Rosey

**GET**

**Geo Environmental Technology**



# Quarterly Groundwater Monitoring
# Fourth Quarter 2002

For

Livermore Gas and Mini Mart
160 Holmes Street
Livermore, California

Prepared by

Geo Environmental Tech
343 Soquel Avenue, #33
Santa Cruz, CA 95062

12/31/02

Costas Orountiotis
Project Manager

Date

REGISTERED PROFESSIONAL ENGINEER
KENNETH L. MELEEN III
C017487
EXP 06/30/05
CIVIL
STATE OF CALIFORNIA

12-31-02

Kenneth L. Meleen
Senior Engineer

Date

**December 2002**

## TABLE OF CONTENTS



### TABLES



### FIGURES



### APPENDICES

GET
Geo Environmental Technology

# GROUNDWATER MONITORING REPORT
# FOURTH QUARTER 2002

**Livermore Gas and Mini Mart**
**160 Holmes Street**
**Livermore, California**

## 1.0 INTRODUCTION

This report documents the results of the 12/11/02 quarterly groundwater monitoring performed at the Livermore Gas and Mini Mart, located at 160 Holmes Street in Livermore, California (site). A site vicinity map is presented as Figure 1 and site details are shown on the Site Plan, Figure 2.

The Livermore Gas and Mini Mart had been serviced by three 10,000-gallon gasoline and one 10,000-gallon diesel Underground Storage Tanks (USTs). The USTs, piping and dispensers were removed on 4/5/99 under permit from the Livermore-Pleasanton Fire Department (LPFD). Analysis of soil and groundwater samples collected at the time of the UST removal, indicated that the site has been impacted by a release of petroleum hydrocarbons and MTBE.

The Alameda County Environmental Health Services (ACEHS) has directed quarterly groundwater monitoring for this site.

## 2.0 PAST WORK ON SITE

On 2/26/99, a soil boring was advanced in the northern section of the property, about 10 feet from the edge of First Street sidewalk, to log the soil profile and determine depth to groundwater. A groundwater grab sample was collected and analyzed for Total Petroleum Hydrocarbons as gasoline (TPHg), benzene, toluene, ethyl-benzene, total xylenes (BTEX) and methyl tertiary butyl ether (MTBE). The sample was found to be impacted by petroleum hydrocarbons (TPHg: 100,000 ug/l, Benzene: 6,100 ug/l, MTBE: 60,000 ug/L). The results were communicated to the Livermore-Pleasanton Fire Department (LPFD) and a UST Unauthorized Release Report was generated.

On 4/5/99, three gasoline and one diesel USTs, associated dispensers and piping were removed, manifested and disposed, under permit by the LPFD. The pit was over-excavated and samples were collected from native soil beneath the USTs; sample analysis indicated the presence of petroleum hydrocarbons in soil. Total Petroleum

343 Soquel Avenue #33, Santa Cruz, CA 95062
Phone: (831) 423-8780
Fax: (831) 423-8827

Hydrocarbons as diesel (TPHd) were detected at low levels (61 mg/kg) in the soil stockpile, but not beneath the diesel tank; Total Petroleum Hydrocarbons as gasoline (TPHg) concentrations ranged from undetectable to 80 mg/kg in all samples; MTBE concentrations ranged from 24 to 110 mg/kg.

On 5/20/99 soil samples were collected beneath the dispenser islands. TPHg was found beneath the east dispenser island in varying concentrations ranging from 32 mg/kg to 6,500 mg/kg; TPHd beneath the diesel dispenser was detected at 1300 mg/kg; no MTBE was detected beneath the dispenser islands.

On 7/26/00, three soil borings were drilled onsite to an approximate depth of 30' below ground surface (bgs). Soil samples were collected for analyses. Upon completion of drilling activities, the soil borings were converted to groundwater monitoring wells (MW1, MW2 and MW3) by installing 2-inch diameter, Schedule 40, factory threaded polyvinyl chloride (PVC) slotted 0.010-inch. The slotted interval extends from 15 to 30 and factory slotted feet bgs. The wells were sampled on 8/11/00 and analyzed for TPHd, TPHg, BTEX and MTBE. The sample results indicated significant hydrocarbon impact in the groundwater. Directly downgradient well MW1 had concentrations of TPHg and MTBE of 170,000 ug/L and 320,000 ug/L respectively. A "Well Installation Report" was issued by ETIC Engineering on 9/22/00.

On 10/19/00 groundwater samples were collected as part of quarterly monitoring at the site. Samples were analyzed for TPHd, TPHg, BTEX and MTBE. The sample results confirmed the presence of significant hydrocarbon impact in the groundwater. Directly downgradient well MW1 had concentrations of TPHg and MTBE of 170,000 ug/L and 200,000 ug/L respectively. Geo Environmental Technologies (GET) issued a "Quarterly Monitoring Report" on 1/31/00.

On 02/22/01 groundwater samples were collected and analyzed for TPHd, TPHg BTEX and MTBE. The sample results confirmed significant hydrocarbon impact in the groundwater. Directly downgradient well MW1 had concentrations of TPHg and MTBE of 11,000 ug/L and 190,000 ug/L respectively. GET issued a "Quarterly Monitoring Report" on 3/31/01.

On 05/30/01 groundwater samples were not collected because all three monitoring wells were found to be dry. The monitoring wells were dry also in August 2001.

On 11/14/01 groundwater samples were collected during the installation of an onsite extraction well and three off-site monitoring wells. Monitoring wells MW1, MW2 and MW3 were all dry. Groundwater samples were collected from the four newly installed wells. Samples were analyzed for TPHd, TPHg, BTEX and MTBE. The sample results confirmed the presence of significant hydrocarbon concentrations offsite and an areal impact to the groundwater. Directly downgradient extraction well EX1 contained concentrations of TPHg and MTBE of 2,000 ug/L and 2,200 ug/L respectively. GET issued a "Quarterly Monitoring Report" on 3/31/01. Construction details of all wells are presented in Table 1.

On 5/7/02 groundwater samples were collected and analyzed for TPHd, TPHg/BTEX and MTBE. Directly downgradient extraction well EX1 contained concentrations of TPHg and MTBE of 7,700 ug/L and 6,200 ug/L respectively. GET issued a "Quarterly Monitoring Report" on May 28, 2002.

On 9/11/02 groundwater samples were collected and analyzed for TPHg/BTEX and MTBE. Directly downgradient wells EX1 and MW1 contained concentrations of TPHg 2,800 and 130,000 ug/L and MTBE of 2,500 and <5,000 ug/L respectively. GET issued a "Quarterly Monitoring Report" on December 13, 2002.

## 3.0 SITE CONTACTS

The following is a listing of site contacts, addresses and phone numbers.

| | |
|---|---|
| UST Operator: | Livermore Gas and Mini Mart<br>Attention: Manwel and Samira Shuwayhat<br>160 Holmes Street<br>Livermore, CA 94520<br>Phone: (925) 455-4212 |
| Local Oversight Agency: | ACEHS<br>Attention: Eva Chu<br>1131 Harbor Bay Parkway, Suite 250<br>Alameda, CA 94502<br>Phone: (510) 567-6700 |
| Environmental engineers: | Geo Environmental Technologies<br>Attention: Costas Orountiotis<br>343 Soquel Avenue, #33<br>Santa Cruz, CA 95062<br>Phone: (831) 423-8780 |

## 4.0 METHODS AND PROCEDURES

### 4.1 Sample Collection and Analysis

Groundwater was sampled on 12/11/02. Depth to groundwater (DTW) was measured in each of the monitoring wells prior to purging and sampling. DTW data is summarized in Table 2. A sample of static groundwater was collected from each well using a clean, clear plastic bailer to visually assess for the presence of floating product or product sheen. No floating product or sheen was found.

To maximize the possibility of sampling fresh, inflowing groundwater, individual wells were purged of four well casing volumes of groundwater prior to sample collection.

Purged groundwater was stored in a steel, 55-gallon, 17H drum. After ascertaining that a minimum 80 percent recovery of the initial casing volume level had occurred in the well, the monitoring wells were sampled. Samples were collected using new, clean, disposable plastic bailers. Field purge data is presented in Appendix A.

Groundwater samples were collected using new, clean, disposable plastic bailers. Water was decanted from the bailer into 40-ml VOA vials with caps equipped with Teflon lined septa, in such a manner that neither headspace nor air bubbles were allowed to remain in the containers. Samples were labeled and placed in a pre-cooled container on ice, to minimize potential loss of volatile constituents. Labels contained project name, sample number, date and time of collection.

Sample collection information was entered onto a Chain of Custody (COC) document that accompanied the samples during site time and during transport to Entech Analytical Labs, Inc., a State certified laboratory for hazardous materials analysis, for the requisite analyses.

Groundwater samples were analyzed for TPHg, TPHd, BTEX and MTBE using EPA Methods 8015 MOD and 8020.

## 4.2 Results

Upgradient monitoring well MW3 was dry and therefore could not be sampled.

Offsite monitoring wells MW4, and MW6 did not contain TPHg/TPHd/BTEX above laboratory detection limits. MTBE concentrations of 24 ug/l were found in well MW4. Well MW6 did not contain MTBE above laboratory detection limits.

Offsite monitoring well MW5 contained TPHg concentrations of 73 ug/l; TPHd and BTEX were below the reported detection limits. MTBE concentrations were detected at 160 ug/l.

Crossgradient well MW2 contained 250 ug/l TPHg, 120 ug/l TPHd and 180 ug/l MTBE; low levels of BTEX constituents were also detected.

Downgradient monitoring well MW1 did not contain enough water and was not sampled this quarter.

Extraction well EX1 contained 3,000 μg/L TPHg, 100 ug/l TPHd and 4,800 ug/L MTBE; Benzene was found at 81 ug/l and Ethyl-Benzene at 44 ug/L, Toluene and Xylenes were both below laboratory detection limits.

Cumulative groundwater analytical results are presented in Table 2. Copies of the Laboratory analysis report and COC documentation for this monitoring event are presented in Appendix B.

## 4.3 Groundwater Flow and Gradient

DTW measurements taken on 12/11/02 were used to calculate the groundwater gradient and flow direction. Groundwater flow direction was northeasterly, consistent with general area direction of flow. The gradient was 0.0085 ft/ft. This information is presented graphically in Figure 4.

## 5.0 RECOMMENDATIONS

Based on the results of this groundwater monitoring episode, the following course of action will be pursued:

- Continue quarterly groundwater sampling and depth to water data collection. Next monitoring date within a 15-day window of opportunity, is 3/20/03.

- Forward a copy of this report should to:

  ACEHS
  Attention: Eva Chu
  1131 Harbor Bay Parkway, Suite 250
  Alameda, CA 94502

**TABLE 1 - Well Consrtruction Details**

Livermore Gas and Minimart, 160 Holmes, Livermore, California

| Well Number | Date Installed | Total Depth (feet bgs) | Borehole Diameter (inches) | Casing Diameter (inches) | Slot (inch) | Interval | | | | | DTW 9/11/02 (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Screen (feet) | Blank Casing (feet) | Sand Pack (feet) | Bentonite Seal (feet) | Cement Grout (feet) | |
| MW-1 | 07/26/00 | 30 | 8 | 2 | 0.01 | 30-15 | 15-0.5 | 30-13 | 13-11 | 11-1.0 | 27.55 |
| MW-2 | 07/26/00 | 30 | 8 | 2 | 0.01 | 30-15 | 15-0.5 | 30-13 | 13-11 | 11-1.0 | 27.56 |
| MW-3 | 07/26/00 | 30 | 8 | 2 | 0.01 | 30-15 | 15-0.5 | 30-13 | 13-11 | 11-1.0 | 28.18 |
| MW-4 | 10/30/01 | 50 | 8 | 2 | 0.01 | 50-20 | 20-0.5 | 50-18 | 18-16 | 16-0.5 | 28.39 |
| MW-5 | 10/30/01 | 50 | 8 | 2 | 0.01 | 50-20 | 20-0.5 | 50-18 | 18-16 | 16-0.5 | 29.50 |
| MW-6 | 10/30/01 | 50 | 8 | 2 | 0.01 | 50-20 | 20-0.5 | 50-18 | 18-16 | 16-0.5 | 28.77 |
| EX1 | 10/30/01 | 55 | 10 | 6 | 0.01 | 55-30 | 30-0.5 | 55-28 | 28-26 | 26-0.5 | 27.98 |

**Notes:** bgs Below ground surface
DTW Depth to water

**TABLE 2 - Groundwater Analytical Results**

Livermore Gas and Minimart, 160 Holmes, Livermore, California

| Well ID. | Date | DTW (feet) | TPHd (µg/L) | TPHg (µg/L) | Benzene (µg/L) | Toluene (µg/L) | Ethyl-Benzene (µg/L) | Xylenes (µg/L) | MTBE (µg/L) |
|---|---|---|---|---|---|---|---|---|---|
| MW1 | 08/11/00 | | 57000 | 170000 | 6400 | 7600 | 4200 | 9700 | 320000 |
| | 10/19/00 | 21.94 | 17000 | 170000 | 8400 | 3200 | 2700 | 10000 | 200000 |
| | 02/22/01 | 22.91 | 11000 | 82000 | 5100 | 1000 | 13000 | 8700 | 190000 |
| | 05/30/01 | Dry | | | | | | | |
| | 11/14/01 | Dry | | | | | | | |
| | 05/07/02 | Dry | | | | | | | |
| | 09/11/02 | 26.16 | NA | 130000 | 7700 | 1100 | 4500 | 1500 | <5000 |
| | 12/01/02 | 27.55 | NS | NS | NS | NS | NS | NS | NS |
| MW2 | 08/11/00 | | 1900 | 4500 | 220 | 52 | 160 | 170 | 3000 |
| | 10/19/00 | 21.80 | 1300 | 3400 | 150 | 21 | 100 | 70 | 1900 |
| | 02/22/01 | 22.87 | 880 | 7600 | 25 | < 10 | 69 | 25 | 2200 |
| | 05/30/01 | Dry | | | | | | | |
| | 11/14/01 | Dry | | | | | | | |
| | 05/07/02 | 26.70 | 86 | 400 | 5.4 | <0.50 | 1.9 | 2.3 | 230 |
| | 09/11/02 | 25.96 | NA | 260 | 1.3 | <0.50 | 0.57 | 0.77 | 200 |
| | 12/11/02 | 27.56 | 120 | 250 | 7.9 | 1.6 | 13 | 9.9 | 180 |
| MW3 | 08/11/00 | | 260 | 59 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 5.0 |
| | 10/19/00 | 22.45 | < 65 | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 5.0 |
| | 02/22/01 | 23.51 | 100 | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 5.0 |
| | 05/30/01 | Dry | | | | | | | |
| | 11/14/01 | Dry | | | | | | | |
| | 05/07/02 | Dry | | | | | | | |
| | 09/11/02 | 26.61 | NA | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 5.0 |
| | 12/11/02 | 28.18 | Dry | | | | | | |
| MW-4 | 11/14/01 | 33.84 | 90 | 510 | 4 | < 0.50 | < 0.50 | < 0.50 | 14 |
| | 05/07/02 | 26.75 | < 50 | 150 | 3.5 | 0.5 | < 0.50 | < 0.50 | 48 |
| | 09/11/02 | 26.66 | NA | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | 15 |
| | 12/11/02 | 28.39 | < 50 | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | 24 |
| MW-5 | 11/14/01 | 34.94 | < 66 | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | 8.2 |
| | 05/07/02 | 27.90 | < 50 | 140 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | 110 |
| | 09/11/02 | 27.99 | NA | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | 6.3 |
| | 12/11/02 | 29.50 | < 50 | 73 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | 160 |
| MW-6 | 11/14/01 | 33.88 | < 50 | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 5.0 |
| | 05/07/02 | 27.01 | < 67 | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 5.0 |
| | 09/11/02 | 27.03 | NA | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 5.0 |
| | 12/11/02 | 28.77 | < 50 | < 50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 |

**TABLE 2 - Groundwater Analytical Results**

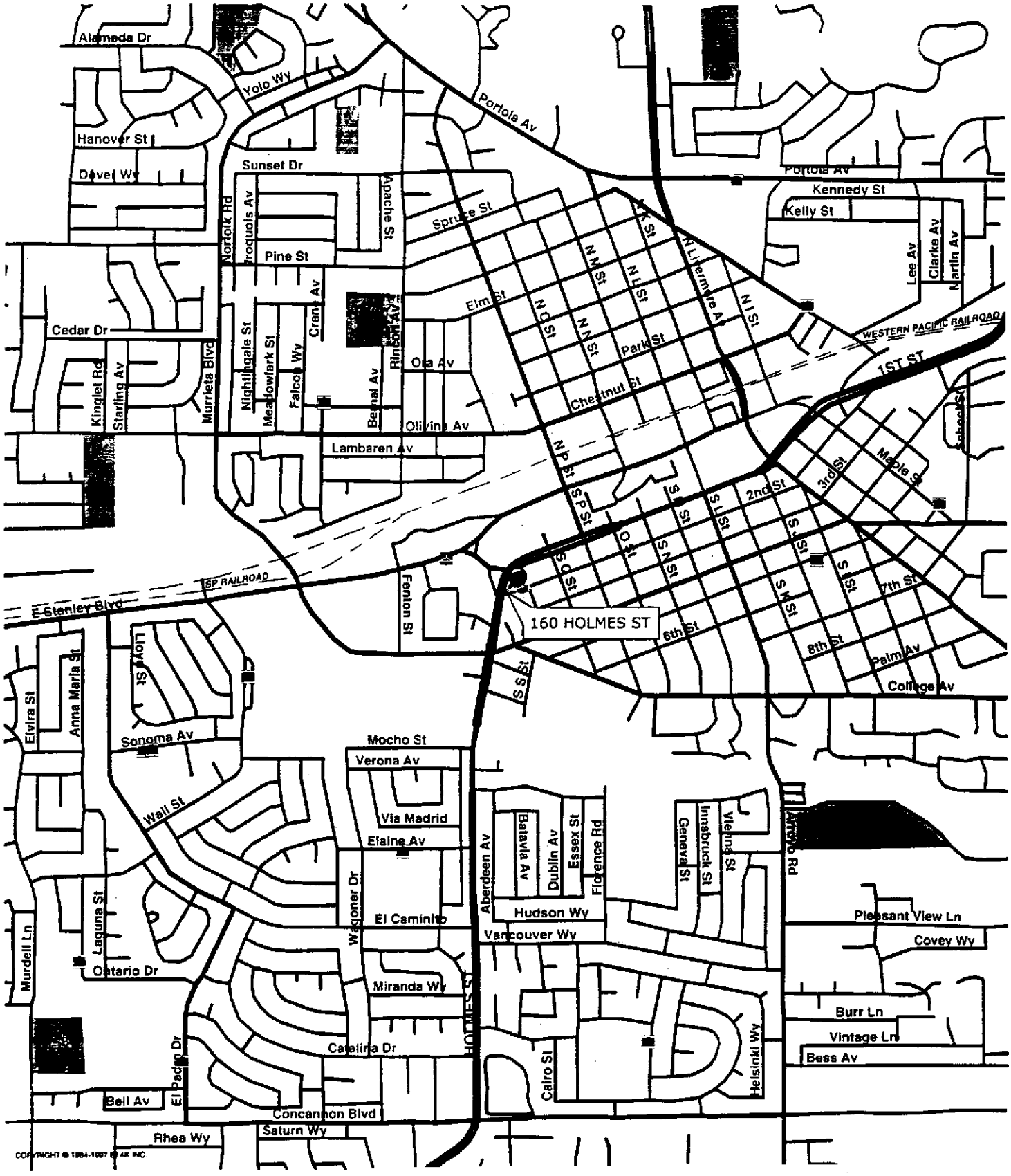
Livermore Gas and Minimart, 160 Holmes, Livermore, California

| Well ID. | Date | DTW (feet) | TPHd (µg/L) | TPHg (µg/L) | Benzene (µg/L) | Toluene (µg/L) | Ethyl-Benzene (µg/L) | Xylenes (µg/L) | MTBE (µg/L) |
|---|---|---|---|---|---|---|---|---|---|
| EX1 | 11/14/01 | 33.41 | 2000 | 13000 | 180 | 1000 | 330 | 3200 | 2200 |
| | 05/07/02 | 27.58 | 560 | 7700 | 320 | < 25 | 66 | 150 | 6200 |
| | 09/11/02 | NM | NA | 2800 | 32 | < 13 | 14 | < 13 | 2500 |
| | 12/11/02 | 27.98 | 100 | 3000 | 81 | < 0.50 | 44 | < 1 | 4800 |

**Notes:**

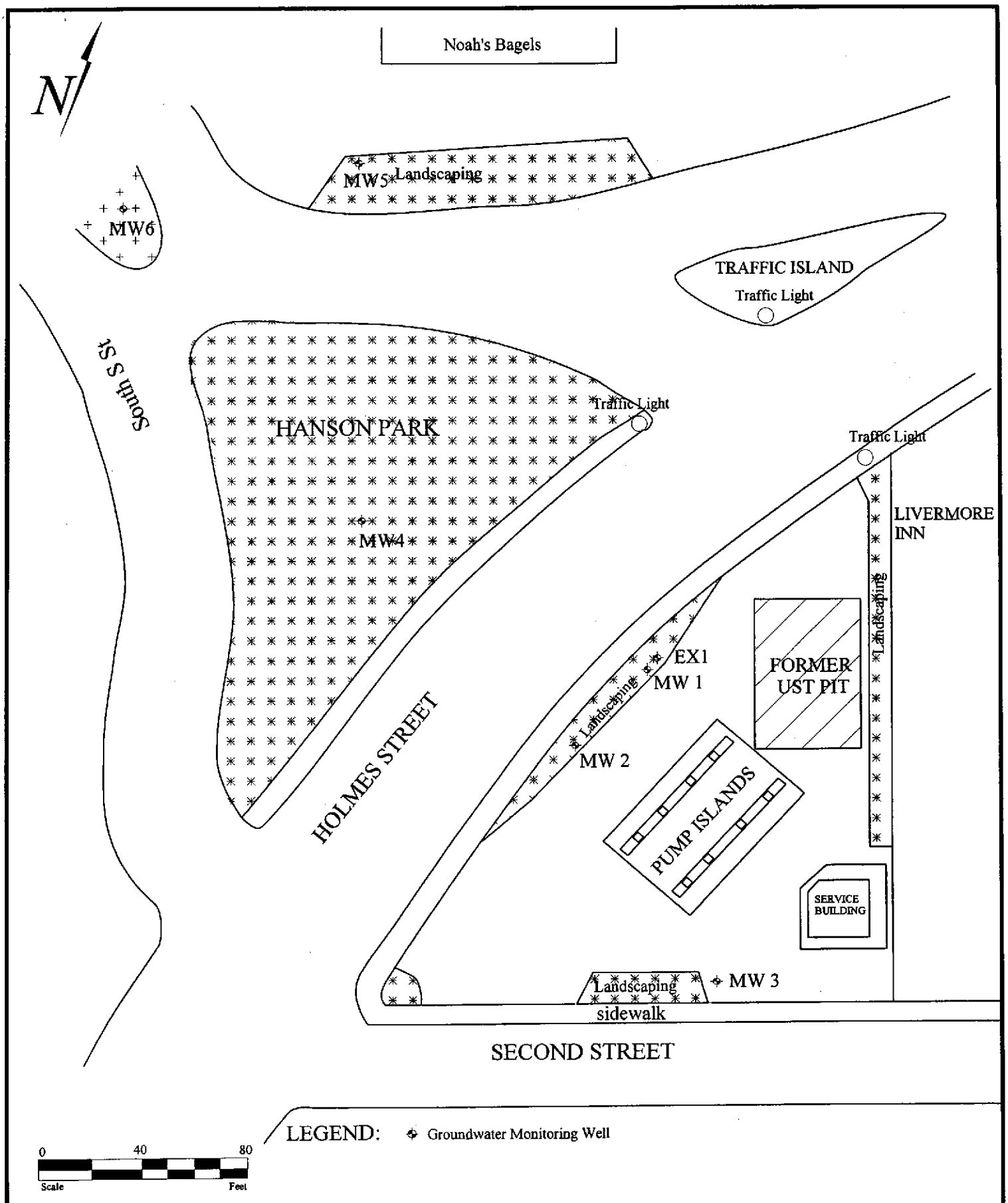
DTW: Depth to Groundwater
NM: Not Measured
NA: Not Analyzed
TPHg: Total Petroleum Hydrocarbons as gasoline
TPHd: Total Petroleum Hydrocarbons as diesel
MTBE: Methyl tertiary Butyl Ether
µg/L: Micrograms per liter

# FIGURES

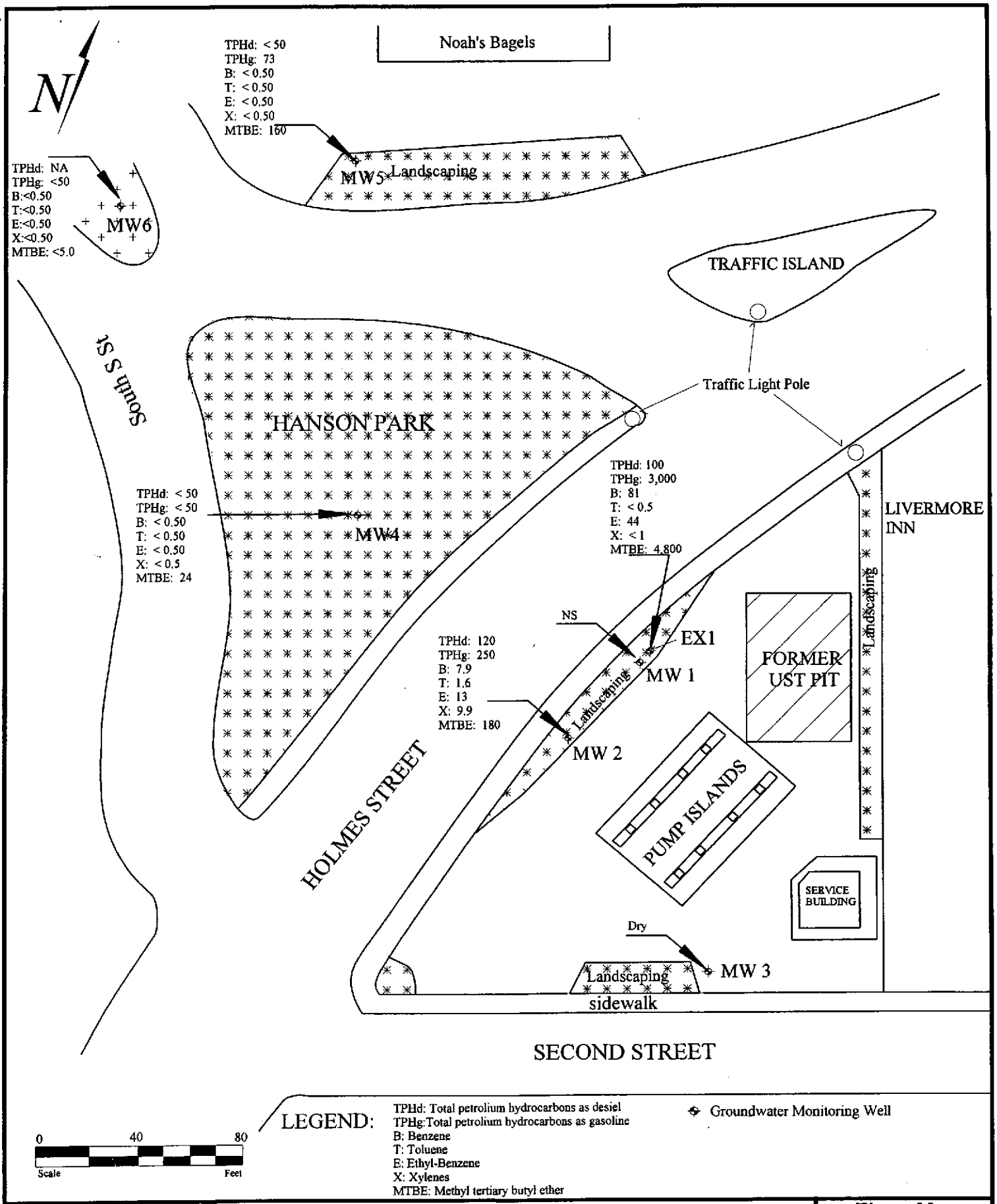




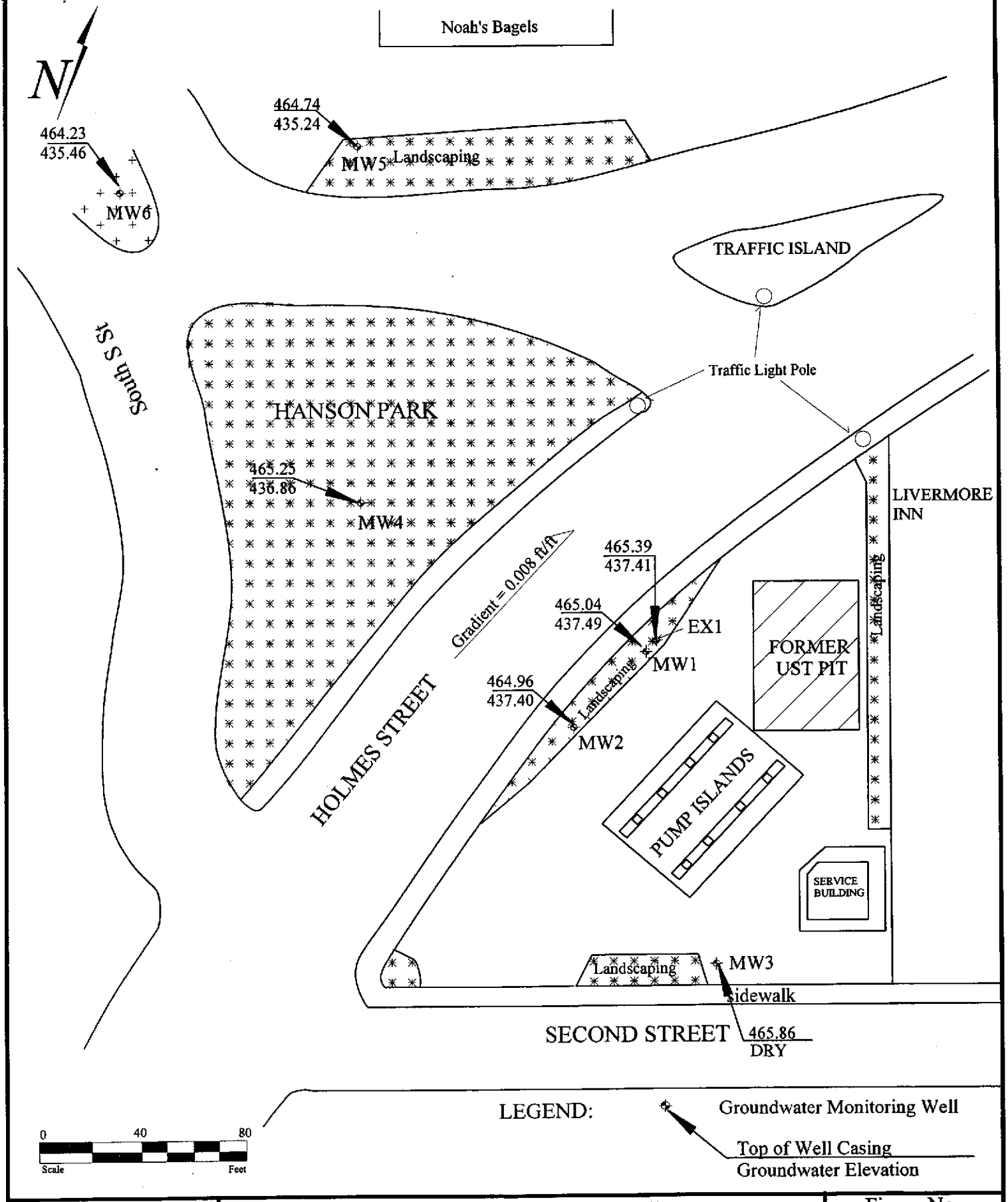

| | | |
|---|---|---|
| *Geo Environmental Technologies* | SITE VICINITY MAP<br>Livermore Gas and Minimart<br>160 Homes Street, Livermore, CA | Figure No.<br>1<br>Project<br>Manwel |




| | | |
|---|---|---|
| ***Geo Environmental Technologies*** | Site Plan<br>12/1/02<br>Livermore Gas and Minimart<br>160 Homes Street, Livermore, CA | Figure No.<br>2<br>Project<br>Manwel |




| | | |
|---|---|---|
| ***Geo Environmental Technologies*** | Groundwater Analyticals<br>12/11/02<br>Livermore Gas and Minimart<br>160 Homes Street, Livermore, CA | Figure No.<br>3<br>Project<br>Manwel |




| | | |
|---|---|---|
| ***Geo Environmental Technologies*** | Groundwater Direction and Gradient<br>12/11/02<br>Livermore Gas and Minimart<br>160 Homes Street, Livermore, CA | Figure No.<br>4<br>Project<br>Manwel |

# APPENDIX A

**GET**
343 Soquel Avenue, Suite 33
Santa Cruz, CA 95062
Phone: (831) 423-8780
Fax: (831) 423-8827

# Well Evaluation Field Data Sheet



**Date:** 12/11/02
**Technician:** GN
**Project:** Maxwell
**Task Description:** DTW, sample wells

| | Well Number | Date Measured | Pressure Y | Pressure N | Sheen Y | Sheen N | Odor Y | Odor N | Free Product Y | Free Product N | Free Product Thickness | Depth to Product | Depth to Water | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10:36 | MW1 | 12/11/02 | | N | | | Y | | | | | | 27.55 | Strong Odor. insufficient level to sample. |
| 10:33 | MW2 | | | N | | | Y | | | | | | 27.56 | Slight odor. Low Purge (3 gal.) |
| 10:6 | MW3 | | | N | | | | N | | | | | 28.18 | No odor. insufficient level to Sample. |
| 10:27 | MW4 | | | N | | | | N | | | | | 28.39 | No Odor |
| 10:22 | MW5 | | | N | | | | N | | | | | 29.50 | No Odor. Purged 5 gal |
| 10:16 | MW6 | | | N | | | | N | | | | | 28.77 | No Odor. |
| 10:38 | EX1 | ↓ | | N | | | Y | | | | | | 27.98 | Slight Odor Purge (5 gal) |

# APPENDIX B

# Entech Analytical Labs, Inc.

3334 Victor Court (408) 588-0200
Santa Clara, CA 95054 (408) 588-0201 - Fax

# Chain of Custody / Analysis Request

| | | | | | |
|---|---|---|---|---|---|
| Attention to: C OROUNTIOTIS | Phone No.: 831 423 8720 | Purchase Order No.: Manuel 4th QM02 | Send Invoice to (if Different) | Phone | |
| Company Name: GET | Fax No.: 8827 | Project Number: Manuel | Company | | |
| Mailing Address: 343 Soquel #33 | | Project Name: Manuel | Billing Address (if Different) | | |
| City: Santa Cruz | State: CA | Zip: 95062 | Project Location: Livermore | City: | State / Zip |

Sampler: GN

Date: 12/11/02

Turn Around Time: Same Day ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ Standard ☒

Order ID:

| Client ID | Laboratory No. | Sampling Date | Sampling Time | Matrix | Composite | Grab | Containers | Preservative |
|---|---|---|---|---|---|---|---|---|
| ~~MW1 EX-1~~ | 32454-004 | 12/11/02 | | W | | ✓ | 3 | ✓ |
| MW2 | 002 | | | | | ✓ | 3 | ✓ |
| ~~MW3~~ | | | | | | | | ✓ |
| MW4 | 003 | | | | | ✓ | 3 | ✓ |
| MW5 | 004 | | | | | ✓ | 3 | ✓ |
| MW6 | 005 | | | | | ✓ | 3 | ✓ |

Volatile Organics by GCMS: Freon 113 ☐ 624 ☐ Fuel Oxygenates by 8240 ☐ MTBE by 8260B ☐ 8260B ☐ Pesticides-8081 ☐ PCBs - 8082 ☐ Halogenated or Aromatic Volatiles: F113 ☐ 601/8010 ☐ TPH as Gas/BTEX ☐ 602/8020 ☐ 8021 ☐ TPH as Gas/BTEX/MTBE ☐ Base/Neutral/Acid Organics 8270 ☐ Fuel Scan 8270-SIMS ☐ Diesel w/ Si-gel Standard Cleanup ☐ w/ Si-gel Column Cleanup ☐ TRPH ☐ Oil & Grease ☐ THM (502.2) Metals - Circle Below Total ☐ Dissolved ☐

Remarks: Not Sampled

| Relinquished by: | Received by: | Date: | Time: |
|---|---|---|---|
| Relinquished by: | Received by: | Date: | Time: |
| Relinquished by: | Received by: | Date: | Time: |
| Relinquished by: | Received by: | Date: | Time: |

Relinquished by: Received by: Jeff Date: 12/11/02 Time: 14:35

**Special Instructions or Comments**

☐ NPDES Detection Limits

If MW1 is dry then sample EX1 otherwise only DTW for EX1

Metals: Al, As, Sb, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, K, Si, Ag, Na, Se, Sr, Tl, Sn, Ti, V, Zn, W : CAM-17 ☐ Plating ☐ PPM-13 ☐ LUFT-5 ☐

# Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

December 24, 2002

Costas Orountiotis
Geo Environmental Tech
343 Soquel Ave, #33
Santa Cruz, CA 95062

**Order:** 32454
**Project Name:** Manwel
**Project Number:**
**Project Notes:**

**Date Collected:** 12/11/2002
**Date Received:** 12/11/2002
**P.O. Number:** Manwel 4th QM02

On December 11, 2002, samples were received under documentented chain of custody. Results for the following analyses are attached:

| Matrix | Test | Method |
|---|---|---|
| Liquid | Gas/BTEX/MTBE | EPA 8015 MOD. (Purgeable) |
| | | EPA 8020 |
| | TPH as Diesel | EPA 8015 MOD. (Extractable) |

Chemical analysis of these samples has been completed. Summaries of the data are contained on the following pages. USEPA protocols for sample storage and preservation were followed.

Entech Analytical Labs, Inc. is certified by the State of California (#2346). If you have any questions regarding procedures or results, please call me at 408-588-0200.

Sincerely,

Patti Sandrock
QA/QC Manager

# Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

**Geo Environmental Tech**
**343 Soquel Ave, #33**
**Santa Cruz, CA 95062**
**Attn: Costas Orountiotis**

Date: 12/24/02
Date Received: 12/11/2002
Project Name: Manwel
Project Number:
P.O. Number: Manwel 4th QM02
Sampled By: GN

## Certified Analytical Report

**Order ID:** 32454 **Lab Sample ID:** 32454-001 **Client Sample ID:** EX-1

**Sample Time:** **Sample Date:** 12/11/2002 **Matrix:** Liquid

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 81 | | 50 | 0.5 | 25 | µg/L | N/A | 12/20/2002 | WGC62696 | EPA 8020 |
| Toluene | ND | | 50 | 0.5 | 25 | µg/L | N/A | 12/20/2002 | WGC62696 | EPA 8020 |
| Ethyl Benzene | 44 | | 50 | 0.5 | 25 | µg/L | N/A | 12/20/2002 | WGC62696 | EPA 8020 |
| Xylenes, Total | ND | | 50 | 1 | 50 | µg/L | N/A | 12/20/2002 | WGC62696 | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 97.8 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl Ether | 4800 | | 50 | 1 | 50 | µg/L | N/A | 12/20/2002 | WGC62696 | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 97.8 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Diesel | 100 | x | 1 | 50 | 50 | µg/L | 12/13/2002 | 12/16/2002 | DW4275A | EPA 8015 MOD. (Extractable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| o-Terphenyl | 75.0 | 32 - 145 |

**Comment:** Not a TPH as Diesel pattern. Possible gasoline compounds in the TPH as Diesel range.

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | 3000 | x | 50 | 50 | 2500 | µg/L | N/A | 12/20/2002 | WGC62696 | EPA 8015 MOD. (Purgeable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 101.7 | 65 - 135 |

**Comment:** Reported TPH as Gasoline value is the result of high concentration of a discrete peak (MTBE) within the TPH as Gasoline quantitation range.

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Patti Sandrock, QA/QC Manager

*Environmental Analysis Since 1983*

# Entech Analytical Labs, Inc.

3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

**Geo Environmental Tech**
**343 Soquel Ave, #33**
**Santa Cruz, CA 95062**
**Attn: Costas Orountiotis**

Date: 12/24/02
Date Received: 12/11/2002
Project Name: Manwel
Project Number:
P.O. Number: Manwel 4th QM02
Sampled By: GN

## Certified Analytical Report

**Order ID:** 32454 **Lab Sample ID:** 32454-002 **Client Sample ID:** MW-2

**Sample Time:** **Sample Date:** 12/11/2002 **Matrix:** Liquid

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 7.9 | | 2.5 | 0.5 | 1.25 | µg/L | N/A | 12/18/2002 | WGC62694 | EPA 8020 |
| Toluene | 1.6 | | 2.5 | 0.5 | 1.25 | µg/L | N/A | 12/18/2002 | WGC62694 | EPA 8020 |
| Ethyl Benzene | 13 | | 2.5 | 0.5 | 1.25 | µg/L | N/A | 12/18/2002 | WGC62694 | EPA 8020 |
| Xylenes, Total | 9.9 | | 2.5 | 1 | 2.5 | µg/L | N/A | 12/18/2002 | WGC62694 | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 92.3 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl Ether | 180 | | 2.5 | 1 | 2.5 | µg/L | N/A | 12/18/2002 | WGC62694 | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 92.3 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Diesel | 120 | x | 1 | 50 | 50 | µg/L | 12/13/2002 | 12/16/2002 | DW4275A | EPA 8015 MOD. (Extractable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| o-Terphenyl | 68.0 | 32 - 145 |

**Comment:** Not a TPH as Diesel pattern. Possible gasoline compounds in the TPH as Diesel range.

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | 250 | | 2.5 | 50 | 125 | µg/L | N/A | 12/18/2002 | WGC62694 | EPA 8015 MOD. (Purgeable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 115.5 | 65 - 135 |

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Patti Sandrock, QA/QC Manager

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**Santa Cruz, CA 95062**
**Attn: Costas Orountiotis**

Date: 12/24/02
Date Received: 12/11/2002
Project Name: Manwel
Project Number:
P.O. Number: Manwel 4th QM02
Sampled By: GN

## Certified Analytical Report

**Order ID:** 32454 **Lab Sample ID:** 32454-003 **Client Sample ID:** MW-4

**Sample Time:** **Sample Date:** 12/11/2002 **Matrix:** Liquid

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Toluene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Ethyl Benzene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Xylenes, Total | ND | | 1 | 1 | 1 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 96.4 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl Ether | 24 | | 1 | 1 | 1 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 96.4 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Diesel | ND | | 1 | 50 | 50 | µg/L | 12/13/2002 | 12/16/2002 | DW4275A | EPA 8015 MOD. (Extractable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| o-Terphenyl | 95.0 | 32 - 145 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | ND | | 1 | 50 | 50 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8015 MOD. (Purgeable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 99.3 | 65 - 135 |

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

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**Attn: Costas Orountiotis**

Date: 12/24/02
Date Received: 12/11/2002
Project Name: Manwel
Project Number:
P.O. Number: Manwel 4th QM02
Sampled By: GN

## Certified Analytical Report

**Order ID:** 32454 **Lab Sample ID:** 32454-004 **Client Sample ID:** MW-5

**Sample Time:** **Sample Date:** 12/11/2002 **Matrix:** Liquid

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Toluene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Ethyl Benzene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Xylenes, Total | ND | | 1 | 1 | 1 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 97.2 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl Ether | 160 | | 1 | 1 | 1 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 97.2 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Diesel | ND | | 1 | 50 | 50 | µg/L | 12/13/2002 | 12/16/2002 | DW4275A | EPA 8015 MOD. (Extractable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| o-Terphenyl | 82.0 | 32 - 145 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | 73 | x | 1 | 50 | 50 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8015 MOD. (Purgeable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 94.5 | 65 - 135 |

**Comment:** Reported TPH as Gasoline value is the result of high concentration of a discrete peak (MTBE) within the TPH as Gasoline quantitation range.

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

Patti Sandrock, QA/QC Manager

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**Geo Environmental Tech**
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**Santa Cruz, CA 95062**
**Attn: Costas Orountiotis**

Date: 12/24/02
Date Received: 12/11/2002
Project Name: Manwel
Project Number:
P.O. Number: Manwel 4th QM02
Sampled By: GN

## Certified Analytical Report

**Order ID:** 32454 **Lab Sample ID:** 32454-005 **Client Sample ID:** MW-6

**Sample Time:** **Sample Date:** 12/11/2002 **Matrix:** Liquid

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Toluene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Ethyl Benzene | ND | | 1 | 0.5 | 0.5 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |
| Xylenes, Total | ND | | 1 | 1 | 1 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 101.6 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl Ether | ND | | 1 | 1 | 1 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8020 |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 101.6 | 65 - 135 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Diesel | ND | | 1 | 50 | 50 | µg/L | 12/13/2002 | 12/16/2002 | DW4275A | EPA 8015 MOD. (Extractable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| o-Terphenyl | 86.0 | 32 - 145 |

| Parameter | Result | Flag | DF | PQL | DLR | Units | Extraction Date | Analysis Date | QC Batch ID | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | ND | | 1 | 50 | 50 | µg/L | N/A | 12/17/2002 | WGC62690A | EPA 8015 MOD. (Purgeable) |

| Surrogate | Surrogate Recovery | Control Limits (%) |
|---|---|---|
| 4-Bromofluorobenzene | 99.1 | 65 - 135 |

DF = Dilution Factor ND = Not Detected DLR = Detection Limit Reported PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)

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## STANDARD LAB QUALIFIERS (FLAGS)

All Entech lab reports now reference standard lab qualifiers. These qualifiers are noted in the adjacent column to the analytical result and are adapted from the U.S. EPA CLP program. The current qualifier list is as follows:

| Qualifier (Flag) | Description |
|---|---|
| U | Compound was analyzed for but not detected |
| J | Estimated value for tentatively identified compounds or if result is below PQL but above MDL |
| N | Presumptive evidence of a compound (for Tentatively Identified Compounds) |
| B | Analyte is found in the associated Method Blank |
| E | Compounds whose concentrations exceed the upper level of the calibration range |
| D | Multiple dilutions reported for analysis; discrepancies between analytes may be due to dilution |
| X | Results within quantitation range; chromatographic pattern not typical of fuel |
| Y | PQL is reported below MDL but verified against a standard analyzed at the client requested reporting limit of 0.5 ppb |
| C | Reported results affected by contaminated reagent materials. See narrative for futher explanation |

# Entech Analytical Labs, Inc.

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## Quality Control Results Summary

**QC Batch #:** DW4275A
**Matrix:** Liquid
**Units:** µg/L
**Date Analyzed:** 12/13/2002

| Parameter | Method | Blank Result | Spike Sample ID | Spike Amount | Sample Result | Spike Result | QC Type | % Recovery | RPD | RPD Limits | Recovery Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Test:** TPH as Diesel | | | | | | | | | | | |
| TPH as Diesel | EPA 8015 M | ND | | 1000 | | 1015.03 | LCS | 101.5 | | | 44.3 - 137.5 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| o-Terphenyl | | | 108.0 | | | 32 - 145 | | | | | |
| **Test:** TPH as Diesel | | | | | | | | | | | |
| TPH as Diesel | EPA 8015 M | ND | | 1000 | | 907.81 | LCSD | 90.8 | 11.15 | 25.00 | 44.3 - 137.5 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| o-Terphenyl | | | 97.0 | | | 32 - 145 | | | | | |

# Entech Analytical Labs, Inc.

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## Quality Control Results Summary

**QC Batch #:** WGC62690A
**Matrix:** Liquid
**Units:** µg/L
**Date Analyzed:** 12/17/2002

| Parameter | Method | Blank Result | Spike Sample ID | Spike Amount | Sample Result | Spike Result | QC Type | % Recovery | RPD | RPD Limits | Recovery Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Test:** TPH as Gasoline | | | | | | | | | | | |
| TPH as Gasoline | EPA 8015 M | ND | | 250 | | 269.6 | LCS | 107.8 | | | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 122.0 | | | 65 - 135 | | | | | |
| **Test:** BTEX | | | | | | | | | | | |
| Benzene | EPA 8020 | ND | | 8 | | 7.95 | LCS | 99.4 | | | 65.0 - 135.0 |
| Ethyl Benzene | EPA 8020 | ND | | 8 | | 8.81 | LCS | 110.1 | | | 65.0 - 135.0 |
| Toluene | EPA 8020 | ND | | 8 | | 8.48 | LCS | 106.0 | | | 65.0 - 135.0 |
| Xylenes, total | EPA 8020 | ND | | 24 | | 27.13 | LCS | 113.0 | | | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 98.1 | | | 65 - 135 | | | | | |
| **Test:** MTBE by EPA 8020 | | | | | | | | | | | |
| Methyl-t-butyl Ether | EPA 8020 | ND | | 8 | | 8.09 | LCS | 101.1 | | | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 98.1 | | | 65 - 135 | | | | | |
| **Test:** TPH as Gasoline | | | | | | | | | | | |
| TPH as Gasoline | EPA 8015 M | ND | | 250 | | 271.95 | LCSD | 108.8 | 0.87 | 25.00 | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 97.5 | | | 65 - 135 | | | | | |
| **Test:** BTEX | | | | | | | | | | | |
| Benzene | EPA 8020 | ND | | 8 | | 7.9 | LCSD | 98.8 | 0.63 | 25.00 | 65.0 - 135.0 |
| Ethyl Benzene | EPA 8020 | ND | | 8 | | 8.71 | LCSD | 108.9 | 1.14 | 25.00 | 65.0 - 135.0 |
| Toluene | EPA 8020 | ND | | 8 | | 8.3 | LCSD | 103.8 | 2.15 | 25.00 | 65.0 - 135.0 |
| Xylenes, total | EPA 8020 | ND | | 24 | | 27.02 | LCSD | 112.6 | 0.41 | 25.00 | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 99.5 | | | 65 - 135 | | | | | |
| **Test:** MTBE by EPA 8020 | | | | | | | | | | | |
| Methyl-t-butyl Ether | EPA 8020 | ND | | 8 | | 7.92 | LCSD | 99.0 | 2.12 | 25.00 | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 99.5 | | | 65 - 135 | | | | | |

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## Quality Control Results Summary

**QC Batch #:** WGC62694 **Units:** µg/L

**Matrix:** Liquid **Date Analyzed:** 12/18/2002

| Parameter | Method | Blank Result | Spike Sample ID | Spike Amount | Sample Result | Spike Result | QC Type | % Recovery | RPD | RPD Limits | Recovery Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Test:** TPH as Gasoline | | | | | | | | | | | |
| TPH as Gasoline | EPA 8015 M | ND | | 250 | | 269.05 | LCS | 107.6 | | | 65.0 - 135.0 |
| | **Surrogate** | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| | 4-Bromofluorobenzene | | 124.1 | | | 65 - 135 | | | | | |
| **Test:** BTEX | | | | | | | | | | | |
| Benzene | EPA 8020 | ND | | 8 | | 7.87 | LCS | 98.4 | | | 65.0 - 135.0 |
| Ethyl Benzene | EPA 8020 | ND | | 8 | | 8.78 | LCS | 109.7 | | | 65.0 - 135.0 |
| Toluene | EPA 8020 | ND | | 8 | | 8.41 | LCS | 105.1 | | | 65.0 - 135.0 |
| Xylenes, total | EPA 8020 | ND | | 24 | | 26.66 | LCS | 111.1 | | | 65.0 - 135.0 |
| | **Surrogate** | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| | 4-Bromofluorobenzene | | 99.6 | | | 65 - 135 | | | | | |
| **Test:** MTBE by EPA 8020 | | | | | | | | | | | |
| Methyl-t-butyl Ether | EPA 8020 | ND | | 8 | | 7.83 | LCS | 97.9 | | | 65.0 - 135.0 |
| | **Surrogate** | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| | 4-Bromofluorobenzene | | 99.6 | | | 65 - 135 | | | | | |
| **Test:** TPH as Gasoline | | | | | | | | | | | |
| TPH as Gasoline | EPA 8015 M | ND | | 250 | | 254.39 | LCSD | 101.8 | 5.60 | 25.00 | 65.0 - 135.0 |
| | **Surrogate** | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| | 4-Bromofluorobenzene | | 110.1 | | | 65 - 135 | | | | | |
| **Test:** BTEX | | | | | | | | | | | |
| Benzene | EPA 8020 | ND | | 8 | | 8.07 | LCSD | 100.9 | 2.51 | 25.00 | 65.0 - 135.0 |
| Ethyl Benzene | EPA 8020 | ND | | 8 | | 8.88 | LCSD | 111.0 | 1.13 | 25.00 | 65.0 - 135.0 |
| Toluene | EPA 8020 | ND | | 8 | | 8.51 | LCSD | 106.4 | 1.18 | 25.00 | 65.0 - 135.0 |
| Xylenes, total | EPA 8020 | ND | | 24 | | 27.4 | LCSD | 114.2 | 2.74 | 25.00 | 65.0 - 135.0 |
| | **Surrogate** | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| | 4-Bromofluorobenzene | | 101.3 | | | 65 - 135 | | | | | |
| **Test:** MTBE by EPA 8020 | | | | | | | | | | | |
| Methyl-t-butyl Ether | EPA 8020 | ND | | 8 | | 8.23 | LCSD | 102.9 | 4.98 | 25.00 | 65.0 - 135.0 |
| | **Surrogate** | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| | 4-Bromofluorobenzene | | 101.3 | | | 65 - 135 | | | | | |

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## Quality Control Results Summary

**QC Batch #:** WGC62696 **Units:** µg/L
**Matrix:** Liquid **Date Analyzed:** 12/19/2002

| Parameter | Method | Blank Result | Spike Sample ID | Spike Amount | Sample Result | Spike Result | QC Type | % Recovery | RPD | RPD Limits | Recovery Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Test:** TPH as Gasoline | | | | | | | | | | | |
| TPH as Gasoline | EPA 8015 M | ND | | 250 | | 269.05 | LCS | 107.6 | | | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 123.4 | | | 65 - 135 | | | | | |
| **Test:** BTEX | | | | | | | | | | | |
| Benzene | EPA 8020 | ND | | 8 | | 7.79 | LCS | 97.4 | | | 65.0 - 135.0 |
| Ethyl Benzene | EPA 8020 | ND | | 8 | | 8.71 | LCS | 108.9 | | | 65.0 - 135.0 |
| Toluene | EPA 8020 | ND | | 8 | | 8.35 | LCS | 104.4 | | | 65.0 - 135.0 |
| Xylenes, total | EPA 8020 | ND | | 24 | | 26.48 | LCS | 110.3 | | | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 99.3 | | | 65 - 135 | | | | | |
| **Test:** MTBE by EPA 8020 | | | | | | | | | | | |
| Methyl-t-butyl Ether | EPA 8020 | ND | | 8 | | 7.71 | LCS | 96.4 | | | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 99.3 | | | 65 - 135 | | | | | |
| **Test:** TPH as Gasoline | | | | | | | | | | | |
| TPH as Gasoline | EPA 8015 M | ND | | 250 | | 268.45 | LCSD | 107.4 | 0.22 | 25.00 | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 124.9 | | | 65 - 135 | | | | | |
| **Test:** BTEX | | | | | | | | | | | |
| Benzene | EPA 8020 | ND | | 8 | | 8.22 | LCSD | 102.8 | 5.37 | 25.00 | 65.0 - 135.0 |
| Ethyl Benzene | EPA 8020 | ND | | 8 | | 9.07 | LCSD | 113.4 | 4.05 | 25.00 | 65.0 - 135.0 |
| Toluene | EPA 8020 | ND | | 8 | | 8.75 | LCSD | 109.4 | 4.68 | 25.00 | 65.0 - 135.0 |
| Xylenes, total | EPA 8020 | ND | | 24 | | 27.87 | LCSD | 116.1 | 5.11 | 25.00 | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 102.1 | | | 65 - 135 | | | | | |
| **Test:** MTBE by EPA 8020 | | | | | | | | | | | |
| Methyl-t-butyl Ether | EPA 8020 | ND | | 8 | | 8.12 | LCSD | 101.5 | 5.18 | 25.00 | 65.0 - 135.0 |
| **Surrogate** | | | **Surrogate Recovery** | | | **Control Limits (%)** | | | | | |
| 4-Bromofluorobenzene | | | 102.1 | | | 65 - 135 | | | | | |