction potential (ORP), ferrous iron, total iron, nitrate, nitrite, sulfate and manganese were measured by the field crew. After collecting groundwater samples, they were placed in an ice chest and delivered to Curtis & Tompkins, Ltd. of Berkeley, California for routine analyses and to Microseeps Analytical Laboratories of Pittsburgh, Pennsylvania (Microseeps) for methane analyses only. Additionally, the field crew measured certain groundwater parameters such as pH, temperature, electrical conductivity and turbidity in-situ during the groundwater monitoring event.

2.1 Laboratory Analysis

Curtis & Tompkins, Ltd. of Berkeley, California analyzed the groundwater samples. The measured constituents included TPH-g, TPH-ss, BTEX , MtBE and VOCs.

TPH-g and TPH-ss were measured using EPA Method 8015M. EPA Method 8021B was used to measure BTEX and MtBE. EPA Method 8260B was used to measure volatile organic compounds.

Most of the groundwater constituents related to bio-degradation activities were measured by SOMA's field crew except dissolved methane, which was performed by Microseeps. The analyses conducted by the field crew included ferrous iron, total iron, nitrate, nitrite, sulfate, dissolved manganese, and dissolved oxygen. A difficulty was encountered during the measurement of dissolved oxygen inside the one-inch diameter monitoring wells installed by Geosolv and LFR. Due to the fined grained nature of the saturated sediments, during the concurrent purging (using flow-flow pumps) and monitoring of dissolved oxygen content a large drawdown was observed, and in some cases the well went dry and as a result an erroneous oxygen content was recorded. On June 11, 2001 the field crew, made another trip and re-measured the oxygen content of those wells. Table 9 shows the re-measured oxygen contents.

3.0 Results

This section describes the results of the second quarter 2001 groundwater monitoring event, and it includes groundwater flow conditions, the status of groundwater contamination, and the occurrence of bioattenuation in the subsurface.

3.1 Groundwater Flow Condition

Table 2 presents the measured groundwater elevations at different groundwater monitoring wells and temporary groundwater sampling points. At each location, depth to watertable and the elevation of the top of casing were used to calculate the watertable elevation relative to the assumed datum. Appendix B presents the field notes. Table 3 shows the historical water level elevations at different groundwater monitoring wells.

As Table 2 shows, the watertable elevations ranged from 67.62 feet in LFR-3 to 75.26 feet above mean sea level, which is about three feet lower than in the first quarter. The drop in the water level elevation can be attributed to the lack of rainfall during this monitoring event. In evaluating the groundwater flow direction and gradient, water level data from GW-4, B-7 and B-9 were not utilized for the following reasons:

1. No accurate information about the construction details of the "B" wells installed by Geosolve is available, therefore water level data from these wells are questionable;
2. GW-4 was installed adjacent to the storm drain system in order to evaluate whether or not the storm drain system is leaking. This well was installed in the shallow formation, and may partially penetrate into the underlying water-bearing zone. Therefore, the water level elevation recorded inside GW-4 may not be representative of the underlying water-bearing zone.

Figure 3 displays the groundwater elevation contour map. As Figure 3 shows, during the recent monitoring event, the groundwater was found to flow from the northeast to southwest. This is consistent with the findings of the previous monitoring events conducted by LFR.

The field measurements of some physical and chemical parameters of the

groundwater samples are presented in detail in the field notes in Appendix B, and are summarized in Table 4, along with their historical values. Water temperatures ranged from 14.6 °C to 19.5 °C. The variation in temperature may reflect the changes in air temperature during sampling. The temperature measurements allowed the field crew to make corrections to the pH, Electrical Conductivity (EC), and dissolved oxygen measurements. pH measurements ranged from 5.43 to 6.80 units. The EC measurements ranged from 0.613 to 1.34 µS/cm.

The significant difference between the electrical conductivity values at different wells may suggest that the groundwater monitoring wells may have been completed in different water-bearing zones. To evaluate such phenomenon, additional groundwater samples from B-10 and LFR-1 were collected and submitted to the laboratory for total anion and cation analyses.

3.2 Groundwater Quality

The groundwater samples were analyzed for petroleum hydrocarbons and volatile organic compounds using EPA Methods 8015M, 8021B, and 8260B. In addition, two groundwater samples collected from B-10 and LFR-1 were analyzed for total cations and anions. Table 5 displays the results of the laboratory analyses for TPH-ss, TPH-g, MtBE, benzene, toluene, ethylbenzene, and total xylenes. As Table-5 shows, TPH-g and TPH-ss were found at high concentrations beneath the Site. Like the previous monitoring event, the maximum concentrations of TPH-g and TPH-ss were found in B-7, which is located inside the former Glovatorium building. Also, TPH-g and TPH-ss were found in six out of nine groundwater monitoring wells sampled during this monitoring event. In comparison with the first quarter 2001 groundwater monitoring event, the concentrations of TPH-g and TPH-ss did not show a significant change. Figures 4 and 5 show the concentration contour maps of TPH-g and TPH-ss in groundwater, respectively.

As was the case during previous groundwater monitoring events, minor concentrations of MtBE and BTEX were found at various groundwater monitoring wells. Unlike the previous groundwater monitoring event, MtBe was not detected in any of the trip blank samples. The maximum concentration of MtBE was detected in B-7 at 6.9 µg/L (see Table-5). The maximum reported concentration of benzene during this monitoring event was reported at LFR-4 at 27 µg/L, which was significantly higher than the previous monitoring event at LFR-4 (benzene was reported at 3.3 µg/L in well LFR-4 during the previous monitoring event). The maximum concentrations of toluene, ethylbenzene and xylenes were detected in well B-7, with concentrations of 71, 77 and 208 µg/L, respectively, which shows slightly higher concentrations than the previous monitoring event at this well.

Table 7 shows the historical TPH-ss, TPH-g, TPH-d, MtBE and BTEX concentrations measured at different groundwater monitoring wells and groundwater sampling points.

Table 6 shows the concentration of volatile organic compounds in the groundwater during this monitoring event. As Table 6 shows, cis-1,2-dichloroethene (cis-1,2-DCE) was found most frequently. Cis-1,2-DCE was detected at a maximum concentration of 7,300 µg/L in B-10, which represents a slight increase in this well compared to the previous groundwater monitoring event. Cis-1,2-DCE is produced during the reductive dechlorination of tetrachloroethene (PCE). In general, the reductive dechlorination process occurs by sequential dechlorination from PCE to trichloroethene (TCE) to DCE to vinyl chloride (VC). Bouwer (1994) reports that under the influence of biodegradation, cis-1,2-DCE is a more common intermediate than trans-1,2-DCE, and that 1,1-DCE is the least prevalent of the three DCE isomers when they are present as daughter products. Trans-1,2-DCE was found less frequently and at lower concentrations than cis-1,2-DCE. Cis-1,2-DCE was reported in eight out of nine groundwater monitoring wells, while trans-1,2-DCE was only detected in B-10

and B-7. Figure 6 shows the distribution of cis-1,2-DCE concentration in groundwater.

PCE and TCE were reported at relatively high concentrations and frequencies in the groundwater samples. PCE and TCE were detected in six out of nine groundwater monitoring wells. The maximum reported concentration of PCE and TCE were 1,700 and 1,400 µg/L, respectively, both in well B-10. This represents a slight decrease from the values reported during the previous groundwater monitoring event. Figures 7 and 8 show the distribution of PCE and TCE concentrations in the groundwater.

VC was only detected in LFR-2 and its duplicate sample of LFR-2-2 at concentrations of 1.9 and 1.3 µg/L, respectively. During the previous groundwater monitoring event, VC was found at a concentration of 1.6 µg/L in LFR-2. This may indicate that the reductive dechlorination process of PCE and TCE is strongly occurring beneath the Site. The strong occurrence of bioattenuation process in the subsurface is further evident by depletion of PCE and TCE in some of the source area wells. Table 8 shows the historical concentration of volatile organic compounds in the groundwater.

3.3 Bioattenuation Parameter Analysis Results

This is the fourth groundwater quarterly monitoring event in which the natural attenuation parameters of groundwater were studied. The objective of the bioattenuation study is to evaluate whether or not intrinsic bioremediation processes are active at the Site. The result of this study will reveal whether or not PCE and other dissolved organic compounds are biodegrading beneath the Site.

In the current groundwater monitoring event, certain bioattenuation parameters such as carbon dioxide, hydrogen, chloride, alkalinity, sulfide, and nitrogen were

omitted from further analysis. In addition, dissolved oxygen was only measured in-situ by the field crew. This decision was made because of the following reasons:

1. As discussed in the previous monitoring reports, the role of certain parameters such as alkalinity, carbon dioxide, sulfide, hydrogen and nitrogen is hard to define or characterize. For instance the presence of alkalinity in groundwater can be attributed to several different biodegradation processes in the subsurface and therefore, its distribution may not assist in identifying the occurrence of dechlorination processes in the subsurface.
2. Based on Borden (1998) and Sepehr (1999), the ex-situ measurement of natural gases such as dissolved oxygen may introduce oxygen into the groundwater sample and result in certain errors. Therefore, dissolved oxygen was only measured in the field inside the casing without collecting a groundwater sample.

During the degradation process, the indigenous bacteria that exist in the subsurface consume electron acceptors such as dissolved oxygen. After the dissolved oxygen is consumed, anaerobic microorganisms typically use alternative electron acceptors in the following order of preference: nitrate, ferric iron, oxyhydroxide, sulfate, and, finally, carbon dioxide. Evaluating the distribution of these electron acceptors can provide evidence of where and to what extent chlorinated and aliphatic hydrocarbon biodegradation is occurring. The by-products of biodegradation processes are nitrite, ferrous iron, alkalinity, sulfide, methane, and carbon dioxide. For evaluation of bioattenuation processes, groundwater samples were collected during the second quarter 2001 groundwater monitoring event and analyzed for selected electron acceptors and the by-products of biodegradation activities, as described below:

Dissolved Oxygen. Dissolved oxygen (DO) is the most favored electron

acceptor used by microbes for the biodegradation of organic compounds. A concentration of DO less than 0.5 mg/L indicates anaerobic conditions. It is our experience that down-hole measurements of DO (i.e., in-situ measurements) yield more realistic results than ex-situ (laboratory) measurements. Significant differences in DO concentrations using in-situ and ex-situ measurements (conducted by Microseep) during the first quarter 2001, can be attributed to cross contamination by atmospheric air during ex-situ measurement (R. Borden, 1998, M. Sepehr 1999). Therefore, during the second quarter 2001, the DO measurements were conducted only by SOMA's field crew. Figure 9 presents the DO concentration contour map in groundwater using in-situ measurements. Figure 9 shows that the low DO concentration areas coincide with the higher levels of contamination in the groundwater. Table 9 presents the current and historical DO concentrations in the groundwater.

Nitrate. After DO has been depleted, nitrate may be used as an electron acceptor for anaerobic biodegradation. Nitrate concentrations less than 1.0 mg/L may indicate that reductive dechlorination is occurring. Low concentrations of nitrate near the apparent source area in B-10, in the downgradient well LFR-2, indicate conditions that are conducive to anaerobic biodegradation. High concentrations of nitrate were observed in upgradient monitoring well MW-11, indicating a low likelihood of anaerobic biodegradation in this well. Figure 10 shows the nitrate concentration contour map using the laboratory data.

Manganese. After DO and nitrate have been depleted, manganese may be used as an electron acceptor for anaerobic biodegradation, and therefore, increased dissolved manganese concentrations are indicative of reductive dechlorination. Manganese concentrations ranged from 0 mg/L (B-10) to 8.8 mg/L (LFR-2) in the apparent source area indicating conditions that are conducive to anaerobic biodegradation.

D

B-10 is the source area!

Sulfate. After DO, nitrate, and manganese have been depleted, sulfate may be used as an electron acceptor for anaerobic biodegradation. This process is

termed sulfate reduction, and results in the production of sulfide. Sulfate concentrations less than 20 mg/L are indicative of reductive dechlorination (EPA 1998). Sulfate concentrations were 5 mg/L in the apparent source area locations B-7 and non-detectable at B-10. Sulfate concentration around well MW-11 and LFR-3 were 28 and 90 mg/L, suggesting aerobic conditions upgradient and further downgradient from the groundwater contaminant plume. Figure 11 shows a sulfate concentration contour map in the groundwater using the laboratory's data.

Ferrous Iron. Increased ferrous iron accompanies anaerobic degradation. Ferric iron can be used as an electron acceptor during anaerobic biodegradation. During this process, ferric iron is reduced to ferrous iron, which may be soluble in water. Ferrous iron concentrations can thus be used as an indicator of anaerobic biodegradation.

The highest ferrous iron concentrations were in the apparent source area (the laboratory reported greater than 3.3 mg/L in B-7). The minimum concentrations of ferrous iron were detected in MW-11 and LFR-3, where conditions are aerobic. Figure 12 shows a ferrous iron concentration contour map using the laboratory data. These results are very similar to the results from the fourth quarter 2000 and first quarter 2001 groundwater monitoring events.

Methane. The presence of methane in groundwater is indicative of strongly reduced conditions, and suggests reductive dechlorination by the process of methanogenesis. Methane was detected in concentrations ranging from 0.00004 mg/L in MW-11 to 14 mg/L in LF-2. The higher concentration of methane at LFR-2 indicates conditions that are conducive to anaerobic biodegradation. Figure 13 shows a methane concentration contour map during the recent groundwater monitoring event, using the laboratory data. In general, these results are similar to the results from both the fourth quarter 2000 and first quarter 2001 groundwater monitoring events.

Oxygen Reduction Potential. The ORP of groundwater is a measure of electron activity, and is an indicator of the relative tendency of a solution to accept or transfer electrons. ORP may range from greater than 800 milliVolts (mV) to less than -400 mV, with lower values expected in areas where anaerobic processes are occurring. ORP measurements obtained in this sampling event ranged from -28 mV in B-7 to +229 mV in MW-11. The highest values were found in downgradient locations (LFR-1 and LFR-3), and upgradient locations (MW-11). The lowest values were found in the apparent source area (B-7 and B-10). These results indicate that conditions in and near the apparent source area are conducive to anaerobic biodegradation.

Hydrogen. Hydrogen concentrations can be useful indicators of the terminal electron accepting processes (TEAPs) involved in reductive dechlorination.

Due to the low variability of hydrogen levels from well to well during the previous monitoring event it was decided not to monitor hydrogen during this monitoring event.

Other Parameters

Alkalinity. Alkalinity is a general water quality parameter. Increases in alkalinity result from interaction between carbon dioxide (a product of several biodegradation processes), and aquifer minerals. Due to the inclusive nature of data collected during the previous groundwater monitoring events in connection with bioattenuation process, no alkalinity data was collected during the current groundwater monitoring event.

Chloride. Chloride is the final product of the reduction of chlorinated solvents, and is also a general water quality parameter.

B-10 ? LFR-1 ?

Due to the inclusive nature of data collected during the previous groundwater monitoring events in connection with bioattenuation process, no chloride data was collected during the current groundwater monitoring event.

Carbon Dioxide. Carbon dioxide is a product of several biodegradation processes. Due to the inclusive nature of data collected during the previous groundwater monitoring events in connection with bioattenuation process, no carbon dioxide data was collected during the current groundwater monitoring event.

Iron. Ferric iron may be used as an electron acceptor during anaerobic biodegradation. During this process, ferric iron is reduced to ferrous iron that may be soluble in water. Ferric iron concentrations may be obtained by subtracting ferrous iron concentrations from total iron concentrations. Total iron concentrations ranged from 0.0 mg/L (well GW-3) to 11.75 mg/L (B-7). The ferrous iron concentration ranged between 0 mg/L (GW-3) to 11 mg/L (B-7) These may be indicative of reductive dechlorination processes. Table 4 presents the results of total iron analyses, and Table 9 presents the results of the ferrous iron analyses.

Nitrite. Nitrate may reduce to nitrite during the process of anaerobic biodegradation. Nitrite measurements were performed on some of the monitoring wells because of limited amount of groundwater sample. Nitrite concentrations ranged from non-detectable to 0.243 mg/L (B-7). As was the case in the first quarter 2001 and fourth quarter 2000 events, these results are inconclusive regarding the occurrence of reductive dechlorination. Nitrite results are included in Table 4.

Sulfide. When sulfate is used as an electron acceptor for anaerobic biodegradation, it is reduced to sulfide. Due to the inclusive nature of data collected during the previous groundwater monitoring events in connection with bioattenuation process, no sulfide data was collected during the current groundwater monitoring event.

pH, Temperature, and Conductivity. The pH of groundwater has an effect on

the activity of microbial populations in groundwater, with optimal pH values ranging from 6 to 8 standard units for microbes capable of degrading PCE and other chlorinated aliphatic hydrocarbons. The groundwater temperature affects the metabolic activity of bacteria, and groundwater conductivity is directly related to the concentration of ions in solution. The pH, temperature, and conductivity values are included in Table 4.

3.4 Evaluation of Natural Quality of Groundwater

Nearly all groundwater originates as rain or snowmelt that infiltrates through soil into systems in the underlying geologic materials. The soil zone has unique and powerful capabilities to alter the water chemistry, as infiltration occurs through this mineral-rich and biologically active zone. As rain water infiltrates deeper its mineral content changes appreciably. As would be expressed from this generalization, it has been observed in groundwater investigations in many parts of the world that shallow groundwater in recharge areas is lower in dissolved solids than the water deeper in the same system (Freeze and Cherry, 1979).

Due to lack of information in connection with detailed groundwater monitoring well completion data by the previous consultants and the fact that some of the monitoring wells may have been completed in different water-bearing zone, groundwater samples were collected from LFR-1, a well with known specification in terms of depth, screen interval and geologic logs and B-10, a well with the least information about its construction details. The groundwater samples were analyzed for total cations and anions. The purpose of this study was to determine whether or not the type of anions and cations in the two groundwater samples are identical.

Figure 14 shows graphically the percent of cations and anions in the two water samples collected from LFR-1 and B-10. The results of the laboratory analyses

indicated that due to the occurrence of biodegradation processes in source area well B-10, there is a dramatic difference in the ratio of anions compared to LFR-1. For instance, sulfate an electron acceptor was not detected in the source area well B-10 due to the presence of anaerobic biodegradation process. In contrast to the source area well B-10, sulfate is present in LFR-1. Also, the chloride concentration is lower in B-10 than LFR-1, while one would expect the opposite result, since chloride is one the final products of the reduction of chlorinated solvents. This result indicate that the groundwater type in B-10 may be different than LFR-1. In addition, the higher concentration of sodium in B-10 further suggests the difference in composition between the two different water samples. The difference between the two water types suggests that B-10 and LFR-1 may have been completed in two different water-bearing zones.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of the work performed on April 26 and 27, 2001 and the results of this work.

Groundwater samples were collected from monitoring wells LFR-1 through LFR-4, temporary sampling points B-7, B-10, GW-2 and GW-3. GW-4 was not sampled this time due to inaccessibility problems (On April 27, a car was parked over this well and the owner of the car was not available), and from well MW-11. The samples were analyzed for TPH-ss, TPH-g, MtBE, BTEX, and VOCs.

The PCE concentration of 0.44 mg/L detected in well LFR-1 is approximately one half of the PCE concentration present in this well in the previous groundwater monitoring event. In August 2000, PCE a concentration of 2.8 mg/L was reported in this well.

This was the fourth quarterly groundwater monitoring event in which bioattenuation parameters were analyzed. Selected samples were analyzed for the following: DO, nitrate, manganese, sulfate, ferrous iron, methane, ORP, total iron, and nitrite. Certain parameters such as chloride, carbon dioxide, hydrogen,

alkalinity, and sulfide were not measured due to their inconclusive role in the bioattenuation processes at this Site..

cis-1,2-DCE is one of the breakdown products of PCE. It was detected at concentrations up to 7.3 mg/L (it was detected at 6.6 mg/L during the previous monitoring event) in temporary sampling point B-10 and its presence in groundwater indicates that reductive dechlorination is likely occurring.

Vinyl chloride was only detected in well LFR-2 and its duplicate sample at concentrations of 0.013 and 0.019 mg/L, respectively. The presence of vinyl chloride, a breakdown product of PCE, indicates reductive dechlorination is likely occurring. Benzene was not detected in GW-2, GW-3, LFR-1, LFR-3, or MW- 11, but was detected in B-7, B- 10, LFR-2 (in duplicate sample at 0.59 µg/L), and LFR-4 at concentrations up to 0.027 mg/L (in LFR-4). The presence of MtBE in several on-site and off-site wells and sampling points is believed to be originated at the upgradient TOSCO site.

The maximum concentrations of the petroleum hydrocarbons were found in groundwater monitoring well B-7, as shown in Table-5. The maximum concentration of volatile organic compounds was found in B-10, as shown in Table 6.

4.1 Conclusions

Our conclusions, based on the data obtained during the second quarter 2001 groundwater monitoring event, are as follows:

The farthest downgradient well, LFR-3, contained minor concentration of VOCs such as 1.9 µg/L PCE, 5.4 µg/L toluene and 2.4 µg/L MtBE.

The data collected to date regarding the distribution of PCE and other VOCs in groundwater indicates that PCE has been degraded into some of its breakdown

products. PCE typically degrades into TCE, then cis-1,2-DCE, and trans-1,2-DCE (at much lower concentrations than cis-1,2-DCE), then to vinyl chloride, ethane and ethene and finally carbon dioxide, water, and chloride. This sequence of degradation would be anticipated where biological reductive dehalogenation of PCE is occurring. These breakdown products and relative concentrations are present at the Site. The presence of TCE in the apparent source area near temporary sampling point B-10 in January, August, and October/November 2000, as well as January/February 2001 and April 2001 indicates that PCE degradation is occurring. The presence of relatively high concentrations of cis-1,2-DCE in B-10 and in nearby B-7, and the relatively low concentrations of trans-1,2-DCE in these temporary sampling points is also indicative of biodegradation. Historical data from temporary sampling point GW-8 indicates the presence of vinyl chloride between July 1999 and April 2000. Vinyl chloride was also detected in LFR-2 since the October/November 2000 groundwater monitoring event.

The analysis of DO, nitrate, manganese, sulfate, ferrous iron, methane, and ORP indicates that conditions in the apparent source area are conducive to reductive dechlorination processes, because of their concentration distributions across the Site.

DO concentrations of less than approximately 1.0 mg/L in groundwater are indicative of anaerobic biodegradation conditions. In general, results indicate that conditions in the apparent source area are anaerobic and conducive to anaerobic biodegradation processes, because the lowest DO concentrations occurred in the apparent source area (B-7 and B-10) and in wells LFR-2, and LFR-1.

Relatively low concentrations of nitrate (e.g. less than 1.0 mg/L) are anticipated in locations where the oxygen has been depleted, because nitrate ion can be an effective electron acceptor in anaerobic biodegradation. Low concentrations of nitrate occurred near the apparent source area in temporary sampling points B-7 and B-10, indicating conditions that are conducive to anaerobic biodegradation.

Increased dissolved manganese concentrations are indicative of reductive dechlorination condition. Manganese concentrations ranged from 0 mg/L (MW-11, LFR-4 and GW-3) to 1.7 mg/L (B-7) in the apparent source area, indicating conditions that are conducive to anaerobic biodegradation.

Relatively low concentrations of sulfate (e.g. less than 20 mg/L) are anticipated in locations where the oxygen has been depleted, because sulfate ion can be used as an effective electron acceptor in anaerobic biodegradation. Sulfate concentrations were less than 1.0 mg/L in the apparent source area location (B-10), indicating conditions that are conducive to anaerobic biodegradation.

The reducing conditions conducive to dehalogenation of VOCs can also reduce iron to the soluble ferrous state. Therefore, a relatively high concentration of ferrous iron is anticipated in locations where biodegradation occurs. The highest ferrous iron concentrations were in the apparent source area (B-7 and B-10) and in the slightly downgradient location LFR-2, indicating conditions that are conducive to anaerobic biodegradation.

A relatively high concentration of methane is anticipated in locations where biodegradation occurs because methane is indicative of strongly reducing conditions and suggests reductive dechlorination by the process of methanogenesis. Methane concentrations ranged from 7.6 mg/L to 14 mg/L in the apparent source area (B-7 and B-10), indicating conditions that are conducive to anaerobic biodegradation.

The ORP of groundwater is a measure of electron activity and is an indicator of the relative tendency of a solution to accept or transfer electrons. ORP may range from greater than 800 milliVolts (mV) to less than -400 mV, with negative values expected in areas where anaerobic processes are occurring. The lowest values (-28 and –8) were found in and near the apparent source area (B-7, B-10). These results indicate that conditions in and near the apparent source area are conducive to anaerobic biodegradation.

4.2 Recommendations

SOMA's recommendations for future work at the Site are as follows:

1. Continue implementing the sampling and analysis plan for the routine parameters and natural bioattenuation parameters established through discussion with representatives of ACEHS and the RWQCB.

2. Continue quarterly groundwater monitoring in the four wells, LFR-1 through LFR-4, installed in July 2000, in the upgradient well MW- 11, and in selected previously installed temporary sampling points. Groundwater levels will be measured in LFR-1 through LFR-4, MW-8, MW-9, and MW-11, and in temporary sampling points.

3. The evaluation of the following parameters is recommended in order to characterize biodegradation at the Site:

    - In-Situ dissolved oxygen measurement;
    - No laboratory measurements of dissolved oxygen, hydrogen, nitrogen, or carbon dioxide are needed;
    - Groundwater samples should be analyzed both in field and in the laboratory for ferrous iron, total iron, nitrate, sulfate, total manganese and dissolved manganese.

4. Continue to evaluate PCE and potential breakdown product concentrations on-site using mass flux calculations. Develop site conceptual model.

SOMA's Workplan dated **June 14, 2001** includes our proposed action for collecting additional data and defining the Site's regulatory status. Once the Site's regulatory status in terms "Low Risk" or "High Risk" chemical release site is known, the most appropriate corrective action can be proposed to ACEHS.

Where is it?

5.0 REFERENCES

Borden, R.C., 1998 "Hand book of Bioremediation" Section 9 Natural Bioremediation of Hydrocarbon-Contaminated Ground Water, pp 177-199.

EPA 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater, EPA/600/R-98/128. September.

Helley, E.J., K.R. Lajoie, and D.B. Burke. 1972. Geologic Map of Late Cenozoic Deposits, Alameda County, California.

LFR. 1999. Results of Utility Survey and Work Plan for Soil and Grab Groundwater Investigation. May 6.

LFR. 2000a. Soil and Groundwater Investigation Report. March 20.

LFR. 2000b, Work Plan for Installation of Groundwater Monitoring Wells, Former Glovatorium, 3815 Broadway, Oakland, California. June 14.

LFR. 2000c. Groundwater Monitoring Report, Second Quarter 2000, Former Glovatorium, 3815 Broadway, Oakland, California. July 7.

LFR. 2000d. Groundwater Monitoring Report, Third Quarter 2000, Former Glovatorium, 3815 Broadway, Oakland, California. November 2.

LFR. 2001. Groundwater Monitoring Report, Fourth Quarter 2000, Former Glovatorium, 3815 Broadway, Oakland, California. November 2.

Microseeps. 2000. Monitored Natural Attenuation As a Remedial Alternative In Groundwater Contamination. Lecture at LFR Levine - Fricke (LFR) Emeryville office by Robert J. Pirkle, Ph.D. of Microseeps. May 31.

Sepehr, M., 1999 "Methanogenesis and Anaerobic Biodegradation of Petroleum Hydrocarbons in Soil and Groundwater" a Paper Presented in 4th IAA Annual Conference at Petrochemical, Energy and Environment, September 1999, New York.

SOMA Environmental; Engineering, Inc. 2001 First Quarter 2001 Groundwater Monitoring Report, Former Glovatorium Facility, 3815 Broadway, Oakland, California, May 7, 2001.

U.S. Geological Survey. Quaternary Geology of Alameda Cty, and Parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, CA: A Digital Database. U.S. Dept of the Interior.

TABLES

Table 1

Construction Data for Temporary Sampling Points and Monitoring Wells

Former Glovatorium Site

3815 Broadway, Oakland, California

Location	Date Installed	Ground Surface Elevation (ft)	Top of Casing Elevation (ft)	Total Depth (ft)	Screen Interval Depth (ft)	Screen Interval Elevation (ft)	Notes
Temporary Sampling Points Installed by Geosolv, LLC:							
B-2	19-Aug-97	82.2	82.09	21	5 to 21	77.2 to 61.2	
B-3	19-Aug-97	82.6	82.57	18	5 to 18	77.6 to 64.6	(1)
B-7	20-Aug-97	77.33	76.96	17.5	5 to 17.5	72.3 to 59.8	
B-8	20-Aug-97	82.06	81.82	24	9 to 24	73.1 to 58.1	
B-9	21-Aug-97	77.57	77.37	19.5	4.5 to 19.5	73.1 to 58.1	
B-10	21-Aug-97	81.65	81.5	19	4 to 19	77.7 to 62.7	
B-13	22-Aug-97	85.12	84.58	20	5 to 20	80.1 to 65.1	
Temporary Sampling Points Installed by LFR:							
GW-1	16-Jul-99	80.24	79.94	8	3 to 8	77.2 to 72.2	
GW-2	16-Jul-99	79.44	79.14	20	10 to 20	69.4 to 59.4	
GW-3	15-Jul-99	78.48	77.92	20	10 to 20	68.5 to 58.5	
GW-4	16-Jul-99	82.55	82.37	12	7 to 12	75.6 to 70.6	
GW-5	15-Jul-99	81.31	81.01	13	8 to 13	73.3 to 68.3	
GW-6	15-Jul-99	81.91	81.65	13.5	7.5 to 13.5	74.4 to 68.4	(2)
GW-6A	16-Jul-99	81.93	81.61	15	5 to 15	76.9 to 66.9	
GW-7	15-Jul-99	81.3	NS	20	10 to 20	71.3 to 61.3	(2)
GW-8	16-Jul-99	80.28	80.1	20	10 to 20	70.3 to 60.3	(2)
Temporary Sampling Points Installed by TOSCO:							
MW-8	unknown	NS	87.44	unknown	unknown	unknown	
MW-9	unknown	NS	86.56	unknown	unknown	unknown	
MW-11	unknown	NS	84.13	unknown	unknown	unknown	
Groundwater Monitoring Wells Installed by LFR:							
LFR-1	28-Jul-00	NS	79.97	19	9 to 19		
LFR-2	27-Jul-00	NS	81.89	19	9 to 19		
LFR-3	27-Jul-00	NS	77.96	22	12 to 22		
LFR-4	28-Jul-00	NS	81.65	19	9 to 19		

Notes:

(1) Top of casing surveyed on south side on January 21, 2000, because the casing was broken.

(2) GW-7 was abandoned on July 15, 1999, in accordance with LFR's workplan dated May 6, 1999. GW-6 and GW-8 were abandoned on July 26, 2000, in accordance with LFR's workplan dated June 14, 2000.

NS = Not surveyed.

Table 2
Groundwater Elevation Data, Second Quarter 2001
Groundwater Monitoring Event
Former Glovatorium Site
3815 Broadway, Oakland, California

Well Name	Date	Casing Elev. (ft.)	DTW (ft.)	GW Elev. (ft.)
B-2	4/26/2001	82.09	6.83	75.26
B-3	4/26/2001	82.57	8.57	74.00
B-7	4/26/2001	76.96	7.36	69.60
B-8	4/26/2001	81.82	8.63	73.19
B-9	4/26/2001	77.37	7.57	69.80
B-10	4/26/2001	81.50	7.89	73.61
GW-1	4/26/2001	79.94	dry	dry
GW-2	4/26/2001	79.14	9.73	69.41
GW-3	4/26/2001	77.92	9.99	67.93
GW-4	4/26/2001	82.37	7.78	74.59
GW-5	4/26/2001	81.01	12.58	68.43
GW-6A	4/26/2001	81.61	13.18	68.43
LFR-1	4/26/2001	79.97	9.74	70.23
LFR-2	4/26/2001	81.89	9.99	71.90
LFR-3	4/26/2001	77.96	10.34	67.62
LFR-4	4/26/2001	81.65	12.78	68.87
MW-8	4/26/2001	87.44	8.31	79.13
MW-9	4/26/2001	86.56	7.65	78.91
MW-11	4/26/2001	84.21	9.40	74.81

Table 3

Historical Groundwater Elevations at Different Wells

Former Glovatorium Site

3815 Broadway, Oakland, California

Well Name	Date Measured	Top of Casing Elevation (ft)	Depth to Water (ft.)	Groundwater Elevation (ft.)	Notes
Temporary Sampling Points Installed by Geosolv, LLC:					
B-2	**26-Apr-01**		**6.83**	**75.26**	
	29-Jan-01	82.09	7.46	74.63	
	30-Oct-00		7.75	74.34	
	9-Aug-00		8.19	73.90	P
	27-Apr-00		6.68	75.41	P
	24-Jan-00		6.16	75.93	P
	19-Jan-00	82.09	8.12	73.97	P
	18-Feb-98		4.04	78.16	1
	26-Oct-97	82.20	9.54	72.66	1
B-3	**26-Apr-01**		**8.57**	**74.00**	
	29-Jan-01	82.57	7.51	75.06	
	30-Oct-00		7.73	74.84	P
	9-Aug-00		8.02	74.55	P
	27-Apr-00		6.71	75.86	P
	24-Jan-00		6.74	75.83	
	19-Jan-00	82.57	9.35	73.22	2
	18-Feb-98		4.53	78.04	1
	26-Oct-97		8.93	73.64	1
B-7	**26-Apr-01**		**7.36**	**69.60**	
	29-Jan-01	76.96	7.85	69.11	
	30-Oct-00		7.95	69.01	
	9-Aug-00		8.35	68.61	
	27-Apr-00		7.11	69.85	P
	24-Jan-00		7.30	69.66	P
	19-Jan-00	76.96	8.36	68.60	P
	18-Feb-98		5.76	71.57	1
	26-Oct-97	77.33	9.24	68.09	1
B-8	**26-Apr-01**		**8.63**	**73.19**	
	29-Jan-01	81.82	7.59	74.23	
	30-Oct-00		8.50	73.32	
	9-Aug-00		9.02	72.80	P
	27-Apr-00		7.68	74.14	P
	24-Jan-00		8.98	72.84	P
	19-Jan-00	81.82	10.01	71.81	P
	18-Feb-98		5.42	76.64	1
	26-Oct-97	82.06	10.95	71.11	1
B-9	**26-Apr-01**		**7.57**	**69.80**	
	29-Jan-01	77.37	8.04	69.33	
	30-Oct-00		7.95	69.42	

Table 3
Historical Groundwater Elevations at Different Wells
Former Glovatorium Site
3815 Broadway, Oakland, California

Well Name	Date Measured	Top of Casing Elevation (ft)	Depth to Water (ft.)	Groundwater Elevation (ft.)	Notes
	9-Aug-00		8.55	68.82	
	27-Apr-00		7.41	69.96	
	24-Jan-00		7.12	70.25	P
	19-Jan-00	77.37	8.46	68.91	P
	18-Feb-98	77.57	6.13	71.44	1
	26-Oct-97		9.18	68.39	1
B-10	**26-Apr-01**		**7.89**	**73.61**	
	29-Jan-01	81.50	8.30	73.20	
	30-Oct-00		8.15	73.35	
	9-Aug-00		8.85	72.65	
	27-Apr-00		7.80	73.70	
	24-Jan-00		7.35	74.15	P
	19-Jan-00	81.50	8.48	73.02	P
	18-Feb-98	81.65	6.52	75.13	1
	26-Oct-97		9.39	72.26	1
B-13	30-Oct-00	81.65	DRY	DRY	
	9-Aug-00		9.35	75.23	
	27-Apr-00		8.71	75.87	
	24-Jan-00		8.26	76.32	
	19-Jan-00	84.58	10.40	74.18	
	18-Feb-98		6.61	78.51	1
	26-Oct-97	85.12	12.10	73.02	1
Temporary Sampling Points Installed by LFR:					
GW-1	**26-Apr-01**		**DRY**	**NA**	
	29-Jan-01	79.94	7.95	71.99	
	9-Aug-00		**DRY**	**DRY**	
	27-Apr-00		DRY	DRY	
	19-Jan-00		DRY	DRY	
	27-Aug-99	79.94	DRY	DRY	
GW-2	**26-Apr-01**		**9.73**	**69.41**	
	29-Jan-01	79.14	10.52	68.62	
	30-Oct-00		10.69	68.45	
	9-Aug-00		10.03	69.11	
	27-Apr-00		8.55	70.59	
	21-Jan-00		10.82	68.32	
	19-Jan-00		10.90	68.24	
	27-Aug-99	79.14	10.68	68.46	
GW-3	**26-Apr-01**		**9.99**	**67.93**	
	29-Jan-01	77.92	10.03	67.89	
	30-Oct-00		9.97	67.95	

Table 3
Historical Groundwater Elevations at Different Wells
Former Glovatorium Site
3815 Broadway, Oakland, California

Well Name	Date Measured	Top of Casing Elevation (ft)	Depth to Water (ft.)	Groundwater Elevation (ft.)	Notes
	9-Aug-00		11.38	66.54	
	27-Apr-00		9.76	68.16	
	20-Jan-00		9.99	67.93	
	19-Jan-00		10.06	67.86	
	27-Aug-99	77.92	10.26	67.66	
GW-4	**26-Apr-01**		**7.78**	**74.59**	
	29-Jan-01	82.37	7.45	74.92	
	30-Oct-00		7.82	74.55	
	9-Aug-00		DRY	DRY	
	27-Apr-00		8.40	73.97	
	21-Jan-00		8.04	74.33	
	19-Jan-00		7.66	74.71	
	27-Aug-99	82.37	NM	NM	
GW-5	**26-Apr-01**		**12.58**	**68.43**	
	29-Jan-01	81.01	12.40	68.61	
	30-Oct-00		12.37	68.64	
	9-Aug-00		12.30	68.71	
	27-Apr-00		12.31	68.70	
	20-Jan-00		12.40	68.61	
	19-Jan-00	81.01	12.40	68.61	
	27-Aug-99	81.01	12.30	68.71	
GW-6A	**26-Apr-01**		**13.18**	**68.43**	
	29-Jan-01	81.61	13.71	67.90	
	30-Oct-00		13.45	68.16	
	9-Aug-00		13.73	67.88	
	27-Apr-00		13.61	68.00	
	19-Jan-00		13.98	67.63	
	27-Aug-99		13.90	67.71	
GW-8	27-Apr-00	81.61	8.76	71.34	
	20-Jan-00		9.68	70.42	
	19-Jan-00		9.66	70.44	
	27-Aug-99	80.10	9.50	70.60	
Monitoring Wells Owned by TOSCO:					
MW-8	29-Jan-01	87.44	9.30	78.14	
	2-Nov-00		9.06	78.38	
	10-Aug-00		10.18	77.26	
	27-Apr-00	87.44	8.29	79.15	
MW-9	29-Jan-01	86.56	8.61	77.95	
	2-Nov-00		8.25	78.31	
	10-Aug-00		9.42	77.14	

Table 3

Historical Groundwater Elevations at Different Wells

Former Glovatorium Site

3815 Broadway, Oakland, California

Well Name	Date Measured	Top of Casing Elevation (ft)	Depth to Water (ft.)	Groundwater Elevation (ft.)	Notes
	27-Apr-00	86.56	9.31	77.25	
MW-11	**26-Apr-01**		**9.40**	**74.81**	
	29-Jan-01	84.21	10.42	73.79	
	30-Oct-00		10.59	73.62	
	9-Aug-00		10.09	74.12	
	27-Apr-00		8.86	75.35	
	25-Jan-00	84.21	10.73	73.48	
Monitoring Wells Installed by LFR:					
LFR-1	**26-Apr-01**		**9.74**	**70.23**	
	29-Jan-01	79.97	9.53	70.44	
	30-Oct-00		9.75	70.22	
	9-Aug-00	79.97	9.81	70.16	
LFR-2	**26-Apr-01**		**9.99**	**71.90**	
	29-Jan-01	81.89	9.85	72.04	
	30-Oct-00		10.27	71.62	
	9-Aug-00	81.89	11.90	69.99	
LFR-3	**26-Apr-01**		**10.34**	**67.62**	
	29-Jan-01	77.96	11.00	66.96	
	30-Oct-00		10.97	66.99	
	9-Aug-00	77.96	11.20	66.76	
LFR-4	**26-Apr-01**		**12.78**	**68.87**	
	29-Jan-01	81.65	13.73	67.92	
	31-Oct-00		13.51	68.14	
	9-Aug-00	81.65	13.26	68.39	

Notes:

1= Survey elevation and water-level measurement taken at concrete surface. Elevations and water levels without a "1" in Notes Column were measured from top of casing.

2= Top of the casing was re-surveyed because it was broken.

NM = not measured

P= Floating product or sheen was observed.

Table 4

Historical Analytical Results and Field Measurements for Dissolved Anions, Cations, Gases, pH, Temperature, and Electrical Conductivity in Groundwater Samples

Former Glovatorium Site

3815 Broadway, Oakland, California

(Concentrations are in milligram per liter [mg/L] unless otherwise noted)

Well ID	Date Sampled	Alkalinity	Chloride	Carbon Dioxide	Iron	Nitrite	Sulfide	Ethane	Ethene	pH Standard Unit	Temp. Celcius	Electrical Cond. (mS/cm)
B-7	8/11/2000	760	39	202				<0.0005	<0.0005	6.86	17.55	1.279
B-7 field	8/11/2000					(1)	0.049					
B-7	10/31/2000	760	42	200	14	<0.1	<2.0					
B-7 field	10/31/2000				17.22	(1)	(1)			6.16	16.05	1.454
B-7	1/31/2000	720	43	170	12	<0.1	<2.0					
B-7 field	1/31/2000									6.79	13.9	1.424
B-7 field	**Apr-26-01**				**>3.3**	**0.243**				**6.59**	**16.3**	**1.34**
B-10	8/10/2001	520	74	145	6	<0.05	<0.04	<0.0005	0.00057	6.86	16.8	1.13
B-10 field	8/10/2000					0.023	0.06					
B-10	10/31/2000	500	76	120	6.6	<0.1	<2.0					
B-10 field	10/31/2000				8.35	0.001	0.004			6.21	16.62	1.051
B-10	1/31/2001	480	81	72	6.1	<0.1	<2.0					
B-10 field	1/31/2001				1.44	0.073				6.81	14.66	1.117
B-10 field	**Jun-11-01**				**1.31**					**6.65**	**16.7**	**1.09**
GW-2	11/1/2000									6.31	18.97	1.218
GW-2	1/30/2001			63								
GW-2 field	1/31/2001									6.82	13.75	0.846
GW-2 field	**Apr-26-01**				**0.02**					**6.8**	**19.5**	**0.874**
GW-3	8/11/2000	340	25	54.3				<0.0005	<0.0005	7.05	21.43	0.86
GW-3 field	8/11/2000					0.046	(1)					
GW-3 field	11/1/2000									6.52	18.83	0.967
GW-3	2/1/2001			54								
GW-3 field	1/29/2001									6.89	17.29	0.602
GW-3 field	**Jun-11-01**				**0**	**0.7**				**5.68**	**16.2**	**0.673**
GW-4	1/30/2001									6.6	13.48	0.479
MW-11	8/10/2000	360	110	216	0.13	<0.05	<0.04	<0.0005	<0.0005	6.47	21	1.089

Table 4

Historical Analytical Results and Field Measurements for Dissolved Anions, Cations, Gases, pH, Temperature, and Electrical Conductivity in Groundwater Samples

Former Glovatorium Site

3815 Broadway, Oakland, California

(Concentrations are in milligram per liter [mg/L] unless otherwise noted)

Well ID	Date Sampled	Alkalinity	Chloride	Carbon Dioxide	Iron	Nitrite	Sulfide	Ethane	Ethene	pH Standard Unit	Temp. Celcius	Electrical Cond. (mS/cm)
MW-11field	8/10/2000					0.036	0.002					
MW-11	11/1/2000	300	120	190	<0.05	<0.1	<2.0					
MW-11field	11/1/2000				0.01	0.003	(1)			5.83	20.13	1.264
MW-11	1/31/2001	330	130	150	<0.05	<0.1	<2.0					
MW-11field	1/31/2001									6.35	13.67	1.098
MW-11 field	**Apr-26-01**				**0.01**					**5.67**	**18**	**1.21**
LFR-1	8/11/2000	250	110					<0.0005	<0.0005	6.97	19.73	0.936
LFR-1 field	8/9/2000			51.1		0.02	(1)					
LFR-1	10/30/2000	240	100	25	<0.05	<0.1	<2					
LFR-1 field/sp	10/30/2000				0.01/0.01	0.031/0.036	0.001/0.001			6.38	17.94	0.697
LFR-1-spl	10/30/2000	220	100	40	<0.05	<0.1	<2					
LFR-1	1/29/2001	150	76	28	<0.05	<0.1	<2					
LFR-1 field	1/29/2001				0	0.037				6.82	15	0.87
LFR-1 Dup	1/29/2001	150	75	26	<0.05	<0.1	<2					
LFR-1 field	**Apr-26-01**				**0.004**					**5.76**	**16.8**	**0.98**
LFR-2	8/11/2000	590	33	174				<0.0005	0.0017	6.8	19.87	1.088
LFR-2 field	8/11/2000				2.95	(1)	0.005					
LFR-2	11/2/2000	550	40	180	6.2	<0.1	<2					
LFR-2 field	11/2/2000				7.45	0.007	0.003			6.19	19.67	1.306
LFR-2	1/30/2001	480	21	130	4.6	<0.1	<2					
LFR-2 field	1/30/2001				1.04	0.007				6.6	12.73	0.945
LFR-2 field	**Apr-27-01**				**2.97**					**5.64**	**16.4**	**0.921**
LFR-3	8/10/2000	310	85	162	<0.1	0.15	0.04	<0.0005	<0.0005	6.57	19.92	0.951
LFR-3 split	8/10/2000	300	85	152				<0.0005	<0.0005			
LFR-3 field	8/10/2000					0.058	(1)					
LFR-3	11/1/2000	350	66	160	<0.05	<0.1	<2					
LFR-3 field	11/1/2000				0.01	0.011	0.002			6.16	17.71	1.164
LFR-3	1/30/2001	250	31	71	<0.05	<0.1	<2					

Table 4

Historical Analytical Results and Field Measurements for Dissolved Anions, Cations, Gases, pH, Temperature, and Electrical Conductivity in Groundwater Samples

Former Glovatorium Site

3815 Broadway, Oakland, California

(Concentrations are in milligram per liter [mg/L] unless otherwise noted)

Well ID	Date Sampled	Alkalinity	Chloride	Carbon Dioxide	Iron	Nitrite	Sulfide	Ethane	Ethene	pH Standard Unit	Temp. Celcius	Electrical Cond. (mS/cm)
LFR-3 field	1/30/2001				0.03					6.64	17.29	0.541
LFR-3 field	**Jun-11-01**				**0.01**					**5.43**	**18**	**0.613**
LFR-4	8/11/2000	630	71	161				<0.0005	<0.0005	6.9	20.11	1.24
LFR-4 field	8/11/2000				0.22	0.018	0.002					
LFR-4	10/31/2000	490	28	130	1	<0.1	<2					
LFR-4 field	10/31/2000				0.67	0.022	0			6.21	18.11	0.83
B-10 FB	8/10/2000							<0.0005	<0.0005			
LFR-4	2/1/2001	460	25	120	1.3	<0.1	<2					
LFR-4 field	2/1/2001				1.43	0.017				6.55	15.28	0.916
LFR-4 field	**Apr-27-01**				**1.44**					**5.79**	**18.3**	**1.06**

Notes

Samples with "field" in the well ID indicate that the results are from field measurements obtained using a Hach spectrometer or a Hydrolab Quanta flow-through instrument.

(1) Sample concentration was too dilute to be reproducibly measured using the Hach spectrometer.

*)Methane measured by Microseep Laboratory, Pittsburgh, PA

Table 5

Anayltical Results of Groundwater Samples Analyzed for Petroleum Hydrocarbons

Former Glovatorium Site

3815 Broadway, Oakland, California

Sample ID	Date	Stoddard Solvent C7-C12 (µg/L)	Gasoline C7-C12 (µg/L)	MtBE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	Total Xylenes (µg/L)
B-10	4/26/2001	2,400	4,700	2.5	4.1	13	ND	29
B-7	4/26/2001	4,500	8,900	6.9	11	71	77	208
GW-2	4/27/2001	ND	86	2.2	ND	24	ND	ND
GW-3	4/27/2001	ND	62	5.6	ND	ND	ND	ND
GW-4	NA	NS	NS	NS	NS	NS	NS	NS
LFR-1	4/26/2001	92	180	4.4	ND	2	ND	ND
LFR-2-2	4/26/2001	360	720	ND	0.59	1.9	ND	13
LFR-2	4/27/2001	330	660	ND	ND	1.3	ND	ND
LFR-3	4/26/2001	ND	ND	2.4	ND	5.4	ND	ND
LFR-4	4/26/2001	220	440	5.8	27	3.6	ND	ND
MW-11	4/27/2001	ND	ND	4.3	ND	2.2	ND	ND
Trip Blank	4/26/2001	ND	ND	ND	ND	ND	ND	ND

ND: Not Detected

NA: Not Analyzed

Table 6

Anayltical Results of Groundwater Samples Analyzed for V

at the Former Glovatorium Site
3815 Broadway, Oakland, California

Sample ID	Date	Tetra chloro ethene (µg/L)	trans-1,2-Dichloro ethene (µg/L)	cis-1,2-Dichloro ethene (µg/L)	Vinyl Chloride (µg/L)
B-10	4/26/2001	1,700	43	7,300	ND
B-7	4/26/2001	ND	6.9	1100	ND
GW-2	4/27/2001	9.6	ND	2.4	ND
GW-3	4/27/2001	79	ND	1.5	ND
GW-4	NA	NA	NA	NA	NA
LFR-1	4/26/2001	440	ND	5	ND
LFR-2-2	4/27/2001	0.7	ND	6.5	1.9
LFR-2	4/27/2001	0.7	ND	5.6	1.3
LFR-3	4/27/2001	1.9	ND	ND	ND
LFR-4	4/27/2001	ND	ND	1.6	ND
Trip Blank	4/26/2001	ND	ND	ND	ND
MW-11	4/27/2001	ND	ND	ND	ND
Blank	1/29/2001	ND	ND	ND	ND
Blank	1/30/2001	ND	ND	ND	ND
Blank	1/31/2001	ND	ND	ND	ND

ND: Not Detected
NA: Not Analyzed

Table 7

Historical Analytical Results for Total Petroleum Hydrocarbon, BTEX, and MtBE Analyses on Groundwater Samples

Former Glovatorium Site

3815 Broadway, Oakland, California

All results are expressed in milligram per liter (mg/L)

Location	Date Sampled	Sreened Interval Depth (ft)	TPH, Ext. Stoddard	TPH, Purgable Stoddard	TPH, Ext. Diesel	TPH, Purgable Gasoline	MtBE	Benzene	Toluene	Ethyl benzene	Xylenes
Temporary Sampling Points Installed by Geosolv, LLC:											
B-2	24-Jan-00	5 to 21	NA	20 J	NA	31 YJ	<0.05	<0.013	<0.013	0.11 C	0.22 C
B-3	24-Jan-00	5 to 18	NA	4.9 J	NA	8.8 YJ	<0.01	0.0048	<0.0025	<0.0025	0.0714
B-7	24-Jan-00	5 to 17.5	NA	19	NA	30 J	<0.05	<0.013	0.062	<0.013	0.207
B-7	11-Aug-00		NA	3.7 J	NA	6.8 YHJ	0.02	0.0077 J	0.047 J	0.007 J	0.065 CJ
B-7	31-Oct-00		NA	62 J	NA	98 YHJ	0.01 J	0.0091 J	0.061 J	<0.0005	0.237 J
B-7	Jan-31-01		NA	5.3	NA	7.9	0.01	0.0089	0.059	0.0097	0.087
B-7	**Apr-26-01**		**NA**	**4.5**	**NA**	**8.9 H**	**0.0069**	**0.011**	**0.071**	**.077 C**	**0.208**
B-8	24-Jan-00	9 to 24	NA	11 J	NA	19 YJ	<0.01	<0.0025	<0.0025	<0.0025	0.17 C
B-9	24-Jan-00	4.5 to 19.5	NA	1 YJ	NA	1.8 YHJ	<0.002	<0.0005	<0.0005	0.01 C	0.0089 C
B-10	24-Jan-00	4 to 19	NA	2.4 Y	NA	4.2	0.014 c	0.0072	0.027	0.025 C	0.032
B-10	10-Aug-00		NA	2.8 Y	NA	6.1 Y	0.16	0.0073	0.012	<0.005	0.0241
B-10	31-Oct-00		NA	2.2 YZ	NA	3.5 Z	<0.002	0.0038	0.011	<0.0005	0.0182
B-10	Jan-31-01		NA	2.4 Z	NA	3.6 HYZ	<0.002	0.0031	0.01	0.00076 c	0.0197
B-10	**Apr-26-01**		**NA**	**2.4 Z**	**NA**	**4.7 Z**	**0.0025**	**0.0041**	**0.013**	**ND**	**0.029**
B-13	24-Jan-00	5 to 20	NA	1.7 J	NA	3 YJ	<0.01	<0.0025	<0.0025	<0.0025	0.02
Temporary Sampling Points Installed by LFR:											
GW-2	19-Jul-99	10 to 20	NA	<0.05	NA	<0.05	0.0025	<0.0005	0.00071	<0.0005	0.00074
GW-2	20-Jan-00		NA	0.15	NA	0.25 Y	0.0044	<0.0005	<0.0005	0.00097 C	0.0013
GW-2	28-Apr-00		NA	<0.05	NA	0.095 YZ	<0.0021	<0.0005	<0.0005	<0.0005	<0.0005
GW-2	2-Nov-00		NA	<0.05	NA	<0.05	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
GW-2	1-Feb-01		NA	<0.05	NA	ND	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
GW-2	**Apr-27-01**		**NA**	**<0.05**	**NA**	**0.086 YZ**	**0.0022**	**<0.0005**	**0.024**	**<0.0005**	**<0.0005**
GW-3	19-Jul-99	10 to 20	NA	0.07 Z	NA	0.1 Z	<0.002	<0.0005	<0.0005	<0.0005	0.00064
GW-3	20-Jan-00		NA	0.15	NA	0.26 Y	<0.002	<0.0005	<0.0005	<0.0005	0.0013 C

Table 7

Historical Analytical Results for Total Petroleum Hydrocarbon, BTEX, and MtBE Analyses on Groundwater Samples

Former Glovatorium Site

3815 Broadway, Oakland, California

All results are expressed in milligram per liter (mg/L)

Location	Date Sampled	Sreened Interval Depth (ft)	TPH, Ext. Stoddard	TPH, Purgable Stoddard	TPH, Ext. Diesel	TPH, Purgable Gasoline	MtBE	Benzene	Toluene	Ethyl benzene	Xylenes
GW-3	27-Apr-00		NA	0.2 YZ	NA	0.38 YZ	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
Split	27-Apr-00	10 to 20	NA	0.3 Z	NA	0.57 YZ	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
GW-3	11-Aug-00		NA	<0.05	NA	0.077 YZ	<0.002	<0.0005	<0.0005	<0.0005	0.00051
GW-3	2-Nov-00		NA	<0.05	NA	0.05 YZ	0.0026	<0.0005	<0.0005	<0.0005	<0.0005
GW-3	1-Feb-01		NA	<.05	NA	<0.05	<.002	<.0005	<.0005	<.0005	<.0005
GW-3	**27-Apr-01**		**NA**	**<.05**	**NA**	**0.062 YZ**	**0.0056**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**
GW-4	21-Jul-99	7 to 12	NA	6.8 J	NA	10 YHJ	0.0022	<0.0005	<0.0005	<0.0005	0.0029 J
GW-4	20-Jan-00		NA	0.97 J	NA	1.6 YJ	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Split	20-Jan-00		NA	0.85 J	NA	1.5 YJ	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
GW-4	27-Apr-00		NA	0.31	NA	0.6 Y	<0.002	<0.0005	<0.0005	<0.0005	0.0027
GW-4	Jan-30-01		NA	0.39	NA	0.58 HY	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
GW-5	27-Aug-99	8 to 13	NA	<0.05	NA	<0.05	<0.001	<0.001	<0.001	<0.001	<0.001
GW-5	20-Jan-00		NA	<0.05	NA	0.057 Y	0.0007	<0.0005	<0.0005	<0.0005	<0.0005
GW-5	27-Apr-00		NA	0.05 Y	NA	0.096 Y	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
GW-6A	27-Aug-99	5 to 15	NA	<0.05	NA	0.054 Y	0.0089	<0.0005	<0.0005	<0.0005	<0.0005
Split	27-Aug-99		NA	<0.05	NA	0.057 Y	0.0087	<0.0005	<0.0005	<0.0005	<0.0005
GW-6A	25-Jan-00		NA	<0.05	NA	<0.05	0.0022	<0.0005	<0.0005	<0.0005	<0.0005
GW-6A	27-Apr-00		NA	<0.05	NA	0.087 Y	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
GW-7	15-Jul-99	10 to 20	0.697 BJ	NA	1.79 AJ	NA	<0.0025	0.05 J	<0.0005	0.000727	0.00313 J
Split	15-Jul-99		1.42 BJ	NA	3.1 AJ	NA	NA	NA	NA	NA	NA
GW-7	15-Jul-99		NA	NA	NA	NA	NA	0.0567 J	<0.002	<0.002	<0.002
Split	15-Jul-99		NA	NA	NA	NA	NA	0.0755 J	<0.002	<0.002	<0.002
GW-8	19-Jul-99	10 to 20	NA	<0.05	NA	<0.05	0.0078	<0.0005	0.00064	<0.0005	0.00151
GW-8	20-Jan-00		NA	0.19	NA	0.33 Y	<0.002	<0.0005	<0.0005	<0.0005	<0.0005

Table 7

Historical Analytical Results for Total Petroleum Hydrocarbon, BTEX, and MtBE Analyses on Groundwater Samples

Former Glovatorium Site

3815 Broadway, Oakland, California

All results are expressed in milligram per liter (mg/L)

Location	Date Sampled	Sreened Interval Depth (ft)	TPH, Ext. Stoddard	TPH, Purgable Stoddard	TPH, Ext. Diesel	TPH, Purgable Gasoline	MtBE	Benzene	Toluene	Ethyl benzene	Xylenes
Split	20-Jan-00	10 to 20	NA	0.2	NA	0.37 Y	<0.002	0.00058	<0.0005	<0.0005	<0.0005
GW-8	28-Apr-00		NA	0.064 YZ	NA	0.12 YZ	0.013	<0.0005	<0.0005	<0.0005	<0.0005
Monitoring Wells Owned by TOSCO:											
MW-11	25-Jan-00	Unknown	NA	<0.05	NA	<0.05	0.009	<0.0005	<0.0005	<0.0005	<0.0005
MW-11	28-Apr-00		NA	<0.05	NA	<0.05	<0.0087	<0.0005	<0.0005	<0.0005	<0.0005
MW-11	10-Aug-00		NA	<0.05	NA	<0.05	0.011	<0.0005	<0.0005	<0.0005	<0.0005
MW-11	1-Nov-00		NA	<0.05	NA	<0.05	0.0068	<0.0005	<0.0005	<0.0005	<0.0005
MW-11	31-Jan-01		NA	<.05	NA	<.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-11	**Apr-27-01**		**NA**	**<0.05**	**NA**	**<0.05**	**0.0043**	**<0.0005**	**0.0022**	**<0.0005**	**<0.0005**
Monitoring Wells Installed by LFR:											
LFR-1	9-Aug-00	9 to 19	NA	0.53	NA	1.2	0.0095	<0.0005	<0.0005	<0.0005	<0.0005
LFR-1	30-Oct-00		NA	0.24 YZ	NA	0.37 YZ	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
LFR-1	29-Jan-01		NA	0.21 YZ	NA	0.31 YZ	0.0033	<0.0005	<0.0005	<0.0005	<0.0005
LFR-1	**Apr-26-01**		**NA**	**0.092**	**NA**	**0.18 YZ**	**0.0044**	**<0.0005**	**0.002**	**<0.0005**	**<0.0005**
Split	30-Oct-00		NA	0.24 YZ	NA	0.37 YZ	0.0043	<0.0005	<0.0005	<0.0005	<0.0005
LFR-2	11-Aug-00	9 to 19	NA	0.59	NA	1.1 YH	0.0022	0.0018	<0.0005	<0.0005	0.0013 C
LFR-2	2-Nov-00		NA	0.38	NA	0.7 YH	0.003	0.0035	0.0011	0.0042	0.01184 C
LFR-2	30-Jan-01		NA	0.36	NA	0.54 HY	0.0034	0.00057	<0.0005	<0.0005	<0.0005
LFR-2	**Apr-27-01**		**NA**	**0.33**	**NA**	**0.66 HY**	**<0.002**	**<0.0005**	**0.0013**	**<0.0005**	**<0.0005**
LFR-2-2	**Apr-27-01**		**NA**	**0.36**	**NA**	**0.72 HY**	**<0.002**	**0.00059**	**0.0019**	**<0.0005**	**0.013**
LFR-3	10-Aug-00	12 to 22	NA	<0.05	NA	<0.05	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
Split	10-Aug-00		NA	<0.05	NA	<0.05	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
LFR-3	1-Nov-00		NA	<0.05	NA	<0.05	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
LFR-3	30-Jan-01		NA	<.05	NA	<.05	0.0036	<0.0005	<0.0005	<0.0005	<0.0005

Table 7

Historical Analytical Results for Total Petroleum Hydrocarbon, BTEX, and MtBE Analyses on Groundwater Samples

Former Glovatorium Site

3815 Broadway, Oakland, California

All results are expressed in milligram per liter (mg/L)

Location	Date Sampled	Sreened Interval Depth (ft)	TPH, Ext. Stoddard	TPH, Purgable Stoddard	TPH, Ext. Diesel	TPH, Purgable Gasoline	MtBE	Benzene	Toluene	Ethyl benzene	Xylenes
LFR-3	**Apr-27-01**		**NA**	**<0.05**	**NA**	**<0.05**	**0.0024**	**<0.0005**	**0.0054**	**<0.0005**	**<0.0005**
LFR-4	11-Aug-00	9 to 19	NA	0.22 Y	NA	0.41 Y	0.0051	0.011	<0.0005	<0.0005	0.00162 C
LFR-4	31-Oct-00		NA	0.17 Y	NA	0.27	0.0065	0.00084	<0.0005	<0.0005	<0.0005
LFR-4	1-Feb-01		NA	0.16Y	NA	0.22	0.0097	0.0033	<0.0005	<0.0005	<0.0005
LFR-4	**Apr-27-01**		**NA**	**0.22 Y**	**NA**	**0.44**	**0.0058**	**0.027**	**0.0036**	**<0.0005**	**<0.0005**
Blanks											
Trip Blank	1-Feb-01		NA	<.05	NA	<.05	0.0051	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	31-Jan-01		NA	<.05	NA	<.05	0.0033	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	29-Jan-01		NA	<.05	NA	<.05	0.0025	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	30-Jan-01		NA	<.05	NA	<.05	0.0038	<0.0005	<0.0005	<0.0005	<0.0005
Field Blank	1-Feb-01		NA	NA	NA	NA	<.002	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	**Apr-26-01**		**NA**	**<0.05**	**NA**	**<0.05**	**<.002**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**
Trip Blank	19-Jul-99		NA	<0.05	NA	<0.05	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	20-Jan-00		NA	<0.05	NA	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	27-Apr-00		NA	<0.05	NA	<0.05	0.0024	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	30-Oct-00		NA	NA	NA	NA	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	31-Oct-00		NA	NA	NA	NA	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	1-Nov-00		NA	NA	NA	NA	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
Trip Blank	2-Nov-00		NA	NA	NA	NA	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
Field Blank	27-Apr-00		NA	<0.05	NA	<0.05	<0.002	<0.0005	0.00054	<0.0005	<0.0005
Field Blank	10-Aug-00		NA	<0.05	NA	<0.05	<0.002	<0.0005	<0.0005	<0.0005	<0.0005
Field Blank	1-Nov-00		NA	NA	NA	NA	<0.002	<0.0005	<0.0005	<0.0005	<0.0005

Notes:

Table 7

Historical Analytical Results for Total Petroleum Hydrocarbon, BTEX, and MtBE Analyses on Groundwater Samples

Former Glovatorium Site

3815 Broadway, Oakland, California

All results are expressed in milligram per liter (mg/L)

Location	Date Sampled	Sreened Interval Depth (ft)	TPH, Ext. Stoddard	TPH, Purgable Stoddard	TPH, Ext. Diesel	TPH, Purgable Gasoline	MtBE	Benzene	Toluene	Ethyl benzene	Xylenes

A = Chromatogram pattern: unidentified hydrocarbons C9-C24

B = Chromatogram pattern: unidentified hydrocarbons C9-C13

C = Presence of this compound confirmed by second column, however, the confirmation concentration different from reported results by more than a factor of two.

J = Result is estimated.

Y = Sample exhibits fuel pattern which does not resemble standard.

H = Heavier hydrocarbons than the standard are present in the sample.

Z = Sample exhibits unknown single peak or peaks.

NA = Not analyzed

TPH, ext. = Total petroleum hydrocarbons (extractable)

TPH, purge = Total petroleum hydrocarbons (purgeable)

Groundwater samples collected from the temporary sampling points are considered grab samples, therefore, the results should be considered estimates of groundwater quality.

Table 8

Historical Analytical Results For Volatile Organic Compound (VOC) Analyses on Groundwater Samples

at the Former Glovatorium Site

3815 Broadway, Oakland, California

All results expressed in milligrams per liter (mg/L)

Location	Date Sampled	Screened Interval (ft-bgs)	Acetone	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,2-Dichloro-propane	Notes
Temporary Sampling Points Installed by Geosolv, LLC:										
B-2	24-Jan-00	5 to 21	NA	<0.0013	<0.0013	0.27	0.0014	< 0.0013	< 0.0013	
B-3	24-Jan-00	5 to 18	NA	< 0.002	< 0.002	0.61	< 0.002	< 0.002	< 0.002	
B-7	24-Jan-00	5 to 17.5	NA	< 0.0036	< 0.0036	0.92	0.0043	< 0.0036	< 0.0036	
B-7	11-Aug-00		NA	< 0.0031	< 0.0031	0.86	0.0048	< 0.0031	< 0.0031	
B-7	31-Oct-00		NA	< 0.0042	< 0.0042	0.91	0.0042	< 0.0042	< 0.0042	
B-7	31-Jan-01		NA	< 0.0042	< 0.0042	0.92	0.0048	< 0.0042	< 0.0042	
B-7	**Apr-27-01**		**NA**	**<0.0031**	**<0.0031**	**1.1**	**0.0069**	**<0.0031**	**<0.0031**	
B-8	24-Jan-00	9 to 24	NA	< 0.0005	< 0.0005	0.035	< 0.0005	< 0.0005	< 0.0005	
B-9	24-Jan-00	4.5 to 19.5	NA	< 0.0005	0.0006	0.0032	< 0.0005	< 0.0005	< 0.0005	
B-10	24-Jan-00	4 to 19	NA	1.2	2.4	14	0.09	< 0.063	< 0.063	
B-10	10-Aug-00		NA	2.9	1.6	6.5	0.05	< 0.025	< 0.025	
B-10	31-Oct-00		NA	2.4	1.9	7.1	0.061	< 0.025	< 0.025	
B-10	31-Jan-01		NA	2.1	1.6	6.6	0.044	< 0.025	< 0.025	
B-10	**Apr-27-01**		**NA**	**1.7**	**1.4**	**7.3**	**0.043**	**<0.025**	**<0.025**	
B-13	24-Jan-00	5 to 20	NA	0.02	0.029	0.13	0.0049	< 0.0005	< 0.0005	
Temporary Sampling Points Installed by LFR:										
GW-2	19-Jul-99	10 to 20	NA	0.014	0.0014	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
GW-2	20-Jan-00		NA	0.13	0.019	0.0055	< 0.0005	< 0.0005	< 0.0005	
GW-2	28-Apr-00		NA	0.12	0.016	0.0033	< 0.0005	< 0.0005	< 0.0005	
GW-2	2-Nov-00		NA	0.0078	0.0008	0.0032	< 0.0005	< 0.0005	< 0.0005	
GW-2	1-Feb-01		NA	0.0077	0.0006	0.0028	< 0.0005	< 0.0005	< 0.0005	
GW-2	**Apr-27-01**		**NA**	**0.0096**	**0.0018**	**0.0024**	**<0.0005**	**<0.0005**	**<0.0005**	
GW-3	19-Jul-99	10 to 20	NA	0.22	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	
GW-3	20-Jan-00	10 to 20	NA	0.055	0.001	0.02	< 0.0005	< 0.0005	< 0.0005	
GW-3	27-Apr-00		NA	0.35	0.0023	0.0056	< 0.0005	< 0.0005	< 0.0005	
Split	27-Apr-00		NA	0.27	0.0015	0.0023	< 0.0013	< 0.0013	< 0.0013	

Table 8

Historical Analytical Results For Volatile Organic Compound (VOC) Analyses on Groundwater Samples

at the Former Glovatorium Site

3815 Broadway, Oakland, California

All results expressed in milligrams per liter (mg/L)

Location	Date Sampled	Screened Interval (ft-bgs)	Acetone	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,2-Dichloro-propane	Notes
GW-3	11-Aug-00		NA	0.068	0.0028	0.012	< 0.0005	< 0.0005	< 0.0005	
GW-3	2-Nov-00		NA	0.059	0.0008	0.0024	< 0.0005	< 0.0005	< 0.0005	
GW-3	1-Feb-01		NA	0.046	0.0006	0.0011	< 0.0005	< 0.0005	< 0.0005	
GW-3	**Apr-27-01**		**NA**	**0.079**	**0.0007**	**0.0015**	**<0.0005**	**<0.0005**	**<0.0005**	
GW-4	19-Jul-99	7 to 12	NA	< 0.0005	< 0.0005	0.0035	< 0.0005	< 0.0005	0.0017	
GW-4	20-Jan-00		< 0.01	0.0008	< 0.0005	0.0036	< 0.0005	< 0.0005	0.0015	(1)
Split	20-Jan-00		< 0.01	0.0006	< 0.0005	0.0044	< 0.0005	< 0.0005	0.0021	(2)
GW-4	27-Apr-00		NA	0.0017	< 0.0005	0.001	< 0.0005	< 0.0005	0.0006	
GW-4	30-Jan-01		NA	< 0.0005	< 0.0005	0.0024	< 0.0005	< 0.0005	0.0014	
GW-5	27-Aug-99	8 to 13	0.24	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
GW-5	20-Jan-00		< 0.01	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
GW-5	27-Apr-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
GW-6A	27-Aug-99	5 to 15	0.19	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Split	27-Aug-99		0.11	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
GW-6A	25-Jan-00		< 0.01	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
GW-6A	27-Apr-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
GW-7	15-Jul-99	10 to 20	NA	< 0.0005	< 0.0005	0.00358	< 0.0005	< 0.0005	0.000632	
GW-7	15-Jul-99		NA	< 0.002	< 0.002	0.00398	< 0.002	< 0.002	< 0.002	(3)
Split	15-Jul-99	10 to 20	NA	< 0.002	< 0.002	0.00383	< 0.002	< 0.002	< 0.002	(4)
GW-8	19-Jul-99	10 to 20	NA	0.024	0.015	0.0038	0.0017	0.0012	< 0.0005	
GW-8	20-Jan-00		NA	0.15	0.19	0.053	0.012	0.0045	< 0.0007	
Split	20-Jan-00		NA	0.15	0.18	0.052	0.011	0.0046	< 0.0005	
GW-8	28-Apr-00		NA	0.12	0.11	0.029	0.0053	0.0023	< 0.0005	
Monitoring wells owned by TOSCO:										
MW-11	25-Jan-00	Unknown	< 0.01	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
MW-11	28-Apr-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	(5)
MW-11	10-Aug-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	

Table 8

Historical Analytical Results For Volatile Organic Compound (VOC) Analyses on Groundwater Samples

at the Former Glovatorium Site

3815 Broadway, Oakland, California

All results expressed in milligrams per liter (mg/L)

Location	Date Sampled	Screened Interval (ft-bgs)	Acetone	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,2-Dichloro-propane	Notes
MW-11	1-Nov-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
MW-11	31-Jan-01		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
MW-11	**Apr-27-01**		**NA**	**< 0.0005**	**< 0.0005**	**< 0.0005**	**< 0.0005**	**< 0.0005**	**< 0.0005**	
Monitoring wells installed by LFR:										
LFR-1	9-Aug-00	9 to 19	NA	2.8	0.064	0.041	< 0.0083	< 0.0083	< 0.0083	
LFR-1	30-Oct-00		NA	0.82	0.034	0.01	< 0.0031	< 0.0031	< 0.0031	
Split	30-Oct-00		NA	0.87	0.035	0.014	< 0.0031	< 0.0031	< 0.0031	
LFR-1	29-Jan-01		NA	0.77	0.026	0.0073	<0.0025	<0.0025	<0.0025	
LFR-1	**Apr-26-01**		**NA**	**0.44**	**0.013**	**0.005**	**<0.0013**	**<0.0013**	**<0.0013**	
LFR-2	11-Aug-00	9 to 19	NA	< 0.0005	< 0.0005	0.035	< 0.0005	0.0045	< 0.0005	
LFR-2	2-Nov-00		NA	< 0.0005	< 0.0005	0.13	0.001	0.015	0.0006	
LFR-2	29-Jan-01		NA	<0.0005	<0.0005	0.0056	<0.0005	0.0016	<0.0005	
LFR-2	**Apr-27-01**		**NA**	**0.0007**	**<0.0005**	**0.0056**	**<0.0005**	**0.0013**	**<0.0005**	
LFR-2-2	**Apr-27-01**		**NA**	**0.0007**	**<0.0005**	**0.0065**	**<0.0005**	**0.0019**	**<0.0005**	
LFR-3	10-Aug-00	12 to 22	NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Split	10-Aug-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
LFR-3	1-Nov-00	12 to 22	NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
LFR-3	30-Jan-01		NA	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
LFR-3	**Apr-27-01**		**NA**	**0.0019**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	
LFR-4	11-Aug-00	9 to 19	NA	< 0.0005	< 0.0005	0.0012	< 0.0005	< 0.0005	< 0.0005	
LFR-4	31-Oct-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
LFR-4	30-Jan-01		NA	<0.0005	<0.0005	0.0006	<0.0005	< 0.0005	< 0.0005	
LFR-4	**Apr-27-01**		**NA**	**<0.0005**	**<0.0005**	**0.0016**	**<0.0005**	**<0.0005**	**<0.0005**	
Blanks										
Trip Blank	19-Jul-99		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Trip Blank	20-Jan-00		< 0.01	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Trip Blank	27-Apr-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	

Table 8

Historical Analytical Results For Volatile Organic Compound (VOC) Analyses on Groundwater Samples

at the Former Glovatorium Site

3815 Broadway, Oakland, California

All results expressed in milligrams per liter (mg/L)

Location	Date Sampled	Screened Interval (ft-bgs)	Acetone	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,2-Dichloro-propane	Notes
Trip Blank	10-Aug-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Trip Blank	30-Oct-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Trip Blank	31-Oct-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Trip Blank	1-Nov-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Trip Blank	2-Nov-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Field Blank	27-Apr-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Field Blank	10-Aug-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	(6)
Field Blank	1-Nov-00		NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Trip Blank	30-Jan-01		NA	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Trip Blank	29-Jan-01		NA	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Trip Blank	31-Jan-01		NA	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Trip Blank	1-Feb-01		NA	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Trip Blank	**Apr-26-01**		**NA**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	

Notes:

(1) = 1,2,4- Trimethylbenzene was detected at 0.0034 mg/L; 1,3,5-trimethylbenzene was detected at 0.0009 mg/L; isopropylbenzene was detected at 0.0055 mg/L; n-butylbenzene was detected at 0.0041 mg/L; para-isopropyl toluene was detected at 0.0009 mg/L; propylbenzene was detected at 0.0094 mg/L; sec-butylbenzene was detected at 0.017 mg/L; tert-butylbenzene was detected at 0.0027 mg/L; 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, para-isopropyl toluene, and n-butylbenzene results are estimated due to FD RPD > 50%.

(2) = 1,2,4-Trimethylbenzene was detected at 0.0083 mg/L; 1,3,5-trimethylbenzene was detected at 0.0022 mg/L; isopropylbenzene was detected at 0.0078 mg/L; n-butylbenzene was detected at 0.0067 mg/L; para-isopropyl toluene was detected at 0.0021 mg/L; propylbenzene was detected at 0.014 mg/L; sec-butylbenzene was detected at 0.024 mg/L; tert-butylbenzene was detected at 0.0034 mg/L; 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, para-isopropyl toluene, and n-butylbenzene results are estimated due to FD RPD > 50%.

(3) = tert-Butylbenzene was detected at 0.00307 mg/L. Results are estimated because EPA-recommended hold time was exceeded.

Table 8

Historical Analytical Results For Volatile Organic Compound (VOC) Analyses on Groundwater Samples

at the Former Glovatorium Site

3815 Broadway, Oakland, California

All results expressed in milligrams per liter (mg/L)

Location	Date Sampled	Screened Interval (ft-bgs)	Acetone	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,2-Dichloro-propane	Notes

(4) = sec-Butylbenzene was detected at 0.00206 mg/L; tert-butylbenzene was detected at 0.0031 mg/L; carbon tetrachloride was detected at 0.00786 mg/L. Results are estimated because EPA-recommended hold time was exceeded.

(5) = 1,3-Dichlorobenzene was detected at 0.0005 mg/L.

(6) = Chloroform was detected at 0.0088 mg/L.

ft bgs = Feet below ground surface

NA = Not analyzed

mg/L = milligrams per liter

cis-1,2-DCE = cis-1,2-dichloroethene

trans-1,2-DCE = trans-1,2-dichloroethene

PCE = Tetrachloroethene

TCE = Trichloroethene

Groundwater samples collected from the temporary sampling points are considered grab sample; therefore the results should be considered estimates of groundwater quality.

Table 9
Historical In-Situ and Ex-Situ Analyses Results for Bioattenuation Parameters on Groundwater Samples at the Former Glovatorium Site 3815 Broadway, Oakland, California

(concentrations in milligrams per liter [mg/L] unless otherwise noted)

Well ID	Date Sampled	Dissolved Oxygen	Manganese (dissolved)	Nitrate	Sulfate	Ferrous Iron (Fe + 2)	Methane*	ORP (milliVolts)	Hydrogen (nano-Moles)
B-7	11-Aug-00						11	193	
B-7-field	11-Aug-00	0.63		(1)	3				
B-7	31-Oct-00	0.62	2.6	< 0.10	< 1.0	11	2.4		(3)
B-7-field	31-Oct-00	0.25		0.4	(1)	15.85		-62.5	
B-7	1-Feb-01	0.78	2.2	0.78	<1.0	15	13		
B-7-field	31-Jan-01	0.48						28	
B-7 Field	**Apr-26-01**	**0.6**	**1.7**	**2.5**	**5**	**>3.3**	**7.6**	**-28**	
B-8 field	31-Jan-01	0.45						58	
B-10	10-Aug-00			< 0.05	< 0.05	5.7	10	213	
B-10-field	10-Aug-00	0.44		(1)	(2)				
B-10	31-Oct-00	2.4	1.4	< 0.10	< 1.0	5.9	6.7		0.81
B-10-field	31-Oct-00	0.44		0	0	7.6		-22.2	
B-10	31-Jan-01	6.4	1.3	< 0.10	<2.0	7.7	24		1.3
B-10-field	31-Jan-01	0.46						64	
B-10 Field	**Jun-11-01**	**0.9**	**0**	**0**	**0**	**1.25**	**3.9**	**-8**	**NM**
GW-2-field	1-Nov-00	2.32						77	
GW-2	1-Feb-01	3.8					0.041		
GW-2-field	1-Feb-01	0.58						159	
GW-2	**Apr-26-01**	**4**	**1**	**7.1**	**36**	**0.015**	**0.00022**	**152**	**NM**
GW-3	11-Aug-00						< 0.0005	395	
GW-3-field	11-Aug-00	0.72		1	46				
GW-3	1-Nov-00								
GW-3-field		7.76						81	
GW-3	29-Jan-01	8.8					0.012		
GW-3-field	1-Feb-01	8.99						235	

Table 9

Historical In-Situ and Ex-Situ Analyses Results for Bioattenuation Parameters on Groundwater Samples at the Former Glovatorium Site 3815 Broadway, Oakland, California

(concentrations in milligrams per liter [mg/L] unless otherwise noted)

Well ID	Date Sampled	Dissolved Oxygen	Manganese (dissolved)	Nitrate	Sulfate	Ferrous Iron (Fe + 2)	Methane*	ORP (milliVolts)	Hydrogen (nano-Moles)
GW-3	**Apr-27-01**	**2.9**	**0**	**0.7**	**30**	**0**	**0.015**	**212**	**NM**
GW-4-field	30-Jan-01	0.83						67	
MW-11	10-Aug-00			2.8	63	< 0.1	< 0.0005	476	
MW-11-field	10-Aug-00	2.52		4.1	67				
MW-11	1-Nov-00	4.1	< 0.010	15	90	< 0.1	0.00004		130
MW-11-field	1-Nov-00	4.01		3.3	73	0		87.4	
MW-11	31-Jan-01	6.3	< 0.010	15	94	< 1.0	0.00005		1.1
MW-11-field	1-Nov-00	3.97		27.3	74	0		319	
MW-11 Field	**Apr-26-01**	**7.4**	**0**	**6.8**	**52**	**0**	**0.0014**	**229**	**NM**
LFR-1	9-Aug-00							462	
	11-Aug-00						0.0096		
LFR-1-field	9-Aug-00	3.63		5.5	30				1.5
LFR-1	30-Oct-00	2.7	0.03	39	42	< 1.0	0.00038		
LFR-1-field/split	30-Oct-00	2.95		10.3/10.0	29/29	0.01/0.01		77.4	1
LFR-1 split	30-Oct-00	3.4	0.03	40	43	< 1.0	0.00069		
LFR-1	29-Jan-01	5.1	<0.01	<0.10	51	<1.0	0.00012		0.43
LFR-1-field	29-Jan-01	3.78	0		36	0		383	
LFR-1 Dup	29-Jan-01	4.6	<0.01	<0.10	50	<1.0	0.000011		0.32
LFR-1	**Apr-26-01**	**3.2**	**0.02**	**12.9**	**16**	**0**	**0.0003**	**224**	**NM**
LFR-2	11-Aug-00						6.6	270	
LFR-2-field	11-Aug-00	0.48		1.5	(1)	2.7			1200
LFR-2	2-Nov-00	2.2	8.8	0.33	5.4	5.3	8.5		
LFR-2-field	2-Nov-00	0.47		0.5	(1)	6.05		-23.7	
LFR-2	30-Jan-01	4.4	8.9	1	8.3	4.6	4.6		1.1
LFR-2-field	30-Jan-01	0.61	10.7	2.9		1.02		210	

Table 9

Historical In-Situ and Ex-Situ Analyses Results for Bioattenuation Parameters on Groundwater Samples at the Former Glovatorium Site 3815 Broadway, Oakland, California

(concentrations in milligrams per liter [mg/L] unless otherwise noted)

Well ID	Date Sampled	Dissolved Oxygen	Manganese (dissolved)	Nitrate	Sulfate	Ferrous Iron (Fe + 2)	Methane*	ORP (milliVolts)	Hydrogen (nano-Moles)
LFR-2	**Apr-27-01**	**1.4**	**0.4**	**1.6**	**1**	**2.66**	**14**	**9**	**NM**
LFR-3	10-Aug-00			2.4	64	< 0.1	0.00051	464	
LFR-3 split	10-Aug-00							< 0.0005	
LFR-3-field	10-Aug-00	1.3		2.4	64				850
LFR-3	1-Nov-00	4.7	0.022	8.8	74	< 1.0	0.00028		
LFR-3-field	1-Nov-00	0.58		1.8	57	0		75.2	
LFR-3	31-Jan-01	4.1	<0.01	1.2	58	< 1.0	0.00038		
LFR-3-field	30-Jan-01	1.75		0.023	44	0		195	
LFR-3 Field	**Jun-11-01**	**1**	**0**	**0.8**	**28**	**0**	**0.0086**	**201**	**NM**
LFR-4	11-Aug-00						0.062	402	
LFR-4-field	11-Aug-00	1.13		0.7	1	0.14			1.1
LFR-4	31-Oct-00	1.9	2.2	< 0.10	2.9	1.1	3.2		
LFR-4-field	31-Oct-00	0.64		1		0.61		-80	
LFR-4	1-Feb-01	3.2	2.8	1.5	2.8	1.8	2.2		1.5
LFR-4-field	1-Feb-01	0.55	4.5	8	0	1.5		59	
LFR-4 Field	**Apr-27-01**	**5.6**	**0**	**1.7**	**0**	**1.37**	**7**	**14**	**NM**

Notes:

Samples with "field" in the well number indicate that the results are from field measurements obtained using a Hach spectrophotometer or a Hydrolab Quanta flow-through instrument.

(1) Sample concentration was too dilute to be reproducibly measured using the Hach spectrophotometer.
(2) Field measurement was not recorded.

Table-10
Cation and Anion Composition at Two Different Wells
Former Glovatorium Site
3815 Broadway, Oakland, California

Well Name	Anions			Cations			
	Chloride mg/l	Sulfate mg/l	Bicarbonate mg/l	Calcium mg/l	Magnesium mg/l	Potassium mg/l	Sodium mg/l
B-10	74	0	410	43	56	0	110
LFR-1	120	36	120	47	45	1.8	46

FIGURES

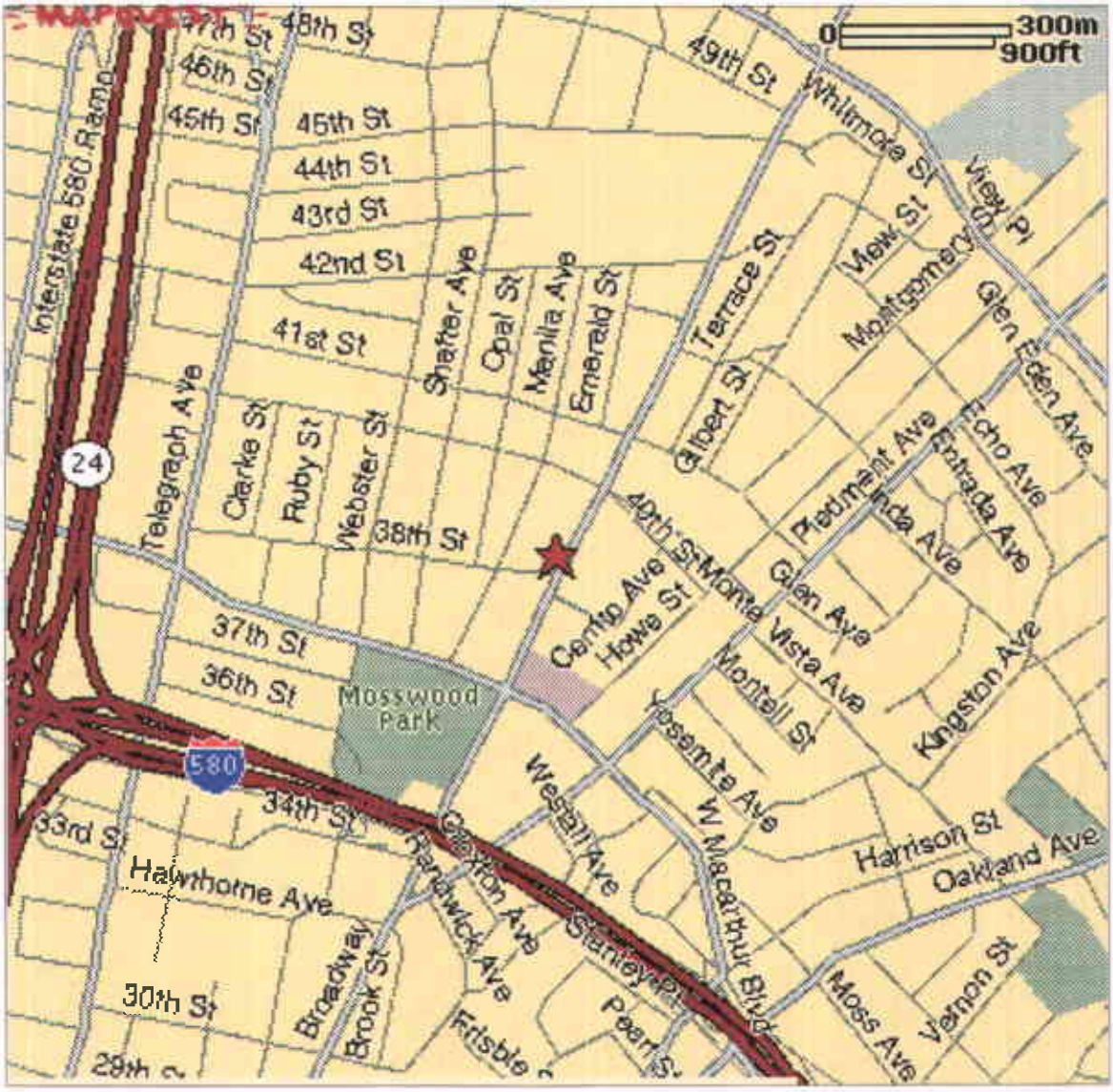


Figure 1: Site Location Map

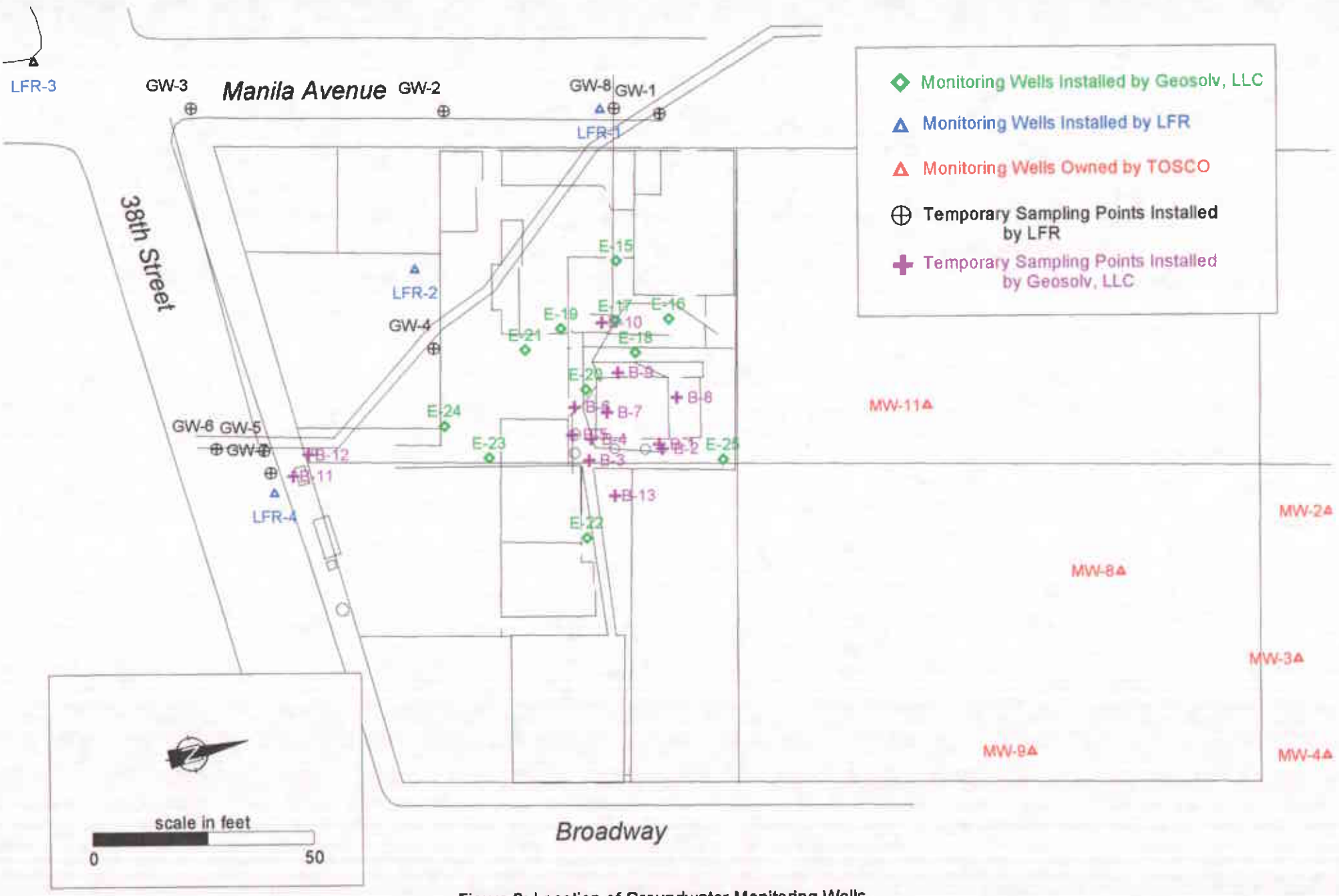


Figure 2: Location of Groundwater Monitoring Wells

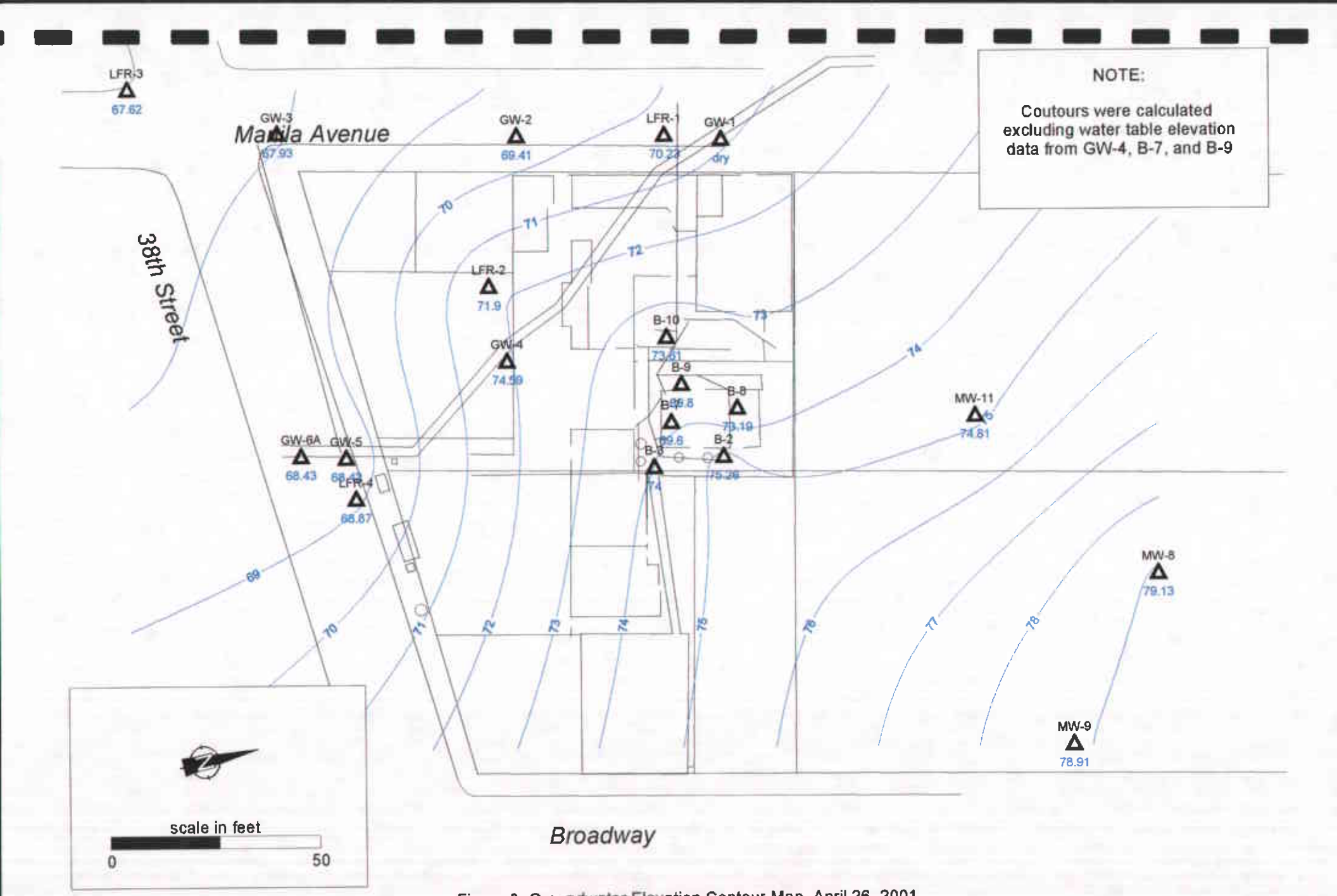


Figure 3: Groundwater Elevation Contour Map, April 26, 2001

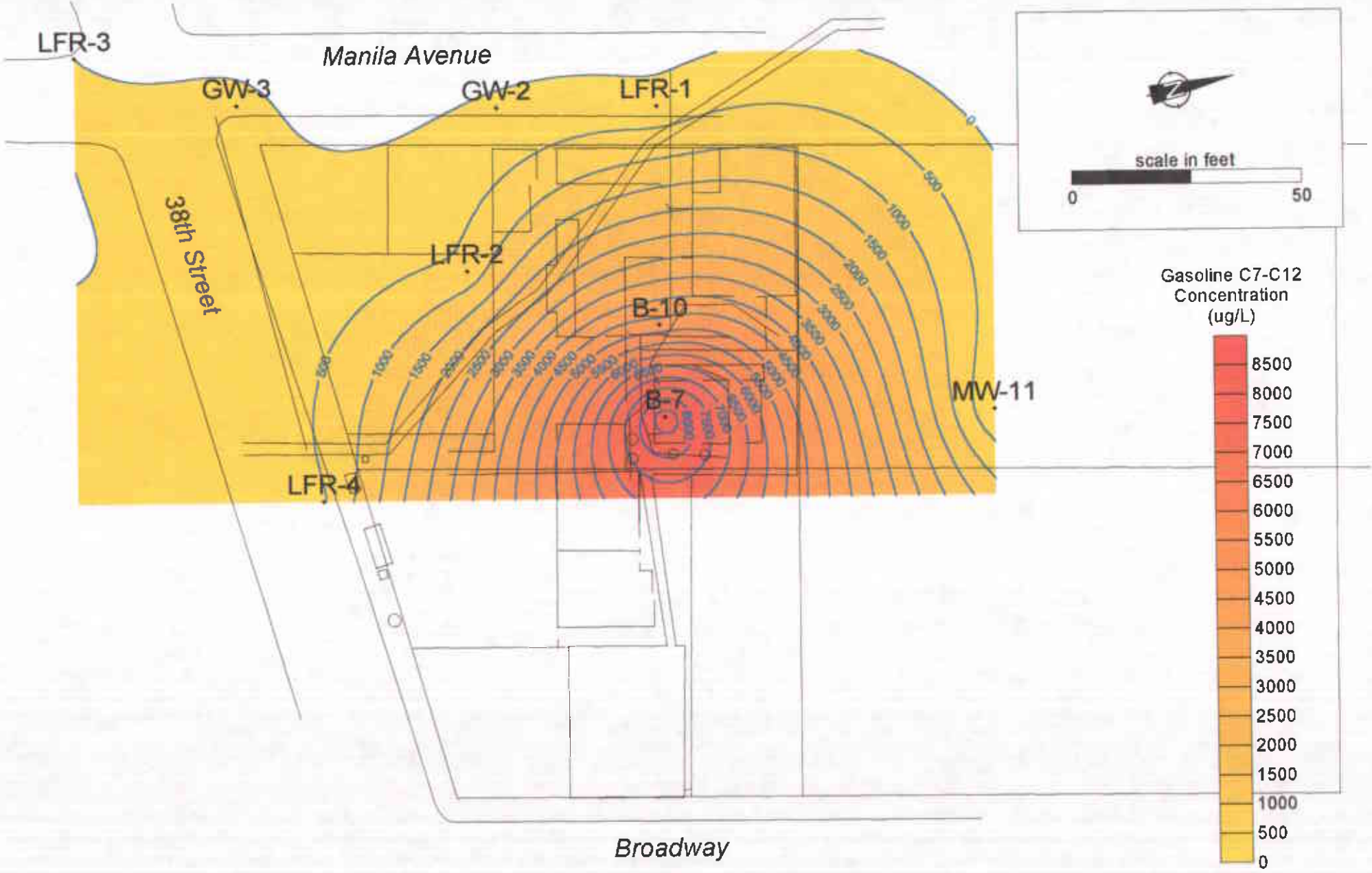


Figure 4: TPH-g Concentration Contour Map in Groundwater, Second Quarter, 2001

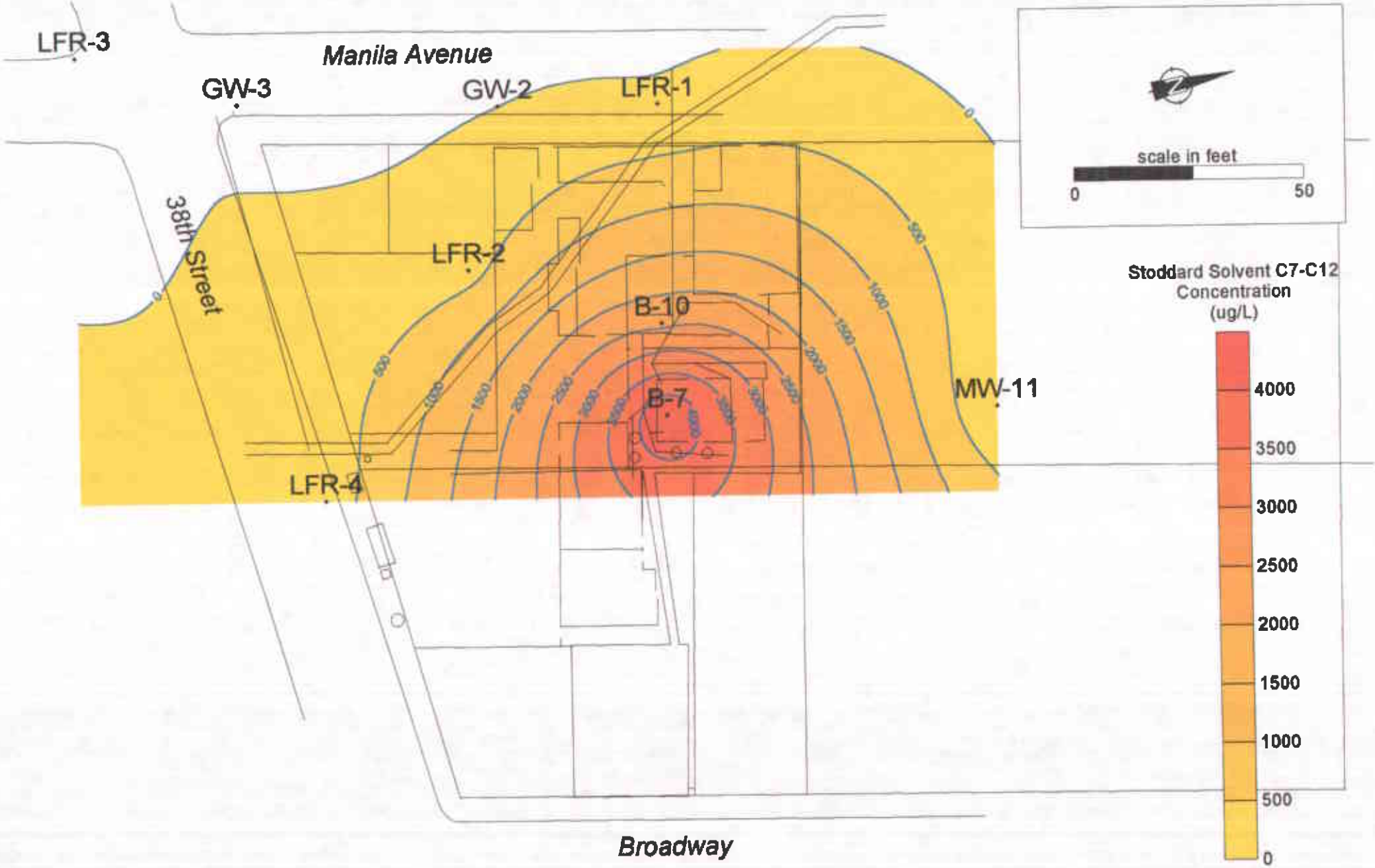


Figure 5: TPH-ss Concentration Contour Map in Groundwater, Second Quarter, 2001

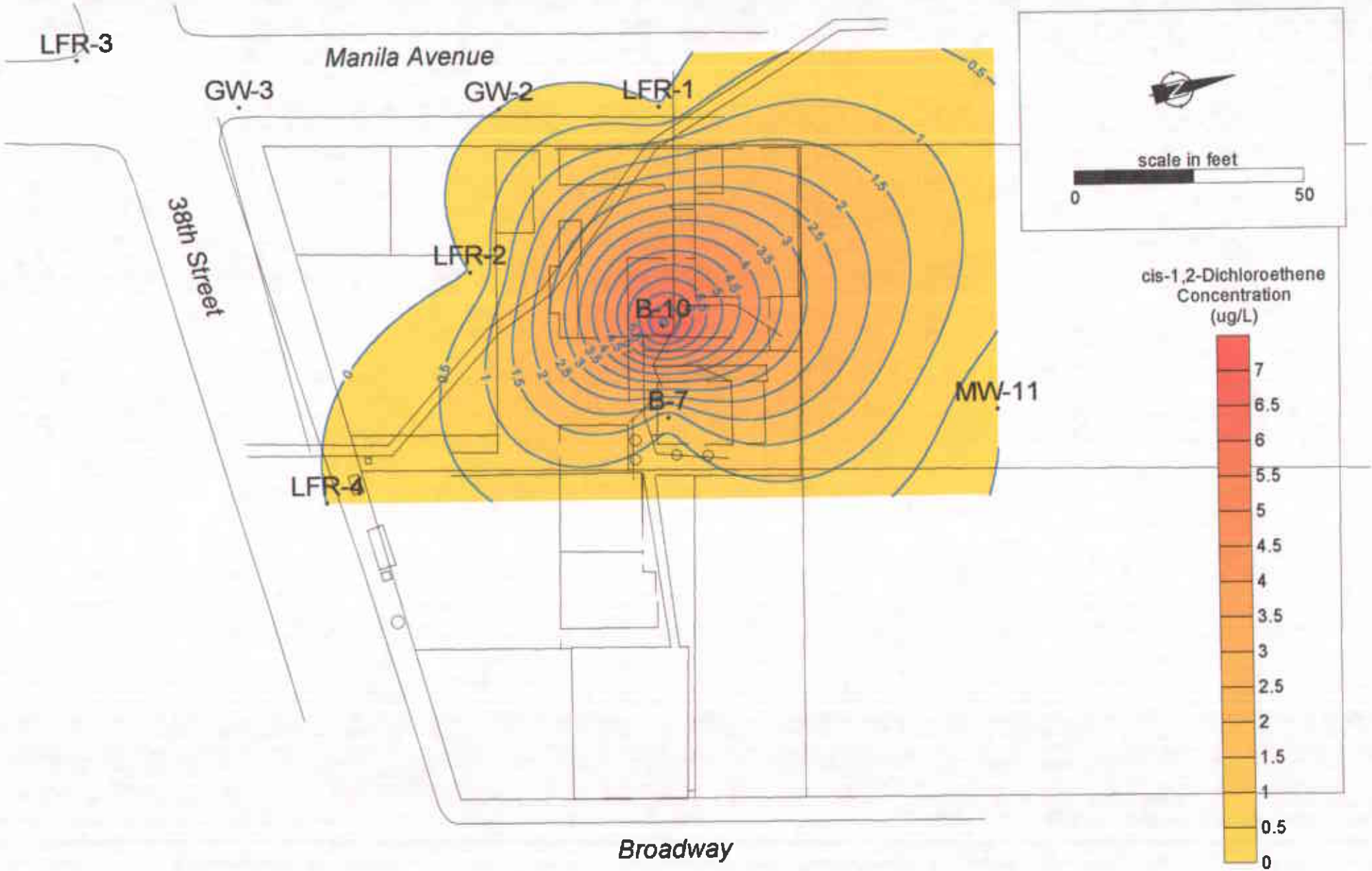


Figure 6: Cis-1,2-DCE Concentration Contour Map in Groundwater, Second Quarter, 2001

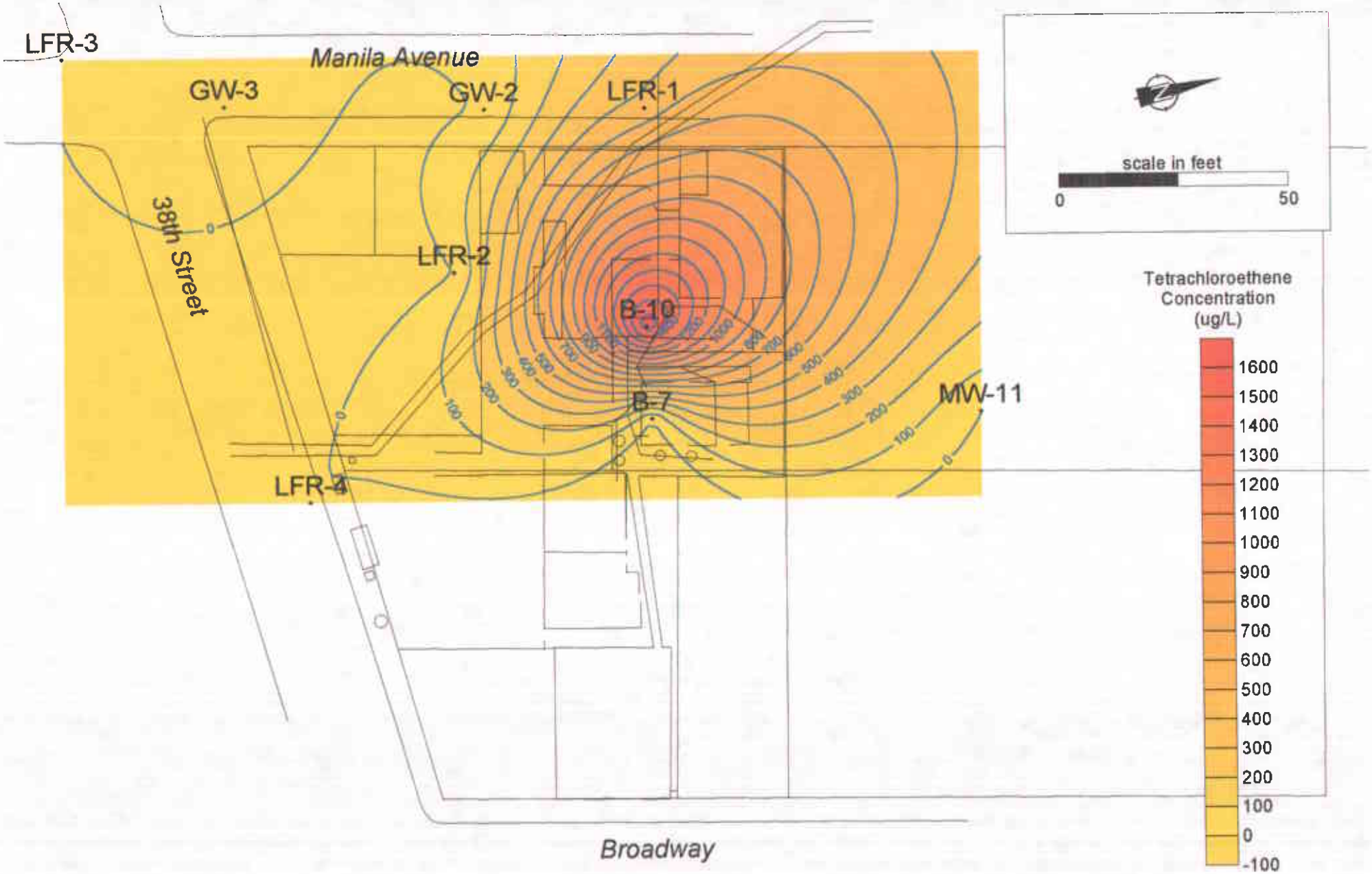


Figure 7: Tetrachloroethene Concentration Contour Map in Groundwater, Second Quarter, 2001

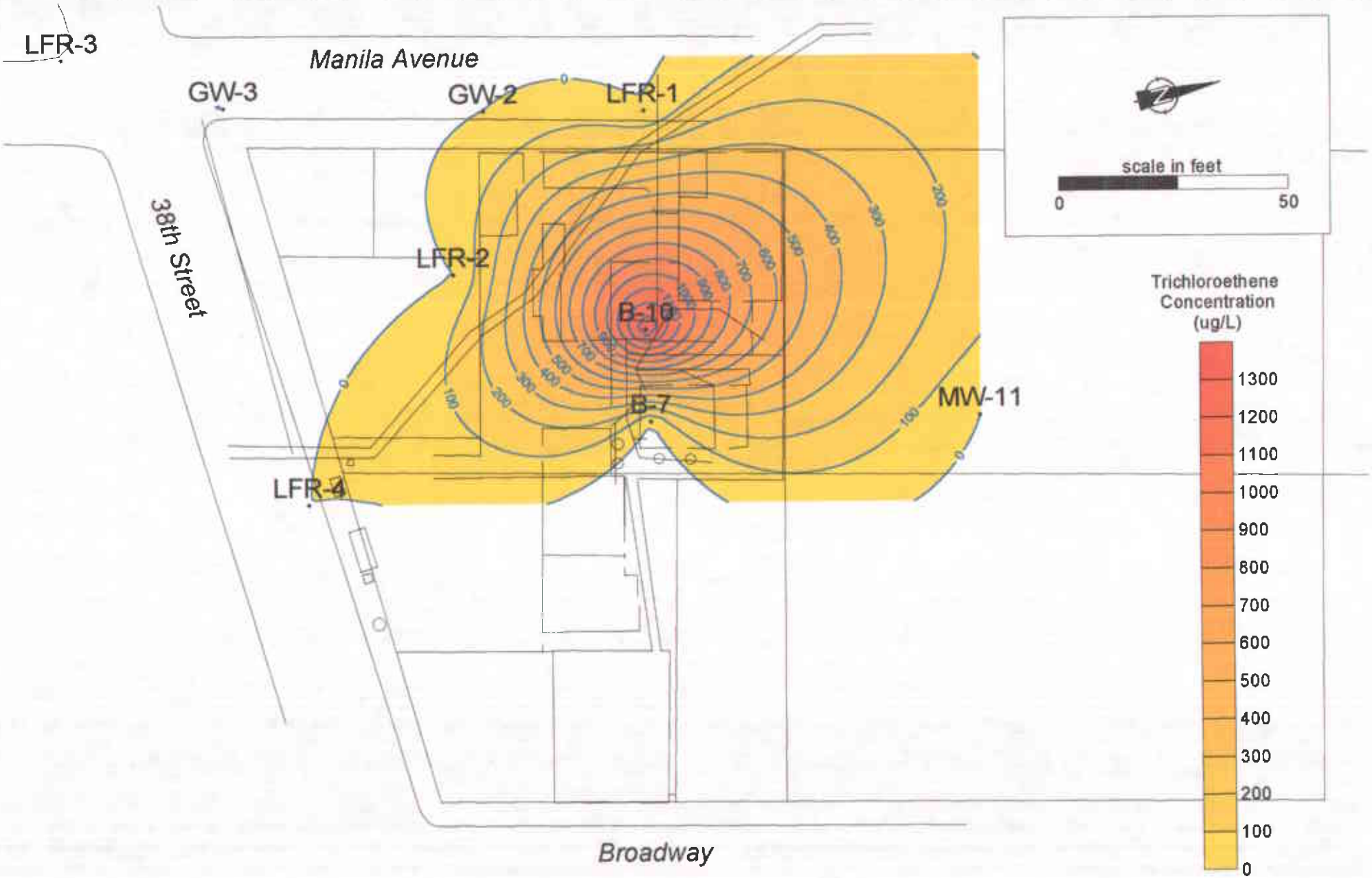


Figure 8: Trichloroethene Concentration Contour Map in Groundwater, Second Quarter, 2001

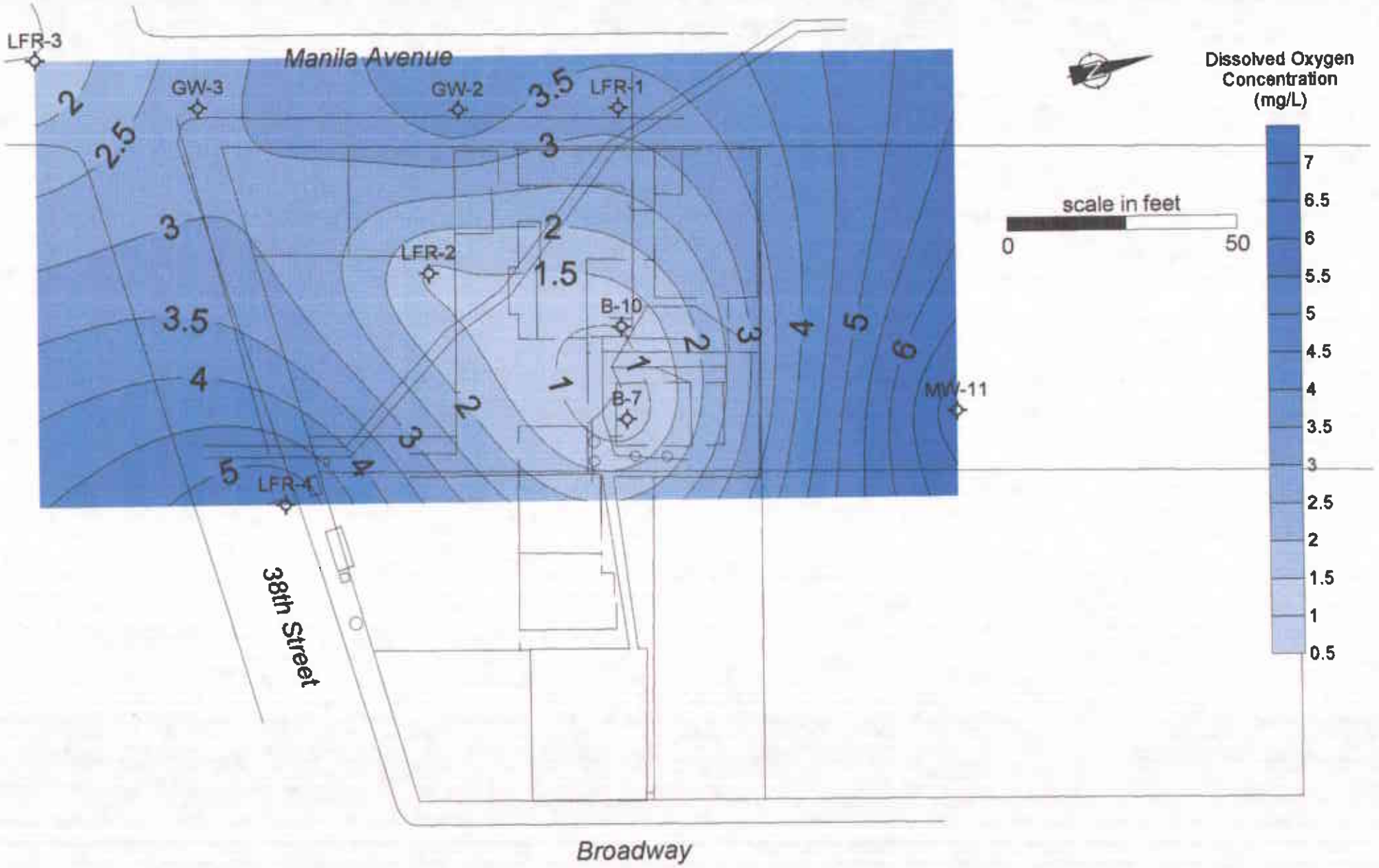


Figure 9: Dissolved Oxygen Concentration Contour Map in Groundwater, Second Quarter, 2001

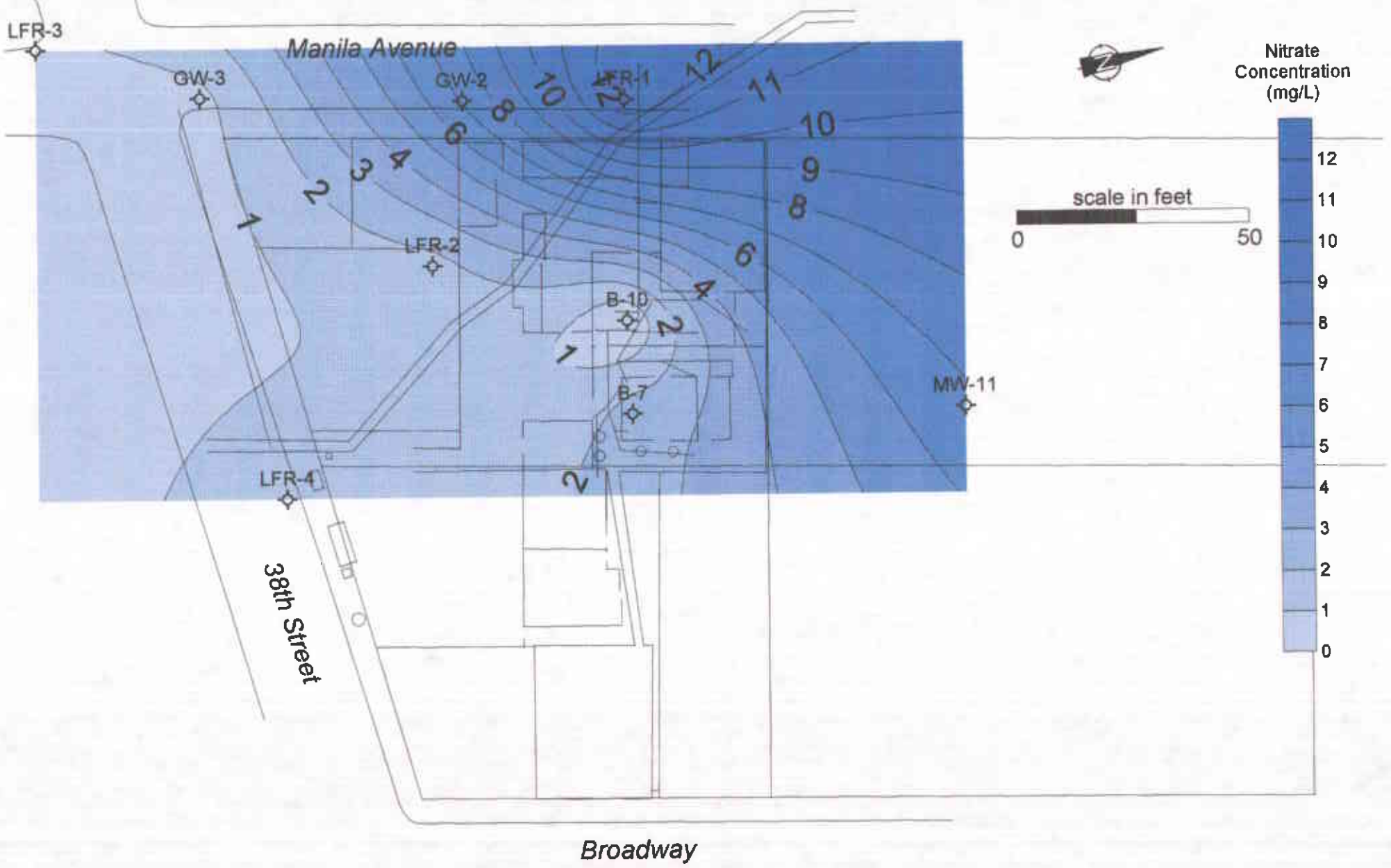


Figure 10: Nitrate Concentration Contour Map in Groundwater, Second Quarter, 2001

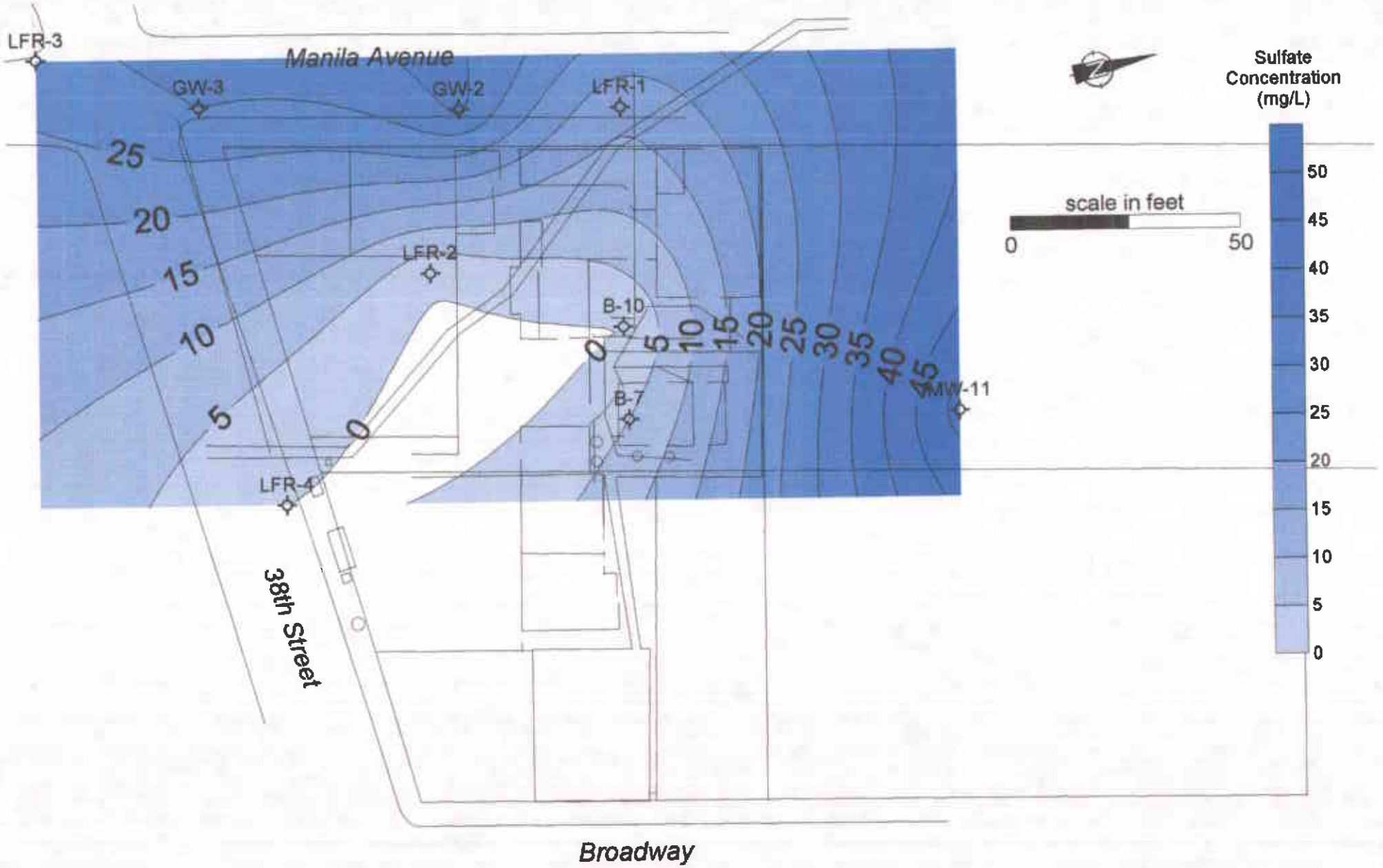


Figure 11: Sulfate Concentration Contour Map in Groundwater, Second Quarter, 2001

SOMA ENVIRONMENTAL ENGINEERING, INC.

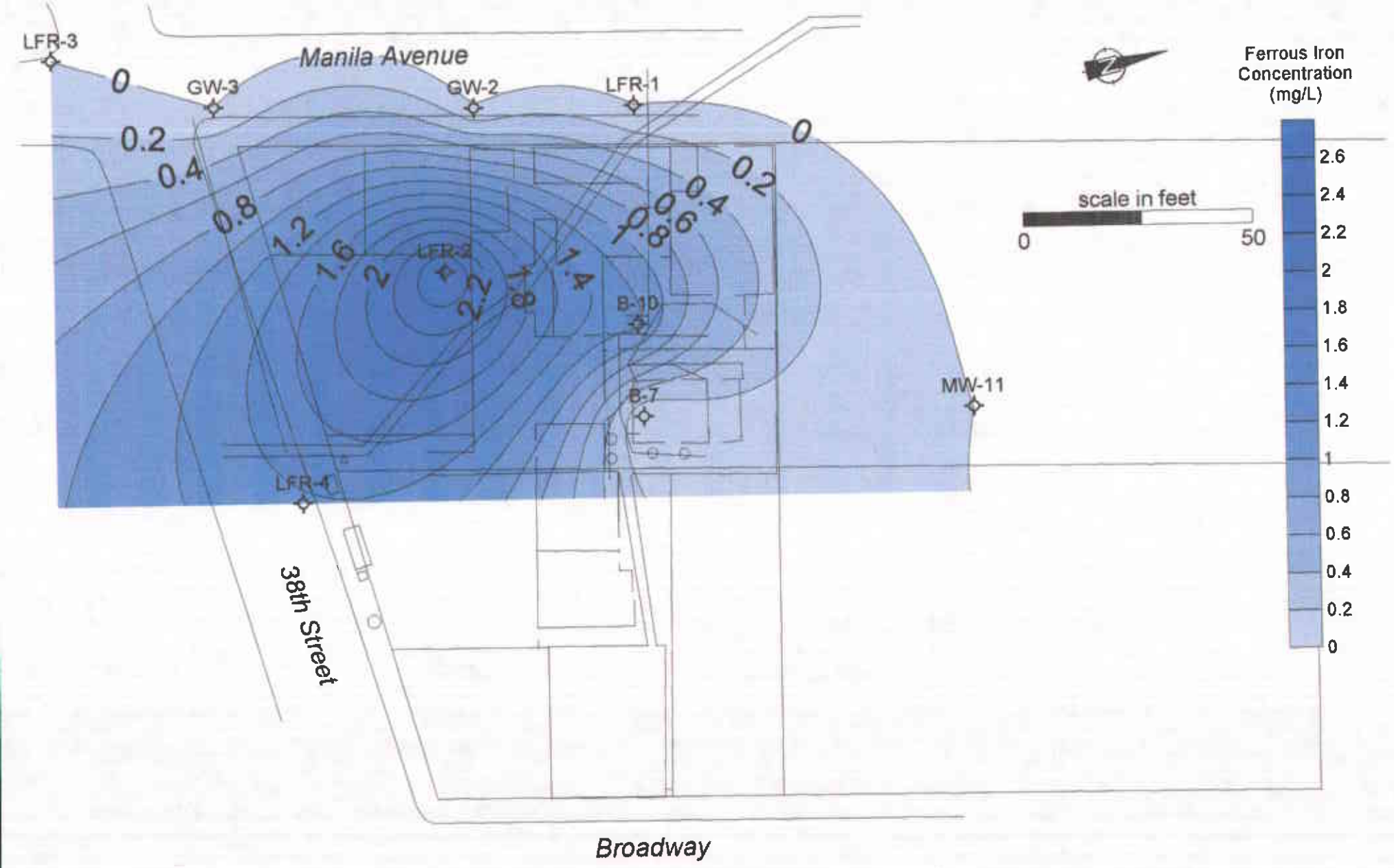


Figure 12: Ferrous Iron Concentration Contour Map in Groundwater, Second Quarter, 2001

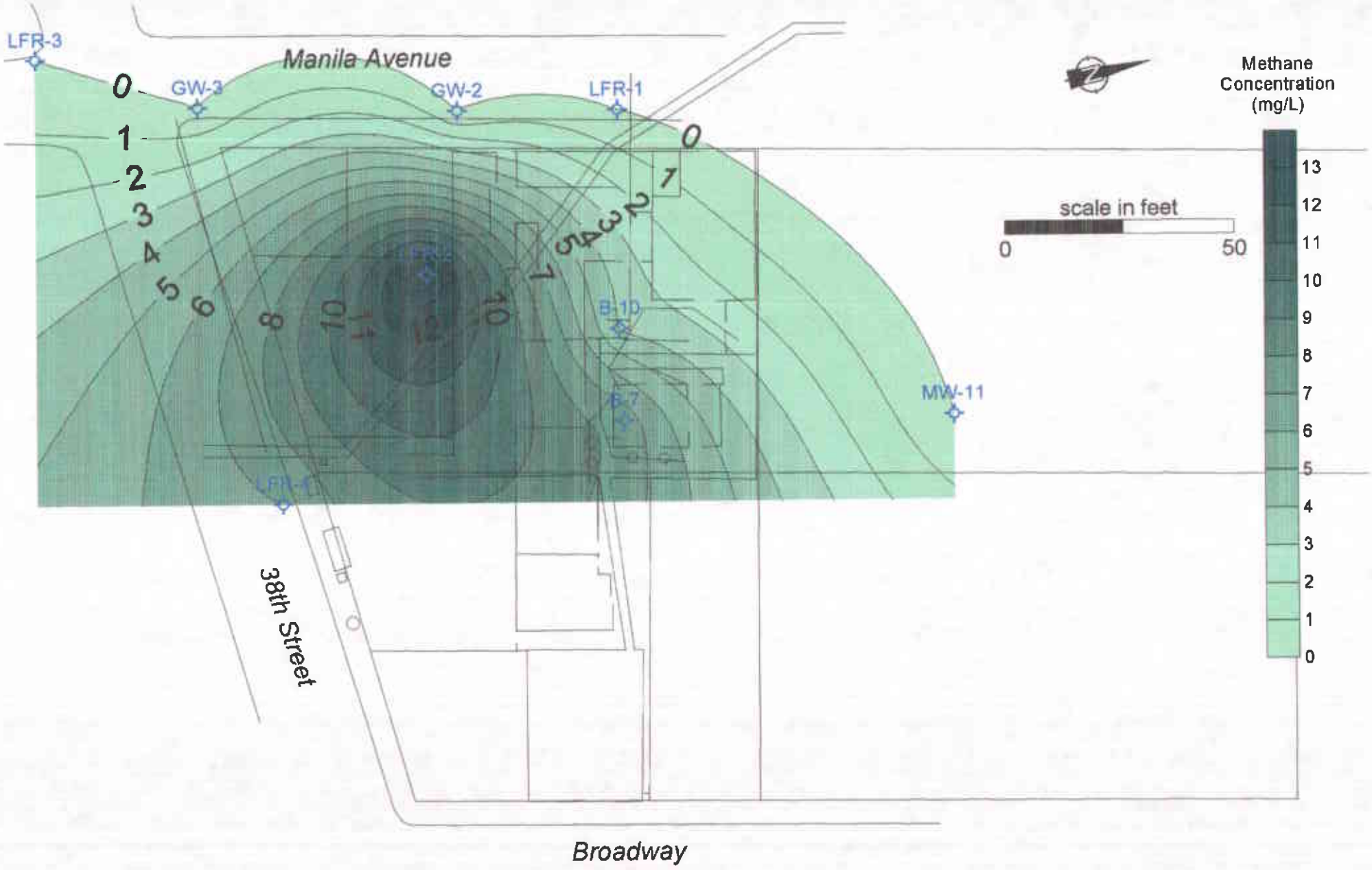
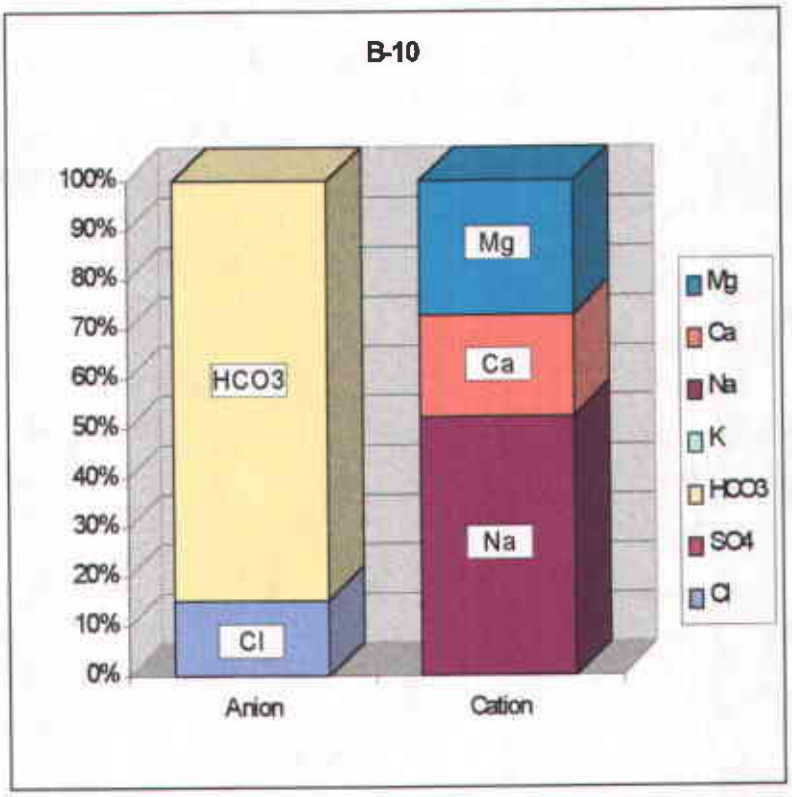


Figure 13: Methane Concentration Contour Map in Groundwater, Second Quarter, 2001



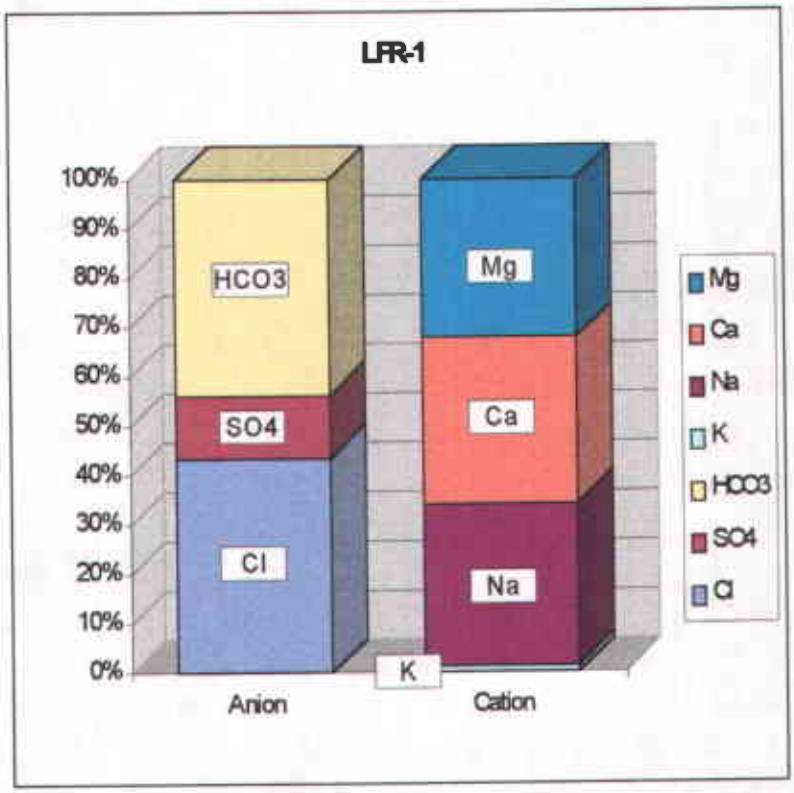


Figure 14: Comparison of Total Anion and Total Cation Concentrations at LFR-1 and B-10

APPENDIX A

FIELD NOTES, LABORATORY REPORTS, CHAIN OF CUSTODY FORMS, D.O. CORRECTION TABLES

Project #:	2511	**Address:**	2815 Broadway	**Date:**	4/26/01
Project Name:	Glovatorium		Oakland, CA	**Sampler:**	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	B-7	**TOC Elevation:**	76.96	feet	**Purge:**	☑ Pump	☐	Bailer	
Dup:	-	**Well Depth:**	17.50	feet	**Sample:**	☑ Pump	☐	Bailer	
Blank:	-	**DTW:**	7.36	feet	**Odor:**	☐ No	☑	Yes	**Describe:** Med/weak solvent
Purge Volume:	2 (gallons)	**Water Table Elev.:**	69.60	feet	**Sheen:**	☑ No	☐	Yes	**Describe:**
Well Diameter:	0.9 (inch)	**Height of Water:**	10.14	feet	**Color:**	☐ No	☑	Yes	**Describe:** light brown/yellow

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Alk, Cl-, Sulfate:	1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs		
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly		
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly		

TIME Stabilization if 3 successive parameters within:	DTW	VOLUME	TEMP (°C)	COND (µS/cm) +/- 3%	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	TURBIDITY (NTU) +/- 10%	pH +/- 0.1%	COMMENTS
9:55	*(no room*	0.5	16.5	1350	1.2	-20	32	6.52	
10:00	*for probe)*		16.4	1320	1.1	-26	32	6.51	
10:05			16.7	1300	0.8	-30	75	6.55	
10:10			16.6	1340	0.8	-31	50	6.56	
10:15			16.5	1320	0.7	-31	35	6.59	
10:20			16.5	1340	0.6	-28	34	6.59	
10:30			16.3	1340	0.6	-28	34	6.59	
Sampled at 13:00									

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	> 3.3	> 3.3	2.5	0.243	5.0	1.7
Form 2:	2.2	2.35				
Dilution:	5	5				10
Comments:	11	11.75				17
(Results in mg/L)						

Project #:	2511	**Address:**	2815 Broadway	**Date:**	6/11/01
Project Name:	Glovatorium		Oakland, CA	**Sampler:**	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	B-10	**TOC Elevation:**	81.50	feet	**Purge:**	☑ Pump	☐	Bailer	
Dup:	-	**Well Depth:**	18.00	feet	**Sample:**	☑ Pump	☐	Bailer	
Blank:	-	**DTW:**	7.89	feet	**Odor:**	☐ No	☑	Yes	**Describe:** Strong solvent odor
Purge Volume:	3 (gallons)	**Water Table Elev.:**	73.61	feet	**Sheen:**	☐ No	☑	Yes	**Describe:**
Well Diameter:	1 (inch)	**Height of Water:**	10.11	feet	**Color:**	☐ No	☑	Yes	**Describe:** Yellow/grey

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Alk, Cl-, Sulfate:	1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs		
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly		
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly		

TIME	DTW	VOLUME	TEMP (°C)	COND (µS/cm)	DO (mg/L)	ORP (mV)	TURBIDITY (NTU)	pH	COMMENTS
Stabilization if 3 successive parameters within:				+/- 3%	+/- 10%	+/- 10 mV	+/- 10%	+/- 0.1%	
8:00	*(no room*	0	-	-	-	-	-	-	Start of Pumping
8:05	*for probe)*		16.7	1170	1.2	-20	320	6.69	
8:10			16.8	1060	0.7	-21	300	6.57	
8:15			16.8	1100	0.8	-7	340	6.65	
8:20			16.8	1090	0.9	-4	240	6.65	
8:25			16.8	1090	0.8	0	110	6.67	
8:30			16.8	1090	0.8	-1	310	6.66	
8:35			16.8	1090	0.9	-4	140	6.64	
8:40			16.8	1070	0.9	-6	190	6.62	
8:45			16.7	1090	0.9	-8	170	6.65	

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	1.25	1.31	0		0	0
Form 2:						
Dilution:	5	5				
Comments:	6.25	6.55				

(Results in mg/L)

Project #:	2511	**Address:**	2815 Broadway	**Date:**	4/26/01
Project Name:	Glovatorium		Oakland, CA	**Sampler:**	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	GW-2	**TOC Elevation:**	79.14	feet	**Purge:**	☑ Pump	☐	Bailer	
Dup:	-	**Well Depth:**	20.00	feet	**Sample:**	☑ Pump	☐	Bailer	
Blank:	-	**DTW:**	9.73	feet	**Odor:**	☐ No	☐	Yes	**Describe:**
Purge Volume:		**Water Table Elev.:**	69.41	feet	**Sheen:**	☐ No	☐	Yes	**Describe:**
Well Diameter:	1 (inch)	**Height of Water:**	10.27	feet	**Color:**	☐ No	☐	Yes	**Describe:**

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Alk, Cl-, Sulfate:	1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs		
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly		
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly		

TIME	DTW	VOLUME	TEMP (°C)	COND (µS/cm)	DO (mg/L)	ORP (mV)	TURBIDITY (NTU)	pH	COMMENTS
Stabilization if 3 successive parameters within:				+/- 3%	+/- 10%	+/- 10 mV	+/- 10%	+/- 0.1%	
16:10		0	18.3	822	3.4	167	40	6.86	begin pumping
16:15			17.4	838	3.1	174	28	6.72	
16:20			17.9	857	4.4	160	38	6.70	
16:25		1 gal	18.8	850	4.0	140	39	6.82	decreased pump rate
16:30			19.3	877	5.2	149	30	7.03	
16:35									off
16:40			19.5	874	4.0	152	35	6.80	
									off

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	0.015	0.02	7.1		36	1.0
Form 2:						
Dilution:						
Comments:						

(Results in mg/L)

Project #:	2511	Address:	2815 Broadway	Date:	6/11/01
Project Name:	Glovatorium		Oakland, CA	Sampler:	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	GW-3	TOC Elevation:	77.92	feet	Purge:	☑ Pump	☐ Bailer		
Dup:	-	Well Depth:	20.00	feet	Sample:	☑ Pump	☐ Bailer		
Blank:	-	DTW:	9.99	feet	Odor:	☐ No	☐ Yes	Describe:	
Purge Volume:		Water Table Elev.:	67.93	feet	Sheen:	☐ No	☐ Yes	Describe:	
Well Diameter:	1 (inch)	Height of Water:	10.01	feet	Color:	☐ No	☐ Yes	Describe:	

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Alk, Cl-, Sulfate: 1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs	
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly	
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly	

TIME Stabilization if 3 successive parameters within:	DTW	VOLUME	TEMP (°C)	COND (µS/cm) +/- 3%	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	TURBIDITY (NTU) +/- 10%	pH +/- 0.1%	COMMENTS
0:15		0	15.8	656	3.3	264	12	5.11	
0:20			16.0	581	3.2	258	13	5.28	
0:25			16.3	616	2.9	249	12	5.36	
0:30			16.5	660	2.9	238	16	5.58	drying up
0:40			16.2	673	2.9	212	15	5.68	decreased pump rate

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	0	0	0.7		30	0
Form 2:						
Dilution:						
Comments:						

(Results in mg/L)

Project #:	2511	**Address:**	2815 Broadway	**Date:**	4/26/01
Project Name:	Glovatorium		Oakland, CA	**Sampler:**	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	LFR-1	**TOC Elevation:**	79.97	feet	**Purge:**	☑ Pump	☐ Bailer			
Dup:	-	**Well Depth:**	19.00	feet	**Sample:**	☑ Pump	☐ Bailer			
Blank:	-	**DTW:**	9.74	feet	**Odor:**	☐ No	☐ Yes	**Describe:**		
Purge Volume:	5 (gal)	**Water Table Elev.:**	70.23	feet	**Sheen:**	☐ No	☐ Yes	**Describe:**		
Well Diameter:	2 (inch)	**Height of Water:**	9.26	feet	**Color:**	☐ No	☐ Yes	**Describe:**		

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Alk, Cl-, Sulfate:	1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs		
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly		
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly		

TIME	DTW	VOLUME	TEMP (°C)	COND (µS/cm)	DO (mg/L)	ORP (mV)	TURBIDITY (NTU)	pH	COMMENTS
Stabilization if 3 successive parameters within:				+/- 3%	+/- 10%	+/- 10 mV	+/- 10%	+/- 0.1%	
17:10		0	17.8	1220	3.8	192	11	6.57	start
17:15			17.6	1220	1.8	189	14	6.38	
17:20			17.6	1150	1.5	188	11	6.35	
17:25			17.5	848	3.0	187	14	6.40	
17:30			17.4	826	3.3	193	12	6.43	
17:35									off, recalibrate instrument
17:45			17.5	879	3.3	234	7	5.66	restart
17:50			17.2	940	3.0	229	7	5.69	
17:55			16.8	990	3.2	223	7	5.76	
18:00			16.8	980	3.2	224	7	5.76	

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	0	0.004	12.9		16	0.02
Form 2:						
Dilution:						
Comments:						
(Results in mg/L)						

Project #:	2511	**Address:**	2815 Broadway	**Date:**	4/27/01
Project Name:	Glovatorium		Oakland, CA	**Sampler:**	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	LFR-2	**TOC Elevation:**	81.89	feet	**Purge:**	☑ Pump	☐ Bailer			
Dup:	LFR 2-2	**Well Depth:**	18.88	feet	**Sample:**	☑ Pump	☐ Bailer			
Blank:	-	**DTW:**	9.99	feet	**Odor:**	☑ No	☐ Yes	**Describe:**		
Purge Volume:	4 (gal)	**Water Table Elev.:**	71.9	feet	**Sheen:**	☑ No	☐ Yes	**Describe:**		
Well Diameter:	2 (inch)	**Height of Water:**	8.89	feet	**Color:**	☑ No	☐ Yes	**Describe:**		

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Atk, Cl-, Sulfate:	1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs		
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly		
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly		

TIME	DTW	VOLUME	TEMP (°C)	COND (µS/cm)	DO (mg/L)	ORP (mV)	TURBIDITY (NTU)	pH	COMMENTS
Stabilization if 3 successive parameters within:				+/- 3%	+/- 10%	+/- 10 mV	+/- 10%	+/- 0.1%	
10:50		0	17.5	940	3.7	+76	23	5.62	begin pumping
10:55			16.7	934	3.1	49	22	5.57	
11:00			16.3	896	1.3	24	76	5.65	
11:05			16.4	849	1.0	19	90	5.63	
11:10			16.4	872	1.3	17	100	5.62	
11:15			16.4	875	1.7	15	90	5.63	
11:23			16.4	921	1.4	9	25	5.64	
Sampled at 11:30									

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	2.66	2.97	1.6		1	0.4
Form 2:						
Dilution:						
Comments:						

(Results in mg/L)

Project #:	2511	Address:	2815 Broadway	Date:	6/11/01
Project Name:	Glovatorium		Oakland, CA	Sampler:	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	LFR-3	TOC Elevation:	77.96	feet	Purge:	☑ Pump	☐ Bailer		
Dup:	-	Well Depth:	20.40	feet	Sample:	☑ Pump	☐ Bailer		
Blank:	-	DTW:	10.34	feet	Odor:	☐ No	☐ Yes	Describe:	
Purge Volume:		Water Table Elev.:	67.62	feet	Sheen:	☐ No	☐ Yes	Describe:	
Well Diameter:	2 (inch)	Height of Water:	10.06	feet	Color:	☐ No	☐ Yes	Describe:	

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Alk, Cl-, Sulfate:	1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs		
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly		
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly		

TIME Stabilization if 3 successive parameters within:	DTW	VOLUME	TEMP (°C)	COND (µS/cm) +/- 3%	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	TURBIDITY (NTU) +/- 10%	pH +/- 0.1%	COMMENTS
11:05		0	17.3	558	7.2	201	110	5.89	begin pumping
11:10			17.8	594	1.9	201	44	5.54	
11:15			17.9	621	1.3	202	53	5.45	
11:20			17.9	633	1.0	202	93	5.43	
11:25			18.1	616	1.0	201	130	5.43	
11:30			18.0	613	1.0	201	132	5.43	

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	0	0.01	0.8		28	0
Form 2:						
Dilution:						
Comments:						

(Results in mg/L)

Project #:	2511	**Address:**	2815 Broadway	**Date:**	4/27/01
Project Name:	Glovatorium		Oakland, CA	**Sampler:**	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	LFR-4	**TOC Elevation:**	81.65	feet	**Purge:**	☑ Pump	☐ Bailer			
Dup:	-	**Well Depth:**	19.38	feet	**Sample:**	☑ Pump	☐ Bailer			
Blank:	-	**DTW:**	12.78	feet	**Odor:**	☐ No	☐ Yes	**Describe:**		
Purge Volume:	6 (gal)	**Water Table Elev.:**	68.87	feet	**Sheen:**	☐ No	☐ Yes	**Describe:**		
Well Diameter:	2 (inch)	**Height of Water:**	6.60	feet	**Color:**	☐ No	☐ Yes	**Describe:**		

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Alk, Cl-, Sulfate:	1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs		
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly		
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly		

TIME	DTW	VOLUME	TEMP (°C)	COND (µS/cm)	DO (mg/L)	ORP (mV)	TURBIDITY (NTU)	pH	COMMENTS
Stabilization if 3 successive parameters within:				+/- 3%	+/- 10%	+/- 10 mV	+/- 10%	+/- 0.1%	
12:25		0	18.4	1080	7.4	+83	3	5.01	
12:30			18.2	1060	3.2	64	1	5.46	
12:35			17.8	1030	3.6	37	0	5.59	
12:40			17.9	1000	1.8	33	-1	5.67	
12:45			18.0	1000	2.2	30	-1	5.70	
12:50			18.1	1010	3.1	24	3	5.76	
13:00			18.4	1030	6.4	17	0	5.78	
13:10			18.3	1050	5.4	14	-1	5.79	
13:15			18.3	1060	5.6	14	-1	5.79	
sampled at 13:20									

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	1.37	1.44	1.7	0.013	0	0
Form 2:						
Dilution:						
Comments:						

(Results in mg/L)

Project #:	2511	**Address:**	2815 Broadway	**Date:**	4/26/01
Project Name:	Glovatorium		Oakland, CA	**Sampler:**	Naser Pakrou
					Patrick Sullivan

Well/Sample ID:	MW-11	**TOC Elevation:**	84.13	feet	**Purge:**	☑ Pump	☐	Bailer		
Dup:	-	**Well Depth:**	19.00	feet	**Sample:**	☑ Pump	☐	Bailer		
Blank:	-	**DTW:**	9.40	feet	**Odor:**	☐ No	☐	Yes	**Describe:**	
Purge Volume:	6 (gallons)	**Water Table Elev.:**	74.73	feet	**Sheen:**	☐ No	☐	Yes	**Describe:**	
Well Diameter:	2 (inch)	**Height of Water:**	9.60	feet	**Color:**	☐ No	☐	Yes	**Describe:**	

Laboratory: Curtis & Tompkins, Ltd.

Delivery: Delivered by samplers

Analysis/preservative:

Sulfide:	1 Poly w/ $Zn(C_2H_3O_2)_2$ + NAOH	Disolved H_2:	1 Septum Vial	Alk, Cl-, Sulfate:	1 unpreserved poly L
Total Iron, Manganese:	1 HNO_3 preserved poly	Dissolved Perm Gases:	2 Unpreserved VOAs		
8260 (8010 list) & MtBE &		Cation & Anion w/ Nitrate & Nitrite:	1 Unpres. Poly and 1 H2SO4 Poly		
BTEX & TPH-g & TPH-ss:	6 VOAs w/ HCL	Ferrous Iron:	1 HCl Pres. Poly		

TIME	DTW	VOLUME	TEMP (°C)	COND (µS/cm)	DO (mg/L)	ORP (mV)	TURBIDITY (NTU)	pH	COMMENTS
Stabilization if 3 successive parameters within:				+/- 3%	+/- 10%	+/- 10 mV	+/-10%	+/- 0.1%	
13:50			19.2	1170	8.3	195	5	5.90	begin pumping
13:55			18.8	1120	6.7	194	38	5.78	
14:00			18.7	1140	6.3	194	39	5.72	
14:05			18.1	1160	6.3	196	43	5.68	
14:13			18.3	1190	6.9	238	23	5.40	
14:18			18.2	1200	6.8	223	19	5.60	
14:25			18.2	1200	7.1	226	22	5.64	
14:30			18.0	1200	7.3	229	19	5.67	
14:35			18.0	1210	7.4	229	-8	5.67	

Result	Ferrous Iron (filtered)	Total Iron (filtered)	Nitrate	Nitrite	Sulfate	Dissolved Manganese
Form 1:	0	0.01	6.8	0.034	52	0
Form 2:						
Dilution:						
Comments:						
(Results in mg/L)						

MICROSEEPS

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203

San Ramon, CA 94583

Order #: P0105214
Report Date: 05/21/01
Client Proj Nam Oakland CA 2511
Client Proj # Oakland CA 2511

Sample Identification

Lab Sample #	Client Sample ID
P0105214-01	B-7
P0105214-02	B-10
P0105214-03	LF-3
P0105214-04	LF-2

Approved By: Rebecca J. Adams

Order #: P0105214
Report Date: 05/21/01
Client Proj Name: Oakland CA 2511
Client Proj #: Oakland CA 2511

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0105214-01

Sample Description	Matrix	Sampled Date/Time	Received
B-7	Water	10 May. 01 10:00	11 May. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	7600	0.015	ug/L	AM18	rw	5/17/01

Order #: P0105214
Report Date: 05/21/01
Client Proj Name: Oakland CA 2511
Client Proj #: Oakland CA 2511

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0105214-02

Sample Description	Matrix	Sampled Date/Time	Received
B-10	Water	10 May. 01 10:30	11 May. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	3900	0.015	ug/L	AM18	rw	5/17/01

Order #: P0105214
Report Date: 05/21/01
Client Proj Name: Oakland CA 2511
Client Proj #: Oakland CA 2511

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0105214-03

Sample Description	Matrix	Sampled Date/Time	Received
LF-3	Water	10 May. 01 11:30	11 May. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	8.6	0.015	ug/L	AM18	rw	5/17/01

Order #: P0105214
Report Date: 05/21/01
Client Proj Name: Oakland CA 2511
Client Proj #: Oakland CA 2511

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0105214-04

Sample Description	Matrix	Sampled Date/Time	Received
LF-2	Water	10 May. 01 12:20	11 May. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	14000	0.015	ug/L	AM18	rw	5/17/01

MICROSEEPS, Inc.

220 William Pitt Way, Pittsburgh, PA 15238

Phone: (412) 826-5245 Fax: (412) 826-3433

CHAIN-OF-CUSTODY RECORD

Company Name: SOMA Env. Eng.

Address: 2680 Bishop Dr. Ste 203 San Ramon

Proj. Manager: Mansour Sedky

Proj. Location: Oakland

Proj. Number: 2511

Phone # : 2252446660 Fax # : 2252446601

Sampler's signature : _____

Note: Enter proper letters in Requested Analyses columns below.

Note: If analysis D,E,or K is selected, scratch (option) NOT wanted.

Analysis Options

* A	C1 -C4	G	Chlorinated HC
* B	Hydrogen & Helium	H	BTEX
* C	Permanent Gases (CH4, CO, CO2, N2, O2)	J	BTEX & C5 - C10
D	Mercury (Soil) or (Air **)	K	TPH (C5 - C10) or (C4 -C12)
E	TO-14 by GC/MS (Ambient) or (Source **)	L	C11 - C18
F	601 & 602 Compounds	Other	Specify below.

* An additional 22 ml vial of sample is required when requested in combination with another analysis.

** Available upon request.

Collection Date	Collection Time	Number of Containers	"Summa" # if Can. used	Sample Type	Sample Identification	Requested Analyses					(Other)	Remarks
5/10	10:00	2		water	B-7	CH4						
5/10	10:30	2		water	B-10	"						
5/10	11:30	2		water	LF-3	"						
5/10	12:20	2		water	LF-2	"						

Results to :

Invoice to :

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Mansour Sedky	SOMA	5/10	3:00	[illegible]	[illegible]	5/11	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Laboratory to return. YELLOW COPY : Laboratory PINK COPY : Submitter

MICROSEEPS

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203

San Ramon, CA 94583

Order #: P0104388
Report Date: 05/07/01
Client Proj Name: Oakland CA 2510
Client Proj #: Oakland CA 2510

Sample Identification

Lab Sample #	Client Sample ID
P0104388-01	LFR-1
P0104388-02	GW-2
P0104388-03	LFR-2-2
P0104388-04	LFR-4
P0104388-05	MW-11
P0104388-06	GW-3

Approved By: Rebecca J. Hanson

NOTES:ALL SAMPLES WERE RECD FROZEN.SAMPLES LFR-2, B7, B10, AND LFR-3 WERE BROKEN(BOTH VIALS). AS PER CLIENT, RUN THE SAMPLES THAT ARE INTACT.(CW 4-30-01)

Order #: P0104388
Report Date: 05/07/01
Client Proj Name: Oakland CA 2510
Client Proj #: Oakland CA 2510

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0104388-01

Sample Description	Matrix	Sampled Date/Time	Received
LFR-1	Water	26 Apr. 01 18:00	30 Apr. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	0.30	0.015	ug/L	AM18	rw	5/4/01

Order #: P0104388
Report Date: 05/07/01
Client Proj Name: Oakland CA 2510
Client Proj #: Oakland CA 2510

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0104388-02

Sample Description	Matrix	Sampled Date/Time	Received
GW-2	Water	27 Apr. 01 8:50	30 Apr. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	0.22	0.015	ug/L	AM18	rw	5/4/01

Order #: P0104388
Report Date: 05/07/01
Client Proj Name: Oakland CA 2510
Client Proj #: Oakland CA 2510

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0104388-03

Sample Description	Matrix	Sampled Date/Time	Received
LFR-2-2	Water	27 Apr. 01 11:30	30 Apr. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	11000	0.015	ug/L	AM18	rw	5/4/01

Order #: P0104388
Report Date: 05/07/01
Client Proj Name: Oakland CA 2510
Client Proj #: Oakland CA 2510

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0104388-04

Sample Description	Matrix	Sampled Date/Time	Received
LFR-4	Water	27 Apr. 01 13:20	30 Apr. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	7000	0.015	ug/L	AM18	rw	5/4/01

Order #: P0104388
Report Date: 05/07/01
Client Proj Name: Oakland CA 2510
Client Proj #: Oakland CA 2510

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0104388-05

Sample Description	Matrix	Sampled Date/Time	Received
MW-11	Water	27 Apr. 01 14:45	30 Apr. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	1.4	0.015	ug/L	AM18	rw	5/4/01

Order #: P0104388
Report Date: 05/07/01
Client Proj Name: Oakland CA 2510
Client Proj #: Oakland CA 2510

Client Name: Soma Environmental Engineering
Contact: Naser Pakrou
Address: 2680 Bishop Dr.
Suite 203
San Ramon, CA 94583

Lab Sample #: P0104388-06

Sample Description	Matrix	Sampled Date/Time	Received
GW-3	Water	27 Apr. 01 15:10	30 Apr. 01

Analyte(s)	Result	PQL	Units	Method #	Analyst	Analysis Date
RiskAnalysis						
Water						
Methane	15	0.015	ug/L	AM18	rw	5/4/01

MICROSEEPS, Inc.

220 William Pitt Way, Pittsburgh, PA 15238

Phone: (412) 826-5245 Fax: (412) 826-3433

CHAIN-OF-CUSTODY RECORD

Company Name: [illegible]

Address: [illegible]

Proj. Manager: [illegible]

Proj. Location: Oakland California

Proj. Number: 2510

Phone # : [illegible] Fax # : [illegible]

Sampler's signature : [illegible]

Note: Enter proper letters in Requested Analyses columns below.

Note: If analysis D,E,or K is selected, scratch (option) NOT wanted.

Analysis Options

* A	C1 -C4	G	Chlorinated HC
* B	Hydrogen & Helium	H	BTEX
* C	Permanent Gases (CH4, CO, CO2, N2, O2)	I	BTEX & C5 - C10
D	Mercury (Soil) or (Air **)	K	TPH (C5 - C10) or (C4 -C12)
E	TO-14 by GC/MS (Ambient) or (Source **)	L	C11 - C18
F	601 & 602 Compounds	Other	Specify below.

* An additional 22 ml vial of sample is required when requested in combination with another analysis.

** Available upon request.

(* samples had frozen + vials broken. On 4/30/01)

Collection Date	Collection Time	Number of Containers	"Summa" # if Can. used	Sample Type	Sample Identification	Requested Analyses					(Other)	Remarks
4/26	12:40	2		water	B-7 *	CH4						
4/26	2:55	2		"	B-10 *	"						
4/27	10am	1			LFR-1	"						
"	8:50am	1			GW-2	"						
4/27	12:30p	1			LFR-3 *	"						
4/27	11:50	1			LFR-2 *	"						
4/27	11:30	1			LFR-2-2	"						
4/27	1:20pm	1			LFR-4	"						
4/27	2:45	1			MW-11	"						
4/27	3:10	1			GW-5	"						

Results to : [illegible]

Invoice to : [illegible]

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[illegible]	[illegible]	4/27	[illegible]	[illegible]	[illegible]	4/30/01	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Laboratory to return. YELLOW COPY : Laboratory PINK COPY : Submitter

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

ANALYTICAL REPORT

Prepared for:

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

Date: 16-MAY-01
Lab Job Number: 151703
Project ID: 2510
Location: GLOVATORIUM

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: Paul Prendergast
Project Manager

Reviewed by:
Operations Manager

CA ELAP # 1459

CHAIN OF CUSTODY FORM

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

C&T LOGIN # 191103

Sampler: P.S.

Project No: 2510

Report To: Naser Rahman

Project Name: Glovatorium

Company: SOMA

Project P.O.:

Telephone: 925.244.6600

Turnaround Time: Standard

Fax: 925.244.6601

Laboratory Number	Sample ID.	Sampling Date Time	Matrix: Soil	Matrix: Water	Matrix: Waste	# of Containers	Preservative: HCL	Preservative: H_2SO_4	Preservative: HNO_3	Preservative: ICE	Field Notes	Analyses: 8015m TPH ss	Analyses: 8021B BTEX, MTBE	Analyses: 8260B VOCs (8010 list)	Analyses: Major anions	Analyses: Major cations
-1	TripBlank	4/26				3	3			/						
-2	LFR 2-2	4/27 11:20				6	6			/						
-3	B-7	4/26 1				6	6			/						
-4	B-10	4/26 3				8	6		1	/						
-6	GW-2	4/27 8:50				6	6			/				X	X	
-5	LFR-1	4/26 6				8	6		1	/				X	X	
-7	LFR-3	4/27 10:30				6	6			/						
-8	LFR-2	4/27 11:30				6	6			/						
-9	LFR-4	4/27 1:20				6	6			/						
-10	MW-11	4/27 2:45				6	6			/						
-11	GW-3	4/27 3:10		✓		6	6			/						

Notes:

RELINQUISHED BY:

Peter Salk 4/27 5:10pm DATE/TIME

DATE/TIME

DATE/TIME

RECEIVED BY:

4/27/01 17:10 DATE/TIME

DATE/TIME

DATE/TIME

Signature

Curtis & Tompkins, Ltd.

Laboratory Number:	**151703**
Client:	**Soma Environmental Engineering, Inc.**
Project Name:	**Glovatorium**
Project #:	**2510**
Receipt Date:	**04/27/01**

CASE NARRATIVE

This hardcopy data package contains sample results and batch QC results for eleven water samples received from the above referenced project on April 27, 2001. The samples were received cold and intact.

TVH (EPA 8015M):

The recoveries for the bromofluorobenzene surrogate were over the acceptable QC limits for client ID B-7 (C&T ID 151703-003), B-10 (C&T ID 151703-004) and LFR-2 (C&T ID 151703-008) due to co-elution of surrogate peaks with interfering peaks from the matrix. The recoveries for the trifluorotoluene surrogate, the matrix spike and its duplicate and the laboratory control sample were within acceptable QC limits so the quality of the sample data should not be affected. No other analytical problems were encountered.

BTXE/MTBE (EPA 8021B):

No analytical problems were encountered.

Purgeable Hydrocarbons (EPA 8260B):

No analytical problems were enocuntered.

General Chemistry:

No analytical problems were encountered.

Curtis & Tompkins, Ltd.

Gasoline by GC/FID CA LUFT

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8015M
Matrix:	Water	Batch#:	63352
Units:	ug/L	Received:	04/27/01
Diln Fac:	1.000		

Field ID: TRIP BLANK
Type: SAMPLE
Lab ID: 151703-001
Sampled: 04/26/01
Analyzed: 05/02/01

Analyte	Result	RL
Gasoline C7-C12	ND	50
Stoddard Solvent C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	100	59-135
Bromofluorobenzene (FID)	106	60-140

Field ID: LFR 2-2
Type: SAMPLE
Lab ID: 151703-002
Sampled: 04/27/01
Analyzed: 05/02/01

Analyte	Result	RL
Gasoline C7-C12	720 H Y	50
Stoddard Solvent C7-C12	360	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	102	59-135
Bromofluorobenzene (FID)	134	60-140

Field ID: B-7
Type: SAMPLE
Lab ID: 151703-003
Sampled: 04/26/01
Analyzed: 05/02/01

Analyte	Result	RL
Gasoline C7-C12	8,900 H	50
Stoddard Solvent C7-C12	4,500	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	105	59-135
Bromofluorobenzene (FID)	237 * >LR b	60-140

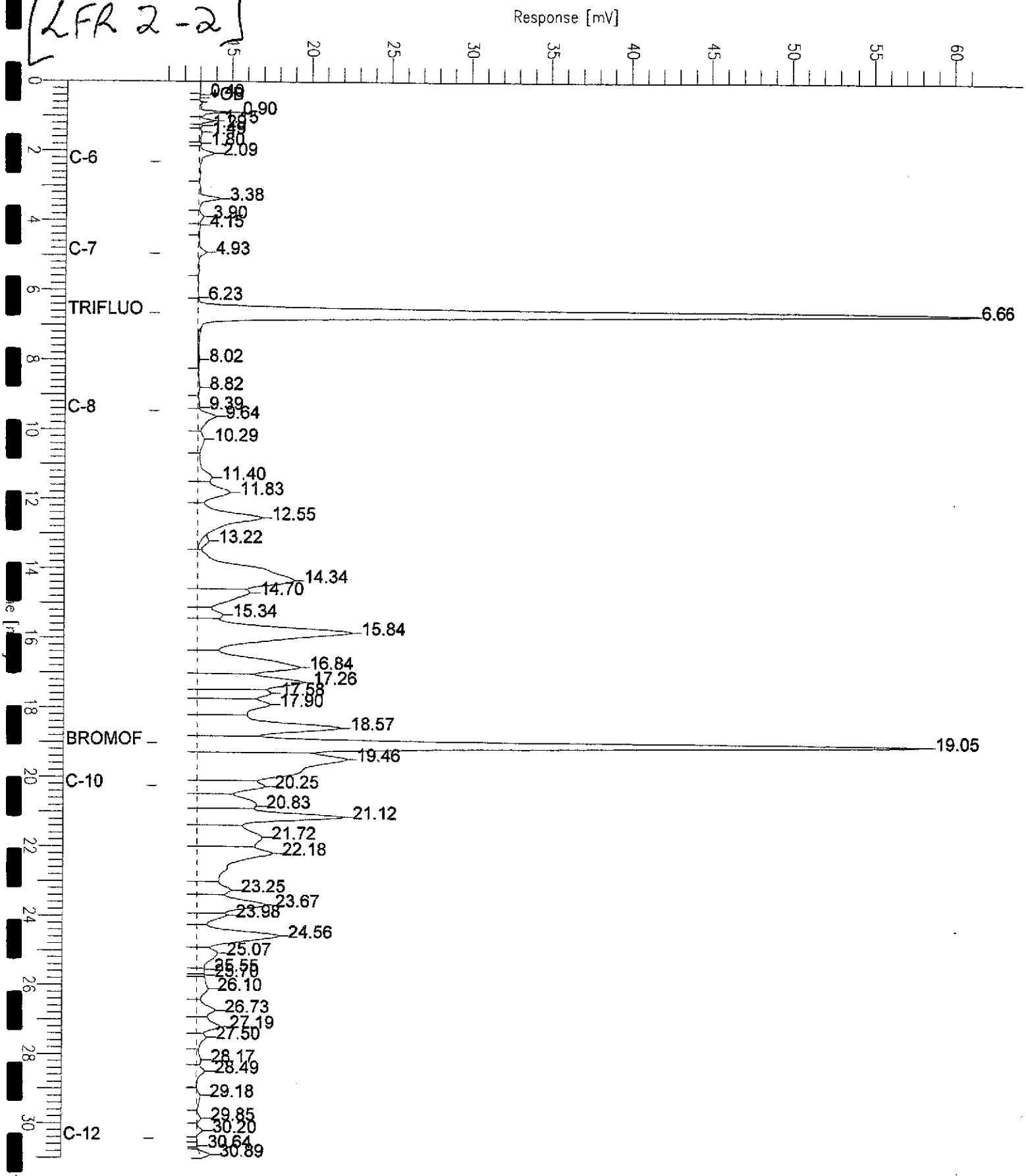
*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits fuel pattern which does not resemble standard
Z= Sample exhibits unknown single peak or peaks
b= See narrative
ND= Not Detected
RL= Reporting Limit
>LR= Response exceeds instrument's linear range

Chromatogram

Sample Name : 151703-002,63352
FileName : G:\GC05\DATA\121G021.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 31.00 min
Scale Factor: 1.0 Plot Offset: 11 mV

Sample #: C1
Date : 5/2/01 07:43 AM
Time of Injection: 5/2/01 07:12 AM
Low Point : 10.52 mV High Point : 61.11 mV
Plot Scale: 50.6 mV

[LFR 2-2]

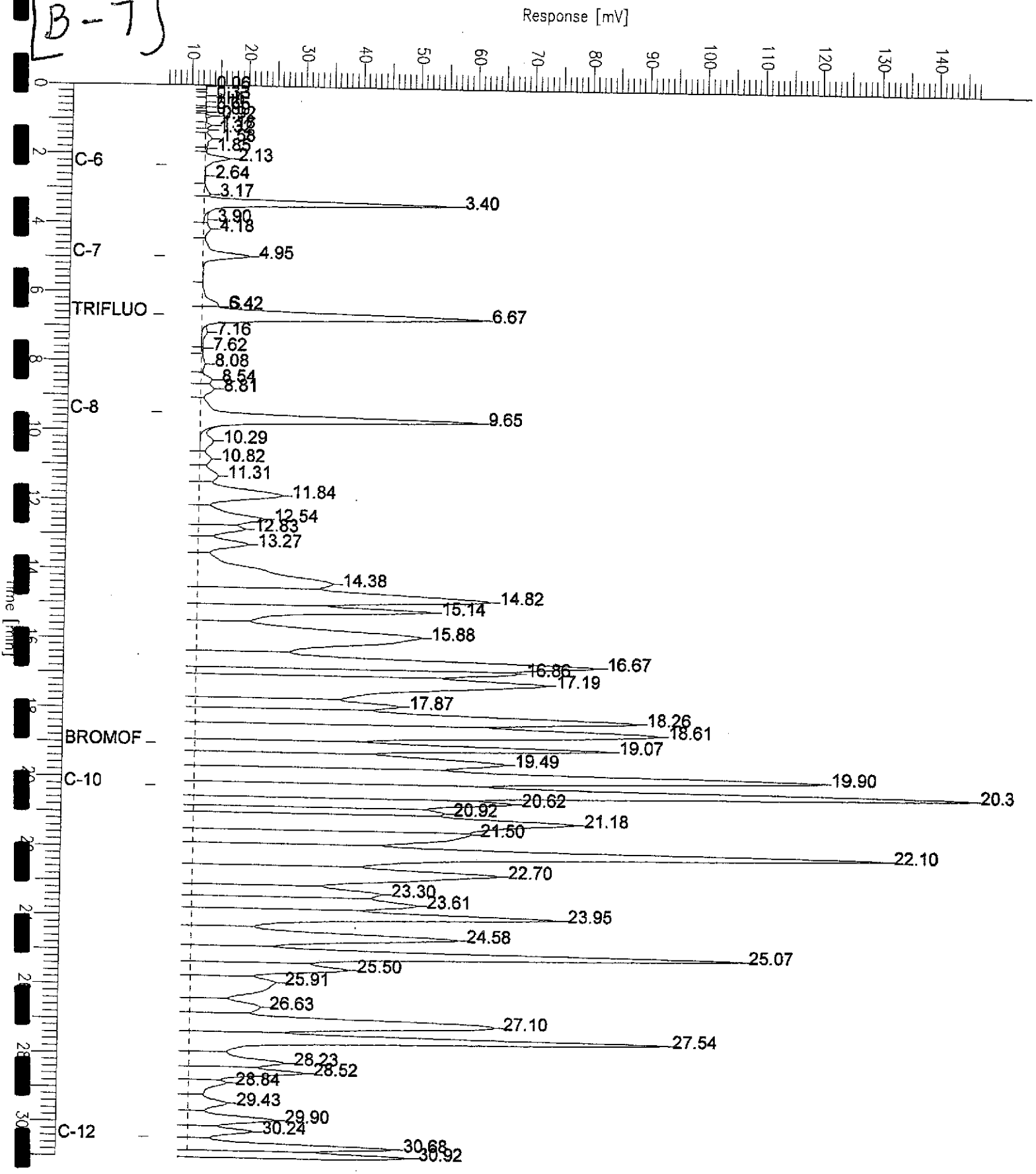


Chromatogram

Sample Name : 151703-003,63352
FileName : G:\GC05\DATA\121G028.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 31.00 min
Scale Factor: 1.0 Plot Offset: 6 mV

Sample #: C1 Page 1 of 1
Date : 5/3/01 02:59 PM
Time of Injection: 5/2/01 01:10 PM
Low Point : 5.67 mV High Point : 147.41 mV
Plot Scale: 141.7 mV

[B-7]



Curtis & Tompkins, Ltd.

Gasoline by GC/FID CA LUFT

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8015M
Matrix:	Water	Batch#:	63352
Units:	ug/L	Received:	04/27/01
Diln Fac:	1.000		

Field ID:	B-10	Sampled:	04/26/01
Type:	SAMPLE	Analyzed:	05/02/01
Lab ID:	151703-004		

Analyte	Result	RL
Gasoline C7-C12	4,700 Z	50
Stoddard Solvent C7-C12	2,400 Z	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	112	59-135
Bromofluorobenzene (FID)	161 *	60-140

Field ID:	LFR-1	Sampled:	04/26/01
Type:	SAMPLE	Analyzed:	05/02/01
Lab ID:	151703-005		

Analyte	Result	RL
Gasoline C7-C12	180 Y Z	50
Stoddard Solvent C7-C12	92 Y Z	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	59-135
Bromofluorobenzene (FID)	106	60-140

Field ID:	GW-2	Sampled:	04/27/01
Type:	SAMPLE	Analyzed:	05/02/01
Lab ID:	151703-006		

Analyte	Result	RL
Gasoline C7-C12	86 Y Z	50
Stoddard Solvent C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	101	59-135
Bromofluorobenzene (FID)	108	60-140

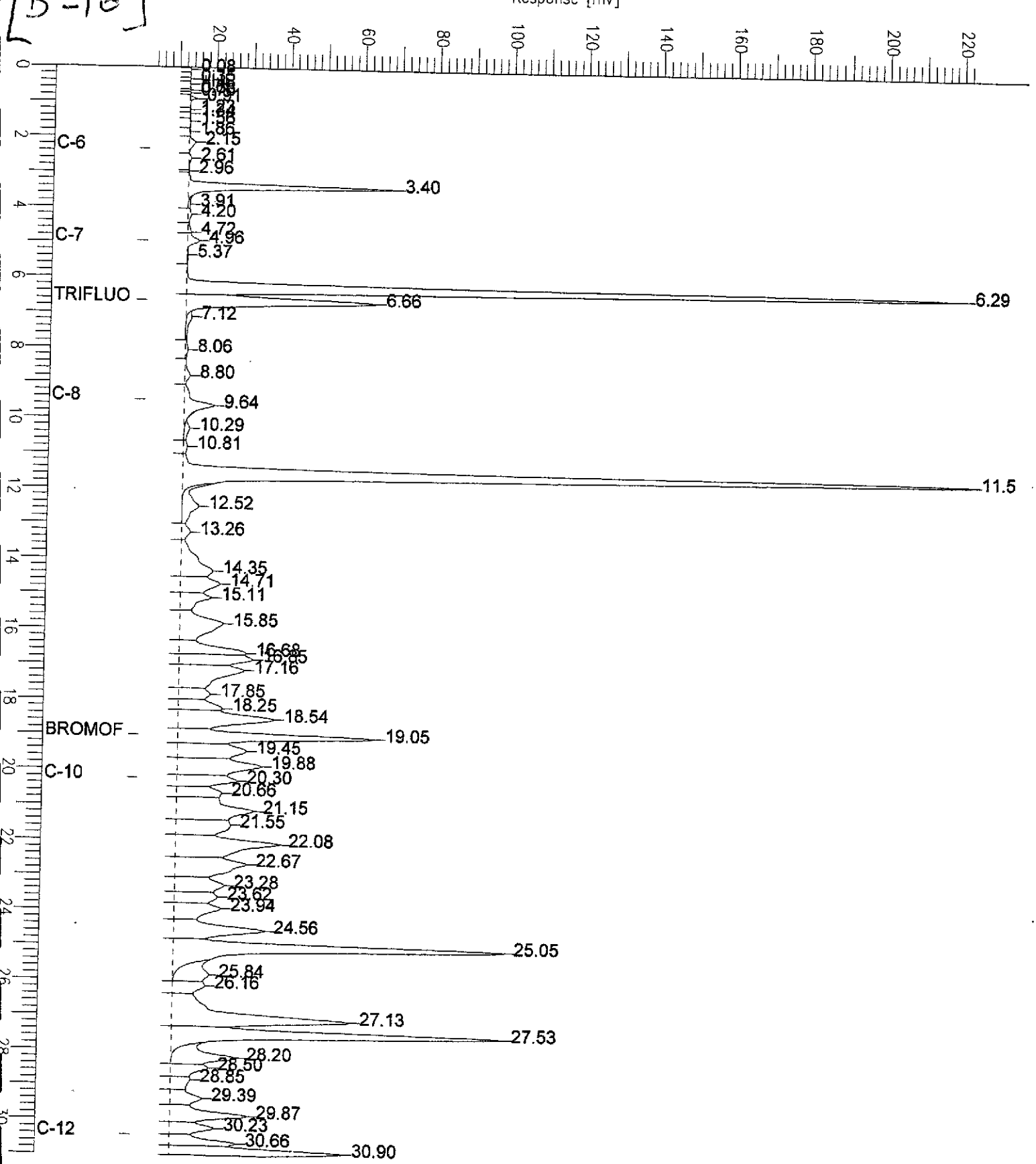
*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits fuel pattern which does not resemble standard
Z= Sample exhibits unknown single peak or peaks
b= See narrative
ND= Not Detected
RL= Reporting Limit
LR= Response exceeds instrument's linear range

Chromatogram

Sample Name : 151703-004,63352
FileName : G:\GC05\DATA\121G027.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 31.00 min
Scale Factor: 1.0 Plot Offset: 2 mV

Sample #: C1 Page 1 of 1
Date : 5/3/01 02:58 PM
Time of Injection: 5/2/01 11:40 AM
Low Point : 2.15 mV High Point : 223.58 mV
Plot Scale: 221.4 mV

[B-10]

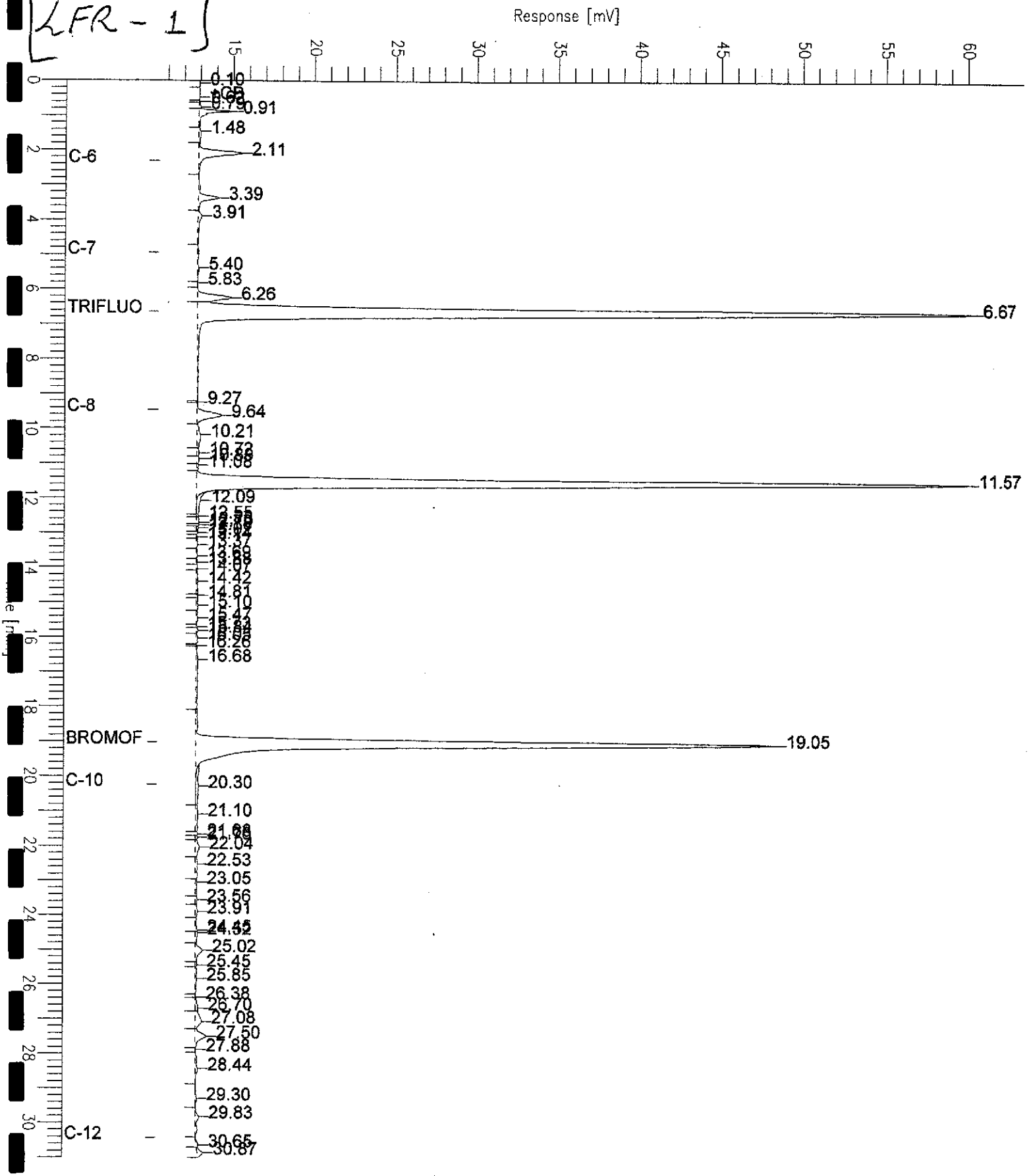


Chromatogram

Sample Name : 151703-005,63352
FileName : G:\GC05\DATA\121G022.raw
thod : TVHBTXE
art Time : 0.00 min End Time : 31.00 min
cale Factor: 1.0 Plot Offset: 10 mV

Sample #: C1 Page 1 of 1
Date : 5/2/01 08:27 AM
Time of Injection: 5/2/01 07:55 AM
Low Point : 10.46 mV High Point : 60.37 mV
Plot Scale: 49.9 mV

[LFR - 1]

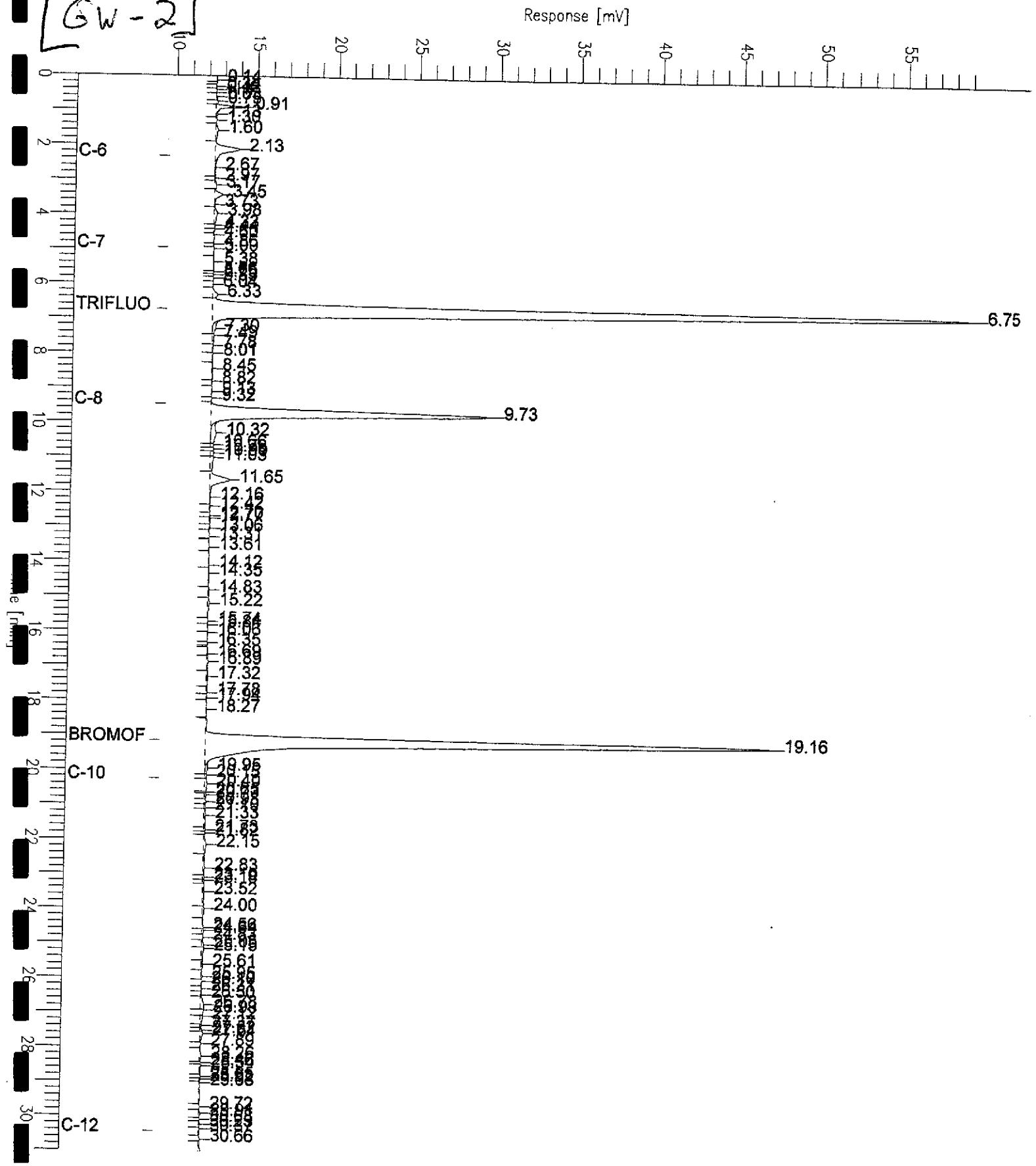


Chromatogram

Sample Name : 151703-006,63352
FileName : G:\GC05\DATA\121G034.raw
ethod : TVHBTXE
tart Time : 0.00 min End Time : 31.00 min
Scale Factor: 1.0 Plot Offset: 10 mV

Sample #: C1 Page 1 of 1
Date : 5/3/01 03:10 PM
Time of Injection: 5/2/01 05:58 PM
Low Point : 9.57 mV High Point : 59.46 mV
Plot Scale: 49.9 mV

[GW-2]



Curtis & Tompkins, Ltd.

Gasoline by GC/FID CA LUFT

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8015M
Matrix:	Water	Batch#:	63352
Units:	ug/L	Received:	04/27/01
Diln Fac:	1.000		

Field ID:	LFR-3	Sampled:	04/27/01
Type:	SAMPLE	Analyzed:	05/02/01
Lab ID:	151703-007		

Analyte	Result	RL
Gasoline C7-C12	ND	50
Stoddard Solvent C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	99	59-135
Bromofluorobenzene (FID)	107	60-140

Field ID:	LFR-2	Sampled:	04/27/01
Type:	SAMPLE	Analyzed:	05/02/01
Lab ID:	151703-008		

Analyte	Result	RL
Gasoline C7-C12	660 H Y	50
Stoddard Solvent C7-C12	330	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	59-135
Bromofluorobenzene (FID)	141 *	60-140

Field ID:	LFR-4	Sampled:	04/27/01
Type:	SAMPLE	Analyzed:	05/02/01
Lab ID:	151703-009		

Analyte	Result	RL
Gasoline C7-C12	440	50
Stoddard Solvent C7-C12	220 Y	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	118	59-135
Bromofluorobenzene (FID)	123	60-140

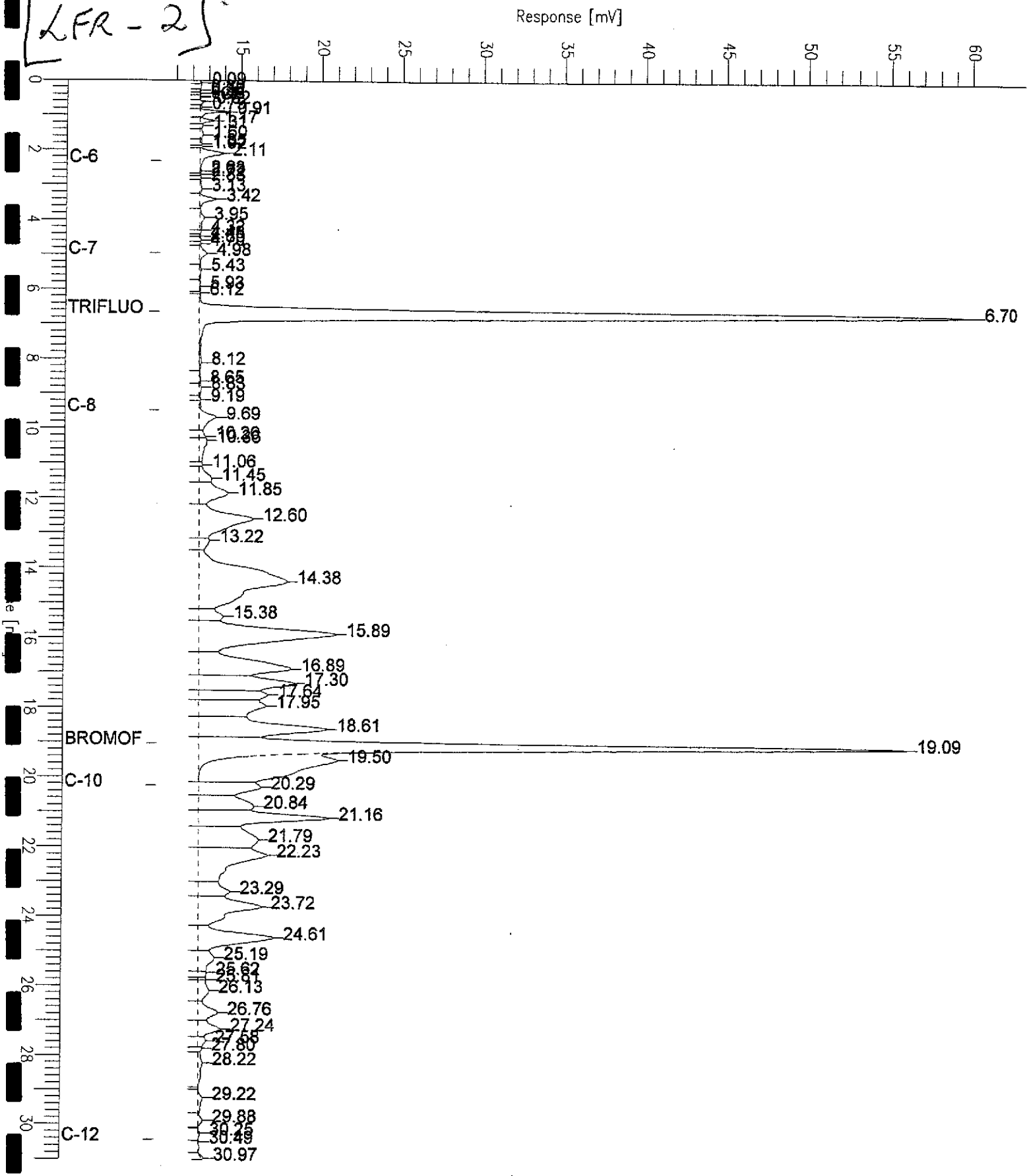
*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits fuel pattern which does not resemble standard
Z= Sample exhibits unknown single peak or peaks
b= See narrative
ND= Not Detected
RL= Reporting Limit
R= Response exceeds instrument's linear range

Chromatogram

Sample Name : 151703-008,63352
FileName : G:\GC05\DATA\121G036.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 31.00 min
Scale Factor: 1.0 Plot Offset: 10 mV

Sample #: C1 Page 1 of 1
Date : 5/2/01 08:02 PM
Time of Injection: 5/2/01 07:31 PM
Low Point : 10.05 mV High Point : 60.19 mV
Plot Scale: 50.1 mV

[LFR - 2]

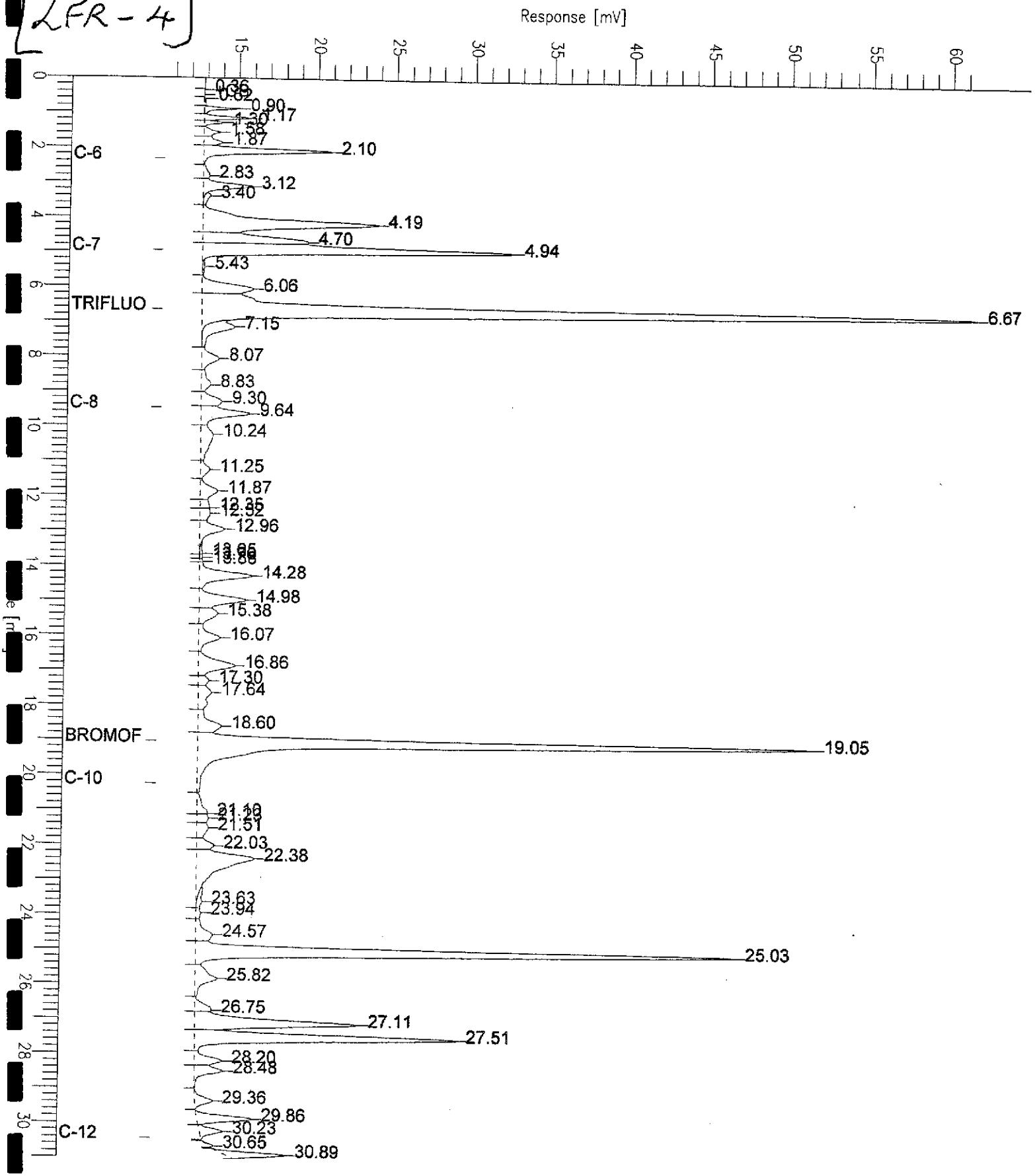


Chromatogram

Sample Name : 151703-009,63352
FileName : G:\GC05\DATA\121G026.raw
ethod : TVHBTXE
tart Time : 0.00 min End Time : 31.00 min
cale Factor: 1.0 Plot Offset: 10 mV

Sample #: C1 Page 1 of 1
Date : 5/2/01 11:27 AM
Time of Injection: 5/2/01 10:55 AM
Low Point : 10.31 mV High Point : 61.74 mV
Plot Scale: 51.4 mV

[LFR-4]



Curtis & Tompkins, Ltd.

Gasoline by GC/FID CA LUFT

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8015M
Matrix:	Water	Batch#:	63352
Units:	ug/L	Received:	04/27/01
Diln Fac:	1.000		

Field ID:	MW-11	Sampled:	04/27/01
Type:	SAMPLE	Analyzed:	05/02/01
Lab ID:	151703-010		

Analyte	Result	RL
Gasoline C7-C12	ND	50
Stoddard Solvent C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	101	59-135
Bromofluorobenzene (FID)	110	60-140

Field ID:	GW-3	Sampled:	04/27/01
Type:	SAMPLE	Analyzed:	05/02/01
Lab ID:	151703-011		

Analyte	Result	RL
Gasoline C7-C12	62 Y Z	50
Stoddard Solvent C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	59-135
Bromofluorobenzene (FID)	111	60-140

Type:	BLANK	Analyzed:	05/01/01
Lab ID:	QC144412		

Analyte	Result	RL
Gasoline C7-C12	ND	50
Stoddard Solvent C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	106	59-135
Bromofluorobenzene (FID)	106	60-140

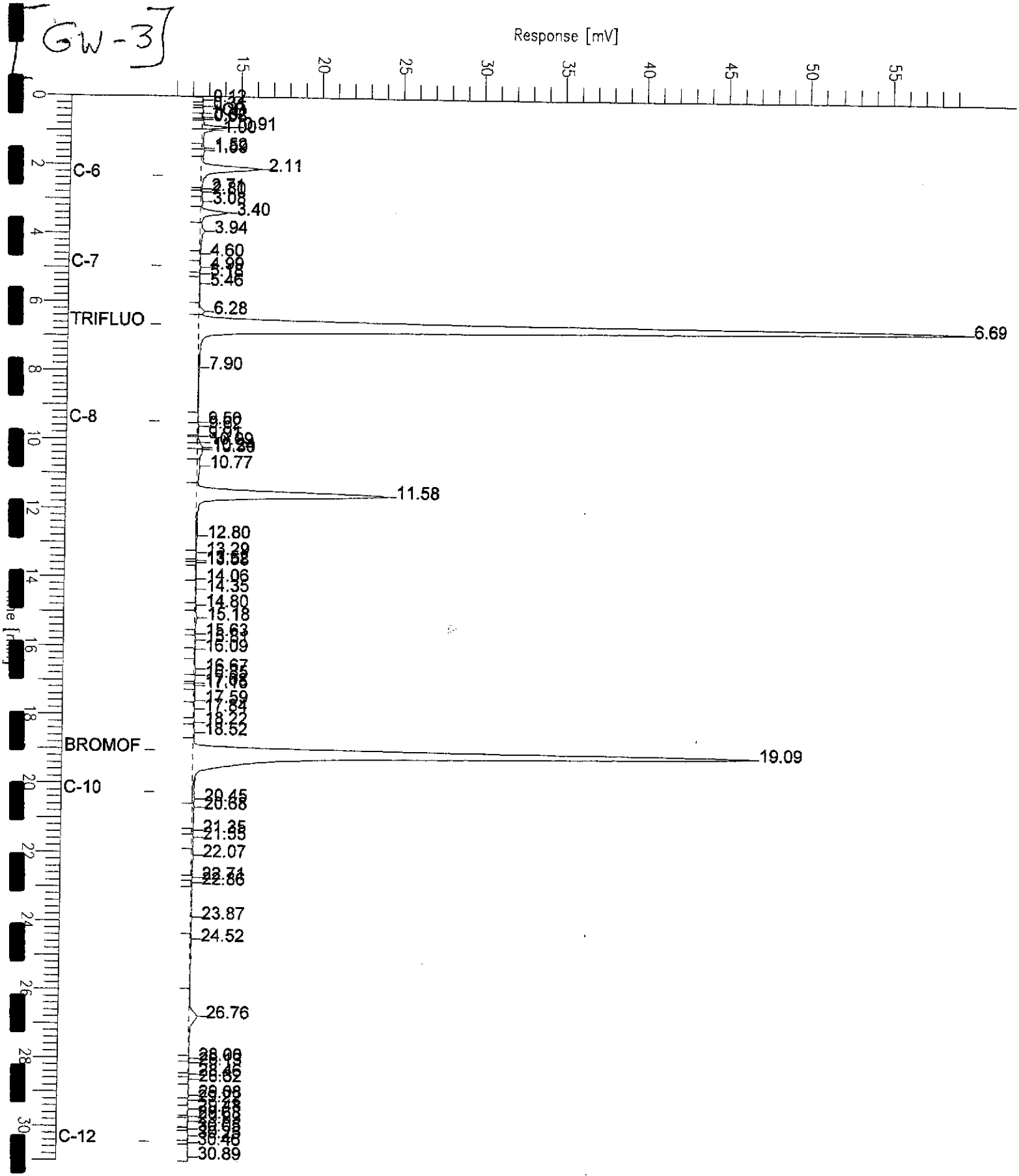
*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits fuel pattern which does not resemble standard
Z= Sample exhibits unknown single peak or peaks
b= See narrative
ND= Not Detected
RL= Reporting Limit
> R= Response exceeds instrument's linear range

Chromatogram

Sample Name : MSS,151703-011,63352
FileName : G:\GC05\DATA\121G038.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 31.00 min
Scale Factor: 1.0 Plot Offset: 10 mV

Sample #: C1
Date : 5/2/01 09:30 PM
Time of Injection: 5/2/01 08:59 PM
Low Point : 10.20 mV High Point : 59.53 mV
Plot Scale: 49.3 mV

GW-3

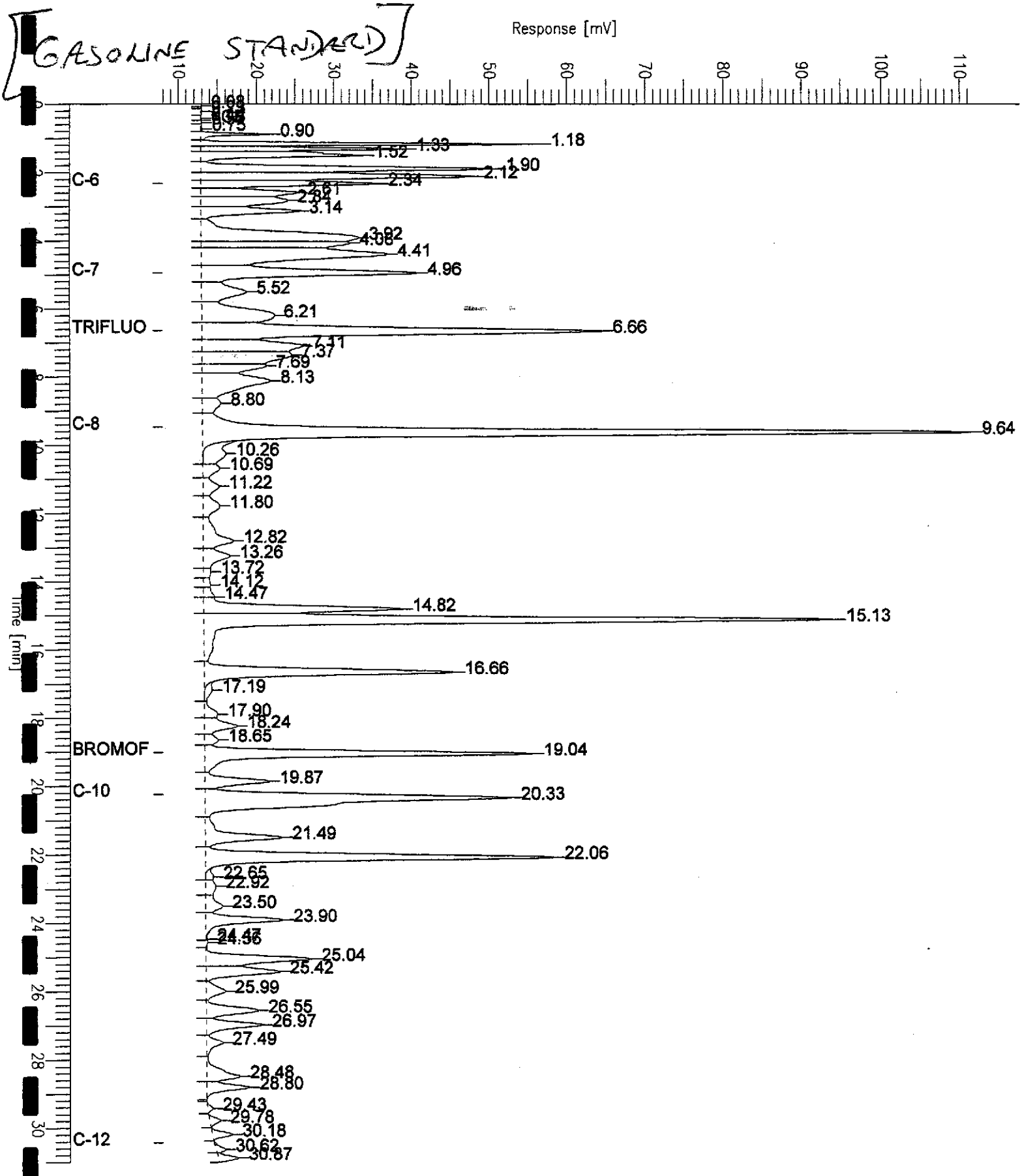


Chromatogram

Sample Name : CCV/LCS,QC144410,63352,01WS1024,5/5000
FileName : G:\GC05\DATA\121G003.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 31.00 min
Scale Factor: 1.0 Plot Offset: 8 mV

Sample #: Page 1 of 1
Date : 5/1/01 06:37 PM
Time of Injection: 5/1/01 06:07 PM
Low Point : 7.96 mV High Point : 111.53 mV
Plot Scale: 103.6 mV

[GASOLINE STANDARD]

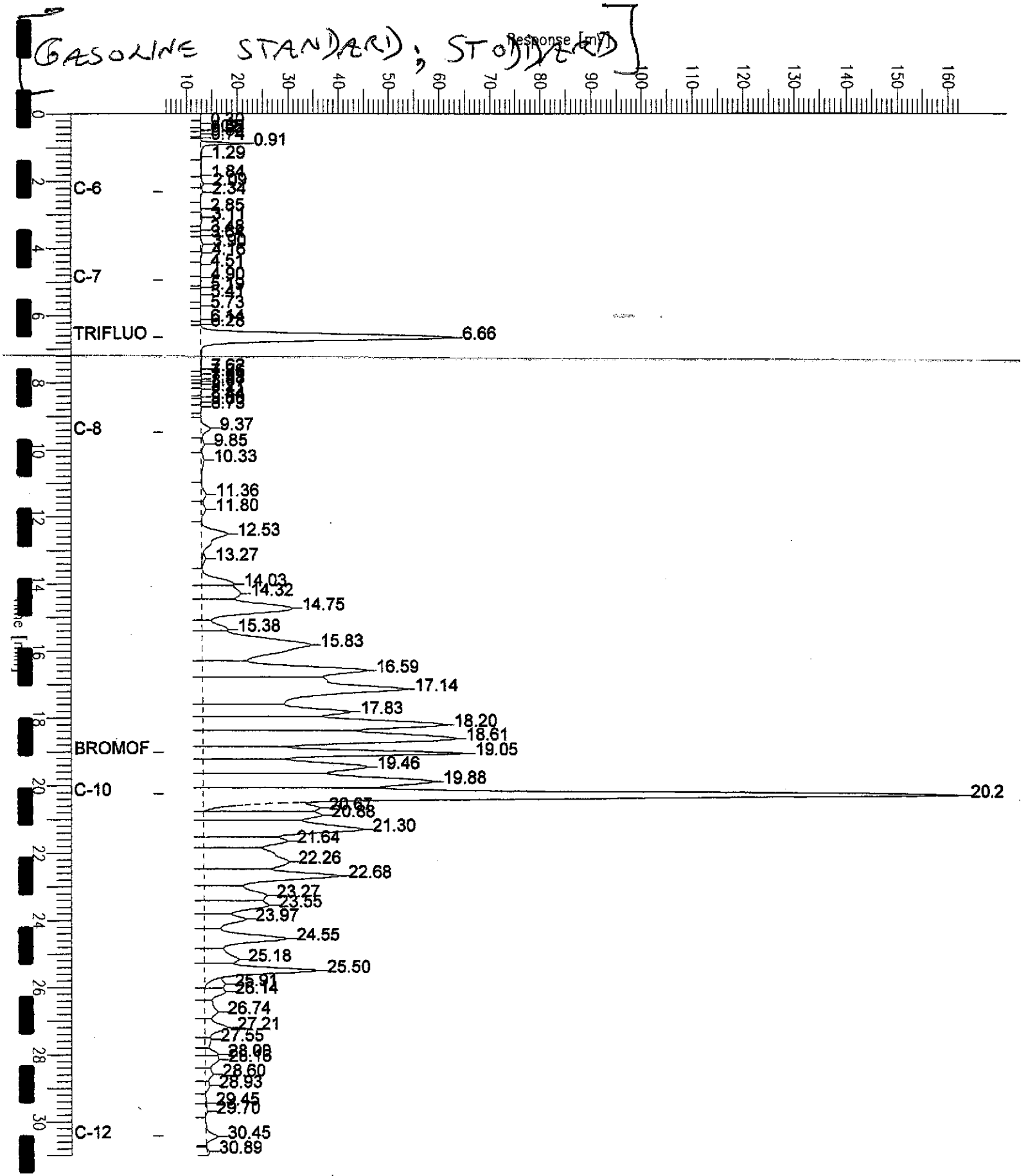


Chromatogram

Sample Name : CCV,STODDARD,63352,01WS0540,5/5000
FileName : G:\GC05\DATA\121G002.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 31.00 min
Scale Factor: 1.0 Plot Offset: 5 mV

Sample #: Page 1 of 1
Date : 5/1/01 05:53 PM
Time of Injection: 5/1/01 05:22 PM
Low Point : 5.37 mV High Point : 162.17 mV
Plot Scale: 156.8 mV

GASOLINE STANDARD; STOD/BTXE



Curtis & Tompkins, Ltd.

Gasoline by GC/FID CA LUFT

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8015M
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC144410	Batch#:	63352
Matrix:	Water	Analyzed:	05/01/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,902	95	73-121

Surrogate	%REC	Limits
Trifluorotoluene (FID)	120	59-135
Bromofluorobenzene (FID)	114	60-140

Curtis & Tompkins, Ltd.

Gasoline by GC/FID CA LUFT

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8015M
Field ID:	GW-3	Batch#:	63352
MSS Lab ID:	151703-011	Sampled:	04/27/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/02/01
Diln Fac:	1.000		

Type: MS Lab ID: QC144413

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	61.71	2,000	1,828	88	65-131

Surrogate	%REC	Limits
Trifluorotoluene (FID)	113	59-135
Bromofluorobenzene (FID)	117	60-140

Type: MSD Lab ID: QC144414

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,804	87	65-131	1	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	112	59-135
Bromofluorobenzene (FID)	115	60-140

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8021B
Matrix:	Water	Diln Fac:	1.000
Units:	ug/L	Received:	04/27/01

Field ID:	TRIP BLANK	Batch#:	63401
Type:	SAMPLE	Sampled:	04/26/01
Lab ID:	151703-001	Analyzed:	05/04/01

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	84	56-142
Bromofluorobenzene (PID)	88	55-149

Field ID:	LFR 2-2	Batch#:	63352
Type:	SAMPLE	Sampled:	04/27/01
Lab ID:	151703-002	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	ND	2.0
Benzene	0.59	0.50
Toluene	1.9	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	13	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	84	56-142
Bromofluorobenzene (PID)	94	55-149

Field ID:	B-7	Batch#:	63352
Type:	SAMPLE	Sampled:	04/26/01
Lab ID:	151703-003	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	6.9	2.0
Benzene	11	0.50
Toluene	71	0.50
Ethylbenzene	77 C	0.50
m,p-Xylenes	68	0.50
o-Xylene	140	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	83	56-142
Bromofluorobenzene (PID)	116	55-149

C= Presence confirmed, but confirmation concentration differed by more than a factor of two
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8021B
Matrix:	Water	Diln Fac:	1.000
Units:	ug/L	Received:	04/27/01

Field ID:	B-10	Batch#:	63352
Type:	SAMPLE	Sampled:	04/26/01
Lab ID:	151703-004	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	2.5	2.0
Benzene	4.1	0.50
Toluene	13	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	11	0.50
o-Xylene	18	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	107	56-142
Bromofluorobenzene (PID)	96	55-149

Field ID:	LFR-1	Batch#:	63352
Type:	SAMPLE	Sampled:	04/26/01
Lab ID:	151703-005	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	4.4	2.0
Benzene	ND	0.50
Toluene	2.0	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	83	56-142
Bromofluorobenzene (PID)	85	55-149

Field ID:	GW-2	Batch#:	63352
Type:	SAMPLE	Sampled:	04/27/01
Lab ID:	151703-006	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	2.2	2.0
Benzene	ND	0.50
Toluene	24	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	77	56-142
Bromofluorobenzene (PID)	86	55-149

C= Presence confirmed, but confirmation concentration differed by more than a factor of two
ND= Not Detected
L= Reporting Limit

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8021B
Matrix:	Water	Diln Fac:	1.000
Units:	ug/L	Received:	04/27/01

Field ID:	LFR-3	Batch#:	63352
Type:	SAMPLE	Sampled:	04/27/01
Lab ID:	151703-007	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	2.4	2.0
Benzene	ND	0.50
Toluene	5.4	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	76	56-142
Bromofluorobenzene (PID)	87	55-149

Field ID:	LFR-2	Batch#:	63352
Type:	SAMPLE	Sampled:	04/27/01
Lab ID:	151703-008	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	1.3	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	79	56-142
Bromofluorobenzene (PID)	109	55-149

Field ID:	LFR-4	Batch#:	63352
Type:	SAMPLE	Sampled:	04/27/01
Lab ID:	151703-009	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	5.8	2.0
Benzene	27	0.50
Toluene	3.6	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	90	56-142
Bromofluorobenzene (PID)	93	55-149

C= Presence confirmed, but confirmation concentration differed by more than a factor of two
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8021B
Matrix:	Water	Diln Fac:	1.000
Units:	ug/L	Received:	04/27/01

Field ID:	MW-11	Batch#:	63352
Type:	SAMPLE	Sampled:	04/27/01
Lab ID:	151703-010	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	4.3	2.0
Benzene	ND	0.50
Toluene	2.2	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	80	56-142
Bromofluorobenzene (PID)	89	55-149

Field ID:	GW-3	Batch#:	63352
Type:	SAMPLE	Sampled:	04/27/01
Lab ID:	151703-011	Analyzed:	05/02/01

Analyte	Result	RL
MTBE	5.6	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	82	56-142
Bromofluorobenzene (PID)	91	55-149

Type:	BLANK	Batch#:	63352
Lab ID:	QC144412	Analyzed:	05/01/01

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	84	56-142
Bromofluorobenzene (PID)	86	55-149

C= Presence confirmed, but confirmation concentration differed by more than a factor of two
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8021B
Matrix:	Water	Diln Fac:	1.000
Units:	ug/L	Received:	04/27/01

Type:	BLANK	Batch#:	63401
Lab ID:	QC144581	Analyzed:	05/03/01

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	79	56-142
Bromofluorobenzene (PID)	82	55-149

C= Presence confirmed, but confirmation concentration differed by more than a factor of two
ND= Not Detected
L= Reporting Limit

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC144411	Batch#:	63352
Matrix:	Water	Analyzed:	05/01/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.15	96	51-125
Benzene	20.00	20.37	102	67-117
Toluene	20.00	20.18	101	69-117
Ethylbenzene	20.00	21.17	106	68-124
m,p-Xylenes	40.00	43.04	108	70-125
o-Xylene	20.00	21.56	108	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	85	56-142
Bromofluorobenzene (PID)	90	55-149

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8021B
Matrix:	Water	Batch#:	63401
Units:	ug/L	Analyzed:	05/03/01
Dil'n Fac:	1.000		

Type: BS Lab ID: QC144579

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	18.94	95	51-125
Benzene	20.00	20.52	103	67-117
Toluene	20.00	19.93	100	69-117
Ethylbenzene	20.00	21.13	106	68-124
m,p-Xylenes	40.00	44.12	110	70-125
o-Xylene	20.00	22.12	111	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	81	56-142
Bromofluorobenzene (PID)	85	55-149

Type: BSD Lab ID: QC144580

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	18.84	94	51-125	1	20
Benzene	20.00	20.39	102	67-117	1	20
Toluene	20.00	20.16	101	69-117	1	20
Ethylbenzene	20.00	21.39	107	68-124	1	20
m,p-Xylenes	40.00	44.37	111	70-125	1	20
o-Xylene	20.00	21.95	110	65-129	1	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	81	56-142
Bromofluorobenzene (PID)	85	55-149

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	TRIP BLANK	Batch#:	63340
Lab ID:	151703-001	Sampled:	04/26/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/01/01
Diln Fac:	1.000		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	ND	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	110	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	112	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	LFR 2-2	Batch#:	63340
Lab ID:	151703-002	Sampled:	04/27/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/01/01
Diln Fac:	1.000		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	1.9	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	6.5	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	0.7	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	110	78-123
Toluene-d8	107	80-110
Bromofluorobenzene	107	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	B-7	Batch#:	63340
Lab ID:	151703-003	Sampled:	04/26/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/01/01
Diln Fac:	6.250		

Analyte	Result	RL
Chloromethane	ND	6.3
Vinyl Chloride	ND	3.1
Bromomethane	ND	6.3
Chloroethane	ND	6.3
Trichlorofluoromethane	ND	3.1
Freon 113	ND	6.3
1,1-Dichloroethene	ND	3.1
Methylene Chloride	ND	130
trans-1,2-Dichloroethene	6.9	3.1
1,1-Dichloroethane	ND	3.1
cis-1,2-Dichloroethene	1,100	3.1
Chloroform	ND	6.3
1,1,1-Trichloroethane	ND	3.1
Carbon Tetrachloride	ND	3.1
1,2-Dichloroethane	ND	3.1
Trichloroethene	ND	3.1
1,2-Dichloropropane	ND	3.1
Bromodichloromethane	ND	3.1
cis-1,3-Dichloropropene	ND	3.1
trans-1,3-Dichloropropene	ND	3.1
1,1,2-Trichloroethane	ND	3.1
Tetrachloroethene	ND	3.1
Dibromochloromethane	ND	3.1
Chlorobenzene	ND	3.1
Bromoform	ND	3.1
1,1,2,2-Tetrachloroethane	ND	3.1
1,3-Dichlorobenzene	ND	3.1
1,4-Dichlorobenzene	ND	3.1
1,2-Dichlorobenzene	ND	3.1

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	112	78-123
Toluene-d8	109	80-110
Bromofluorobenzene	107	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	B-10	Batch#:	63340
Lab ID:	151703-004	Sampled:	04/26/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/02/01
Diln Fac:	50.00		

Analyte	Result	RL
Chloromethane	ND	50
Vinyl Chloride	ND	25
Bromomethane	ND	50
Chloroethane	ND	50
Trichlorofluoromethane	ND	25
Freon 113	ND	50
1,1-Dichloroethene	ND	25
Methylene Chloride	ND	1,000
trans-1,2-Dichloroethene	43	25
1,1-Dichloroethane	ND	25
cis-1,2-Dichloroethene	7,300	25
Chloroform	ND	50
1,1,1-Trichloroethane	ND	25
Carbon Tetrachloride	ND	25
1,2-Dichloroethane	ND	25
Trichloroethene	1,400	25
1,2-Dichloropropane	ND	25
Bromodichloromethane	ND	25
cis-1,3-Dichloropropene	ND	25
trans-1,3-Dichloropropene	ND	25
1,1,2-Trichloroethane	ND	25
Tetrachloroethene	1,700	25
Dibromochloromethane	ND	25
Chlorobenzene	ND	25
Bromoform	ND	25
1,1,2,2-Tetrachloroethane	ND	25
1,3-Dichlorobenzene	ND	25
1,4-Dichlorobenzene	ND	25
1,2-Dichlorobenzene	ND	25

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	106	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	105	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	LFR-1	Batch#:	63340
Lab ID:	151703-005	Sampled:	04/26/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/02/01
Diln Fac:	2.500		

Analyte	Result	RL
Chloromethane	ND	2.5
Vinyl Chloride	ND	1.3
Bromomethane	ND	2.5
Chloroethane	ND	2.5
Trichlorofluoromethane	ND	1.3
Freon 113	ND	2.5
1,1-Dichloroethene	ND	1.3
Methylene Chloride	ND	50
trans-1,2-Dichloroethene	ND	1.3
1,1-Dichloroethane	ND	1.3
cis-1,2-Dichloroethene	5.0	1.3
Chloroform	ND	2.5
1,1,1-Trichloroethane	ND	1.3
Carbon Tetrachloride	ND	1.3
1,2-Dichloroethane	ND	1.3
Trichloroethene	13	1.3
1,2-Dichloropropane	ND	1.3
Bromodichloromethane	ND	1.3
cis-1,3-Dichloropropene	ND	1.3
trans-1,3-Dichloropropene	ND	1.3
1,1,2-Trichloroethane	ND	1.3
Tetrachloroethene	440	1.3
Dibromochloromethane	ND	1.3
Chlorobenzene	ND	1.3
Bromoform	ND	1.3
1,1,2,2-Tetrachloroethane	ND	1.3
1,3-Dichlorobenzene	ND	1.3
1,4-Dichlorobenzene	ND	1.3
1,2-Dichlorobenzene	ND	1.3

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	105	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	105	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	GW-2	Batch#:	63340
Lab ID:	151703-006	Sampled:	04/27/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/01/01
Diln Fac:	1.000		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	2.4	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	1.8	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	9.6	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	110	78-123
Toluene-d8	106	80-110
Bromofluorobenzene	109	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	LFR-3	Batch#:	63340
Lab ID:	151703-007	Sampled:	04/27/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/02/01
Diln Fac:	1.000		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	ND	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	1.9	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	78-123
Toluene-d8	106	80-110
Bromofluorobenzene	107	80-115

ND Not Detected
RL Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	LFR-2	Batch#:	63340
Lab ID:	151703-008	Sampled:	04/27/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/02/01
Dil'n Fac:	1.000		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	1.3	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	5.6	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	0.7	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	107	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	LFR-4	Batch#:	63368
Lab ID:	151703-009	Sampled:	04/27/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/02/01
Diln Fac:	1.000		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	1.6	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	107	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	108	80-115

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	MW-11	Batch#:	63368
Lab ID:	151703-010	Sampled:	04/27/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/02/01
Dil'n Fac:	1.000		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	ND	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	107	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	108	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	GW-3	Batch#:	63368
Lab ID:	151703-011	Sampled:	04/27/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Analyzed:	05/02/01
Dil'n Fac:	1.000		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	1.5	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	0.7	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	79	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	107	78-123
Toluene-d8	104	80-110
Bromofluorobenzene	109	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC144358	Batch#:	63340
Matrix:	Water	Analyzed:	05/01/01
Units:	ug/L		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	ND	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	110	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	109	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC144359	Batch#:	63340
Matrix:	Water	Analyzed:	05/01/01
Units:	ug/L		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	ND	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	111	78-123
Toluene-d8	106	80-110
Bromofluorobenzene	109	80-115

ND Not Detected
RL Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC144470	Batch#:	63368
Matrix:	Water	Analyzed:	05/02/01
Units:	ug/L		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	ND	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	78-123
Toluene-d8	104	80-110
Bromofluorobenzene	107	80-115

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC144471	Batch#:	63368
Matrix:	Water	Analyzed:	05/02/01
Units:	ug/L		

Analyte	Result	RL
Chloromethane	ND	1.0
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Chloroethane	ND	1.0
Trichlorofluoromethane	ND	0.5
Freon 113	ND	1.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	20
trans-1,2-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
cis-1,2-Dichloroethene	ND	0.5
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
cis-1,3-Dichloropropene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
Chlorobenzene	ND	0.5
Bromoform	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	107	78-123
Toluene-d8	104	80-110
Bromofluorobenzene	110	80-115

ND = Not Detected
RL = Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	63340
Units:	ug/L	Analyzed:	05/01/01
Diln Fac:	1.000		

Type: BS Lab ID: QC144356

Analyte	Spiked	Result	%REC	Limits
1,1-Dichloroethene	50.00	58.99	118	74-132
Trichloroethene	50.00	53.53	107	80-119
Chlorobenzene	50.00	51.58	103	80-117

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	104	80-115

Type: BSD Lab ID: QC144357

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	50.00	56.38	113	74-132	5	20
Trichloroethene	50.00	52.89	106	80-119	1	20
Chlorobenzene	50.00	50.99	102	80-117	1	20

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	78-123
Toluene-d8	105	80-110
Bromofluorobenzene	103	80-115

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC144469	Batch#:	63368
Matrix:	Water	Analyzed:	05/02/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
1,1-Dichloroethene	50.00	59.04	118	74-132
Trichloroethene	50.00	53.77	108	80-119
Chlorobenzene	50.00	51.96	104	80-117

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	107	78-123
Toluene-d8	104	80-110
Bromofluorobenzene	103	80-115

Curtis & Tompkins, Ltd.

Purgeable Halocarbons by GC/MS

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030
Project#:	2510	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	63368
MSS Lab ID:	151713-001	Sampled:	04/27/01
Matrix:	Water	Received:	04/30/01
Units:	ug/L	Analyzed:	05/02/01
Diln Fac:	1.000		

Type: MS Lab ID: QC144472

Analyte	MSS Result	Spiked	Result	%REC	Limits
1,1-Dichloroethene	ND	50.00	56.74	113	70-132
Trichloroethene	ND	50.00	52.05	104	62-137
Chlorobenzene	ND	50.00	50.19	100	80-117

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	78-123
Toluene-d8	106	80-110
Bromofluorobenzene	103	80-115

Type: MSD Lab ID: QC144473

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	50.00	56.53	113	70-132	0	20
Trichloroethene	50.00	52.41	105	62-137	1	20
Chlorobenzene	50.00	50.65	101	80-117	1	20

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	78-123
Toluene-d8	106	80-110
Bromofluorobenzene	101	80-115

ND= Not Detected
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	METHOD
Project#:	2510	Analysis:	EPA 310.1
Matrix:	Water	Sampled:	04/26/01
Units:	mg/L	Received:	04/27/01
Batch#:	63407	Analyzed:	05/03/01

Field ID:	B-10	Lab ID:	151703-004
Type:	SAMPLE	Diln Fac:	2.500

Analyte	Result	RL
Alkalinity, Bicarbonate	410	2.5
Alkalinity, Carbonate	ND	2.5
Alkalinity, Hydroxide	ND	2.5
Alkalinity, Total as CaCO3	410	2.5

Field ID:	LFR-1	Lab ID:	151703-005
Type:	SAMPLE	Diln Fac:	1.250

Analyte	Result	RL
Alkalinity, Bicarbonate	120	1.3
Alkalinity, Carbonate	ND	1.3
Alkalinity, Hydroxide	ND	1.3
Alkalinity, Total as CaCO3	120	1.3

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC144602		

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

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	METHOD
Project#:	2510	Analysis:	EPA 310.1
Analyte:	Alkalinity, Total as CaCO3	Units:	mg/L
Type:	LCS	Diln Fac:	1.250
Lab ID:	QC144603	Batch#:	63407
Matrix:	Water	Analyzed:	05/03/01

Spiked	Result	%REC	Limits
200.0	185.1	93	80-110

Alkalinity

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	METHOD
Project#:	2510	Analysis:	EPA 310.1
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	1.250
Field ID:	LFR-1	Batch#:	63407
MSS Lab ID:	151703-005	Sampled:	04/26/01
Matrix:	Water	Received:	04/27/01
Units:	mg/L	Analyzed:	05/03/01

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC144604	124.4	250.0	360.7	95	69-112		
MSD	QC144605		250.0	355.7	93	69-112	1	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	METHOD
Project#:	2510	Analysis:	EPA 300.0
Matrix:	Water	Sampled:	04/26/01
Units:	mg/L	Received:	04/27/01
Batch#:	63397	Analyzed:	05/03/01

Field ID: B-10 Lab ID: 151703-004
Type: SAMPLE

Analyte	Result	RL	Diln Fac
Alkalinity, Total as CaCO3	NA		
Chloride	74	2.0	10.00
Sulfate	ND	0.50	1.000

Field ID: LFR-1 Lab ID: 151703-005
Type: SAMPLE Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Total as CaCO3	NA	
Chloride	120	2.0
Sulfate	36	5.0

Type: BLANK Diln Fac: 1.000
Lab ID: QC144563

Analyte	Result	RL
Alkalinity, Total as CaCO3	NA	
Chloride	ND	0.20
Sulfate	ND	0.50

NA= Not Analyzed
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	METHOD
Project#:	2510	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	63397
Units:	mg/L	Analyzed:	05/03/01
Diln Fac:	1.000		

Type: BS Lab ID: QC144564

Analyte	Spiked	Result	%REC	Limits
Alkalinity, Total as CaCO3		NA		
Chloride	10.00	9.640	96	80-120
Sulfate	20.00	20.03	100	80-120

Type: BSD Lab ID: QC144565

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Alkalinity, Total as CaCO3		NA				
Chloride	10.00	9.620	96	80-120	0	20
Sulfate	20.00	19.54	98	80-120	2	20

NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	METHOD
Project#:	2510	Analysis:	EPA 300.0
Field ID:	B-10	Batch#:	63397
MSS Lab ID:	151703-004	Sampled:	04/26/01
Matrix:	Water	Received:	04/27/01
Units:	mg/L	Analyzed:	05/03/01
Diln Fac:	10.00		

Type: MS Lab ID: QC144566

Analyte	MSS Result	Spiked	Result	%REC	Limits
Alkalinity, Total as CaCO3			NA		
Chloride	74.07	50.00	124.4	101	75-125
Sulfate	<0.5000	100.0	101.2	101	75-125

Type: MSD Lab ID: QC144567

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Alkalinity, Total as CaCO3		NA				
Chloride	50.00	125.3	102	75-125	1	25
Sulfate	100.0	101.0	101	75-125	0	25

NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 3010
Project#:	2510	Analysis:	EPA 6010B
Matrix:	Water	Sampled:	04/26/01
Units:	ug/L	Received:	04/27/01
Diln Fac:	1.000	Prepared:	05/01/01
Batch#:	63363	Analyzed:	05/02/01

Field ID: B-10 Lab ID: 151703-004
Type: SAMPLE

Analyte	Result	RL
Calcium	43,000	500
Magnesium	56,000	500
Potassium	ND	500
Sodium	110,000	500

Field ID: LFR-1 Lab ID: 151703-005
Type: SAMPLE

Analyte	Result	RL
Calcium	47,000	500
Magnesium	45,000	500
Potassium	1,800	500
Sodium	46,000	500

Type: BLANK Lab ID: QC144446

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

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 3010
Project#:	2510	Analysis:	EPA 6010B
Matrix:	Water	Batch#:	63363
Units:	ug/L	Prepared:	05/01/01
Diln Fac:	1.000	Analyzed:	05/02/01

Type: BS Lab ID: QC144447

Analyte	Spiked	Result	%REC	Limits
Calcium	20,000	18,620	93	69-128
Magnesium	20,000	18,960	95	80-119
Potassium	10,000	9,833	98	80-112
Sodium	20,000	19,460	97	80-116

Type: BSD Lab ID: QC144448

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	18,740	94	69-128	1	44
Magnesium	20,000	19,050	95	80-119	0	42
Potassium	10,000	9,706	97	80-112	1	33
Sodium	20,000	19,540	98	80-116	0	28

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	151703	Location:	GLOVATORIUM
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 3010
Project#:	2510	Analysis:	EPA 6010B
Field ID:	ZZZZZZZZZZ	Batch#:	63363
MSS Lab ID:	151704-001	Sampled:	04/26/01
Matrix:	Water	Received:	04/27/01
Units:	ug/L	Prepared:	05/01/01
Diln Fac:	1.000	Analyzed:	05/02/01

Type: MS Lab ID: QC144449

Analyte	MSS Result	Spiked	Result	%REC	Limits
Calcium	95.03	20,000	19,440	97	57-134
Magnesium	31.84	20,000	19,710	98	76-122
Potassium	<390.0	10,000	10,160	102	79-120
Sodium	110.0	20,000	20,670	103	67-133

Type: MSD Lab ID: QC144450

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	19,730	98	57-134	1	20
Magnesium	20,000	20,000	100	76-122	1	20
Potassium	10,000	10,230	102	79-120	1	27
Sodium	20,000	20,770	103	67-133	0	20

RPD= Relative Percent Difference

OXYGEN SOLUBILITY AND CALIBRATION VALUE TABLES

TABLE A — Solubility of Oxygen in mg/L in Water Exposed to Air at 760 mm Hg Pressure

Temp °C	Chlorinity: 0 Salinity: 0	5.0 9.0	10.0 18.1	15.0 27.1	20.0 36.1	25.0 45.2
0.0	14.62	13.73	12.89	12.10	11.36	10.66
1.0	14.22	13.36	12.55	11.78	11.07	10.39
2.0	13.83	13.00	12.22	11.48	10.79	10.14
3.0	13.46	12.66	11.91	11.20	10.53	9.90
4.0	13.11	12.34	11.61	10.92	10.27	9.66
5.0	12.77	12.02	11.32	10.66	10.03	9.44
6.0	12.45	11.73	11.05	10.40	9.80	9.23
7.0	12.14	11.44	10.78	10.16	9.58	9.02
8.0	11.84	11.17	10.53	9.93	9.36	8.83
9.0	11.56	10.91	10.29	9.71	9.16	8.64
10.0	11.29	10.66	10.06	9.49	8.96	8.45
11.0	11.03	10.42	9.84	9.29	8.77	8.28
12.0	10.78	10.18	9.62	9.09	8.59	8.11
13.0	10.54	9.96	9.42	8.90	8.41	7.95
14.0	10.31	9.75	9.22	8.72	8.24	7.79
15.0	10.08	9.54	9.03	8.54	8.08	7.64
16.0	9.87	9.34	8.84	8.37	7.92	7.50
17.0	9.67	9.15	8.67	8.21	7.77	7.36
18.0	9.47	8.97	8.50	8.05	7.62	7.22
19.0	9.28	8.79	8.33	7.90	7.48	7.09
20.0	9.09	8.62	8.17	7.75	7.35	6.96
21.0	8.92	8.46	8.02	7.61	7.21	6.84
22.0	8.74	8.30	7.87	7.47	7.09	6.72
23.0	8.58	8.14	7.73	7.34	6.96	6.61
24.0	8.42	7.99	7.59	7.21	6.84	6.50
25.0	8.26	7.85	7.46	7.08	6.73	6.39
26.0	8.11	7.71	7.33	6.96	6.62	6.29
27.0	7.97	7.58	7.20	6.85	6.51	6.18
28.0	7.83	7.44	7.08	6.73	6.40	6.09
29.0	7.69	7.32	6.96	6.62	6.30	5.99
30.0	7.56	7.19	6.85	6.51	6.20	5.90
31.0	7.43	7.07	6.73	6.41	6.10	5.81
32.0	7.31	6.96	6.62	6.31	6.01	5.72
33.0	7.18	6.84	6.52	6.21	5.91	5.63
34.0	7.07	6.73	6.42	6.11	5.82	5.55
35.0	6.95	6.62	6.31	6.02	5.73	5.46
36.0	6.84	6.52	6.22	5.93	5.65	5.38
37.0	6.73	6.42	6.12	5.84	5.56	5.31
38.0	6.62	6.32	6.03	5.75	5.48	5.23
39.0	6.52	6.22	5.93	5.66	5.40	5.15
40.0	6.41	6.12	5.84	5.58	5.32	5.08
41.0	6.31	6.03	5.75	5.49	5.24	5.01
42.0	6.21	5.93	5.67	5.41	5.17	4.93
43.0	6.12	5.84	5.58	5.33	5.09	4.86
44.0	6.02	5.75	5.50	5.25	5.02	4.79
45.0	5.93	5.67	5.41	5.17	4.94	4.72

TABLE B — Calibration Values for Various Atmospheric Pressures and Altitudes

PRESSURE		ALTITUDE			CORRECTION
in. Hg	mm Hg	kPa	Feet	m	FACTOR (%)
30.23	768	102.3	-276	-84	101
29.92	760	101.3	0	0	100
29.61	752	100.3	278	85	99
29.33	745	99.3	558	170	98
29.02	737	98.3	841	256	97
28.74	730	97.3	1126	343	96
28.43	722	96.3	1413	431	95
28.11	714	95.2	1703	519	94
27.83	707	94.2	1995	608	93
27.52	699	93.2	2290	698	92
27.24	692	92.2	2587	789	91
26.93	684	91.2	2887	880	90
26.61	676	90.2	3190	972	89
26.34	669	89.2	3496	1066	88
26.02	661	88.2	3804	1160	87
25.75	654	87.1	4115	1254	86
25.43	646	86.1	4430	1350	85
25.12	638	85.1	4747	1447	84
24.84	631	84.1	5067	1544	83
24.53	623	83.1	5391	1643	82
24.25	616	82.1	5717	1743	81
23.94	608	81.1	6047	1843	80
23.62	600	80.0	6381	1945	79
23.35	593	79.0	6717	2047	78
23.03	585	78.0	7058	2151	77
22.76	578	77.0	7401	2256	76
22.44	570	76.0	7749	2362	75
22.13	562	75.0	8100	2469	74
21.85	555	74.0	8455	2577	73
21.54	547	73.0	8815	2687	72
21.26	540	71.9	9178	2797	71
20.94	532	70.9	9545	2909	70
20.63	524	69.9	9917	3023	69
20.35	517	68.9	10293	3137	68
20.04	509	67.9	10673	3253	67
19.76	502	66.9	11058	3371	66