



# TWIN STATE ENVIRONMENTAL

Environmental Scientists and Engineers

July 6, 1999

Mr. Timothy Vallee  
R.L. Vallee, Inc.  
P.O. Box 192  
280 South Main Street  
St. Albans, Vermont 05478

JUL 9 10 13 AM '99

**RE: SITE Investigation Report – Georgia Center Market  
3897 Ethan Allen Highway – Georgia, Vermont  
TSEC Project #98113; SMS Site #98-2569**

Dear Mr. Vallee:

Twin State Environmental Corporation (TSEC) has prepared the enclosed SITE investigation report to detail the findings of recent subsurface investigation activities at the Georgia Center Market located at 3897 Ethan Allen Highway in Georgia, Franklin County, Vermont (SITE). The activities were completed following a request by the State of Vermont Sites Management Section to conduct a SITE Investigation due to petroleum contamination discovered during the December 1998 removal of a gasoline underground storage tank (UST).

This investigation was designed to determine the degree and extent of petroleum contamination within the overburden soils and groundwater beneath the SITE. A total of eight (8) soil borings were advanced throughout the SITE, with six (6) completed as groundwater monitoring wells. Laboratory analysis and field screening of groundwater and soil samples collected from newly installed monitoring points indicates that petroleum compounds have impacted groundwater and soil exceeding allowable concentrations. The groundwater contaminant plume extends beyond the current groundwater monitoring well network. The water supply well, however, has not been impacted.

We have recommended that a minimum of four (4) additional groundwater monitoring wells be installed at the SITE, that a quarterly groundwater monitoring program be implemented at the SITE for a period of one (1) year, and that data be collected at the SITE to aid in determining if the SITE is a candidate for remediation by natural attenuation (RNA). Following one (1) year, this monitoring frequency will be re-evaluated.

Please do not hesitate to contact me if you have any questions regarding the enclosed report or any other matters of concern. I can be reached via e-mail at [jonb@twinstateenvironmental.com](mailto:jonb@twinstateenvironmental.com), or at (802) 654-8663 x104.

Sincerely,  
**TWIN STATE ENVIRONMENTAL CORPORATION**

Jon Berntsen  
Project Manager  
encl.

cc: Ms. Lynda Provencher, VT SMS

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34 Roosevelt Highway  
Colchester, Vermont 05446  
E-mail: [tsec@together.net](mailto:tsec@together.net)  
.....  
Phone: (802) 654-8663  
Fax: (802) 654-8667  
[www.twinstateenvironmental.com](http://www.twinstateenvironmental.com)



Phase (check one)	Type (check one)
<input checked="" type="checkbox"/> Site Investigation	<input type="checkbox"/> Work Scope
<input type="checkbox"/> Corrective Action Feasibility Investigation	<input checked="" type="checkbox"/> Technical Report
<input type="checkbox"/> Corrective Action Plan	<input type="checkbox"/> PCF Reimbursement Request
<input type="checkbox"/> Corrective Action Summary Report	<input type="checkbox"/> General Correspondence
<input type="checkbox"/> Operations & Monitoring Report	

**SITE INVESTIGATION REPORT**

July 6, 1999

Georgia Center Market  
 3897 Ethan Allen Highway  
 (US Route 7)  
 Georgia Center, Vermont

UST Facility #1319  
 SMS Site #98-2569  
 TSEC Project # 98113

Jun 9 10 23 AM '99

Report Prepared for:  
 R.L. Vallee, Inc.  
 280 South Main Street  
 P.O. Box 192  
 St. Albans, VT 05478  
 Contact: Mr. Timothy Vallee

Written By:

Jon Berntsen  
 Project Manager

Reviewed By:

John R. Diego  
 Vice President

Georgia Center Market  
SITE Investigation Report

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**Georgia Center Market  
SITE Investigation Report**

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## 1.0 INTRODUCTION

This report has been prepared by Twin State Environmental Corp. (TSEC), under agreement with R.L. Vallee, Inc. (RLV), to present the findings of our recent subsurface investigation conducted at the Georgia Center Market (SITE). The SITE is located at 3897 Ethan Allen Highway (also known as Route 7), approximately 3 miles north of the Exit 18 interchange of Interstate 89 (I-89) in Georgia, Franklin County, Vermont (see SITE Location Map, **Figure 1** and SITE Plan, **Figure 2**). This investigation has been completed in response to a February 23, 1999 request from the State of Vermont Sites Management Section (SMS) to:

- further define the degree and extent of contamination to soil;
- determine the degree and extent of contamination to groundwater;
- assess the potential for contaminant impact on sensitive receptors;
- submit a summary report that outlines the work performed that provides interpretations and recommendations pertinent to the SITE.

A work scope and cost estimate to perform the work presented within this report was approved by Ms. Lynda Provencher of the SMS on April 1, 1999. Copies of the letters received from the VT SMS are presented as **Attachment 1**. All investigation activities presented within this report were conducted between April 8 and April 30, 1999.

## 2.0 BACKGROUND / PREVIOUS WORK

On December 21, 1998, one (1) 5,000 gallon capacity single wall steel underground storage tank (UST) was removed from the SITE. This UST consisted of two (2) 2,500 gallon capacity chambers used for the storage and retail distribution of regular and super grade gasoline. No secondary containment or corrosion protection was present within the UST system. Product delivery piping consisted of two (2) steel suction lines, which were left in place for removal and closure in May 1999.

During removal activities, soils surrounding the UST were field screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). The maximum VOC concentration encountered was 635 parts per million volume (ppmv) as indicated by the PID. Groundwater, encountered at 4.5 ft below grade (bg), exhibited a petroleum sheen.

On May 4, 1999, TSEC returned to the SITE with RLV and Martel Construction (Martel) of St. Albans, Vermont to remove the product lines and perform a closure assessment. During that assessment, soils were field screened for the presence of VOCs. The maximum VOC concentration encountered was 649 ppmv as indicated by the PID. Groundwater was not encountered within the maximum excavation depth of 3.5 ft bgs.

Area receptors include groundwater, soils, basements of adjacent buildings, a surface water drainage feature, and public or private drinking water wells in the immediate vicinity.

The following reports have been prepared to document the above mentioned SITE activities:

- **“Underground Storage Tank Closure Assessment Report”** – TSEC, December 28, 1998
- **“Underground Storage Tank Line Closure Assessment Report”** – TSEC, May 6, 1998

These reports were submitted to the State of Vermont Underground Storage Tank Program by TSEC, on behalf of RLV.

### 3.0 SCOPE OF WORK

The following activities were performed as part of this investigation, as outlined by TSEC's March 11, 1999 work scope/cost estimate:

- Preparation of a SITE specific health and safety plan that conforms to OSHA 40 CFR 1910.120.
- Clearance of SITE and vicinity for underground utilities by contacting DIG SAFE (Clearance ID# 19991501849 was obtained) and other local utilities.
- Advancement of eight (8) soil borings using Geoprobe® Direct Push technology in the vicinity of the former gasoline UST and product piping. Continuous soil samples were collected, logged, and field screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID) equipped with a 10.6 eV lamp.
- Completion of six (6) soil borings as groundwater monitoring wells using 1-inch diameter PVC well materials. These wells were developed in accordance with TSEC's standard operating procedures following installation.
- Completion of a detailed SITE survey and updated site plan.
- Completion of a receptor assessment that determined the potential for petroleum contamination to affect nearby building basements, surface water bodies, subsurface utilities, drinking water wells, etc.
- Collection of groundwater samples from all SITE groundwater monitoring wells for analysis via US EPA Method 8021B for VOCs.
- Preparation of this summary report.

#### 4.0 SITE LOCATION AND DESCRIPTION

**SITE Owner:** Georgia Center Market  
3897 Ethan Allen Highway  
Georgia Center, Vermont

**UST Owner:** R.L. Vallee, Inc  
280 South Main Street  
St. Albans, VT 05478

**Lot Size:** Approximately 0.5 acres

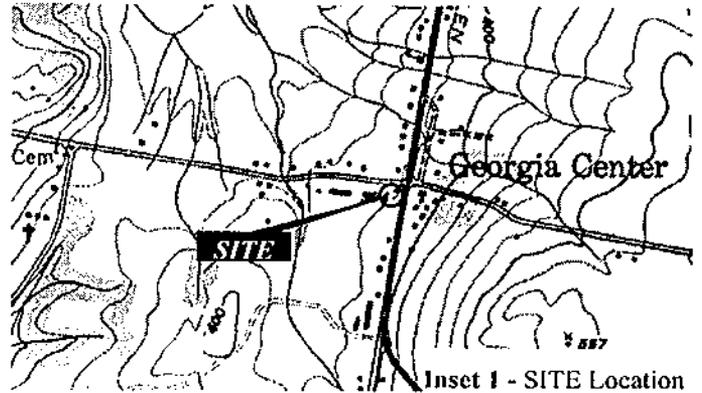
**Latitude:** 44°43'38.78" North

**Longitude:** 73°07'06.67" West

**Zoning:** N/A

**Utilities:** Water – Private connection to northwest corner of building.  
Septic – Underground connection to southwest corner of building.  
Natural Gas – Underground connection to north side of building.  
Electric - Overhead connection to northeast corner of building.  
Telephone - Overhead connection.

**Structures:** One (1) two story country market with one (1) apartment. Market and storage is on first floor, and apartment is on the second floor. There is a basement, however due to debris blocking doorway to the basement, access was not obtained.



Inset 1 - SITE Location

The SITE is located on the west side of Ethan Allen Highway (Route 7) in Georgia Center, Vermont (see SITE Location Map, Figure 1). The building on-SITE is currently in use as a county market and apartment. Please refer to the SITE Photographs presented as Appendix A.

The topography of the SITE and surrounding area slopes east to west. There is a steep slope up to the east with an elevation gain of approximately 150 ft ± over 2,000 ft (7.5% average slope) and a gentle slope to the west (4.7% average slope). The nearest potential sensitive receptors identified during this investigation include the wetland and surface water drainage ditch bordering the property boundary to the south and west, the store basement, and the supply well. See Figure 2, SITE Plan for relative locations.

#### 5.0 REGIONAL SURVEY

The SITE is situated in a mixed residential and agricultural land use area. The properties adjacent to the SITE consist of wetlands to the south, private residences to the north and northeast, a church to the east, a private residence to the southeast, and the Georgia Fire Department and Highway Garage to the west. The nearest residence, with the exception of the apartments on SITE, is approximately 150 ft to the north. There are no other businesses in the immediate vicinity.

Other than the Georgia Center Market SITE (SMS Site #0150) there are four (4) facilities listed on the active hazardous waste site list with the VT SMS that have had releases of oil or hazardous material are located in Georgia. These are the following:

- **Georgia Elementary School** – Route 7 – Georgia SMS Site #91-1083  
Located approximately ½-mile north of the SITE, on Route 7.
- **Georgia Mobil** – Route 7 – Georgia – SMS Site #92-1256  
Located approximately 3-miles south of SITE, at I-89 and Route 7.
- **Vermont Whey Co** – Industrial Park Rd #3 – Georgia – SMS Site #98-2541  
Located at Industrial Park approximately 3½-miles south of SITE.
- **Wyeth Nutritionals** – Industrial Ave – Georgia – SMS Site #98-2575  
Located at Industrial Park approximately 3½-miles south of SITE.

Based on a review of these sites and their location, it does not appear as though they will have a negative impact on the Georgia Center Market SITE.

## 6.0 SUBSURFACE INVESTIGATION

A subsurface exploration program was developed to gather data to further assess petroleum-related contamination in the soils and groundwater on SITE. The investigation was conducted before the petroleum product lines were removed from the ground, and therefore focuses primarily on the subsurface conditions adjacent to the former UST.

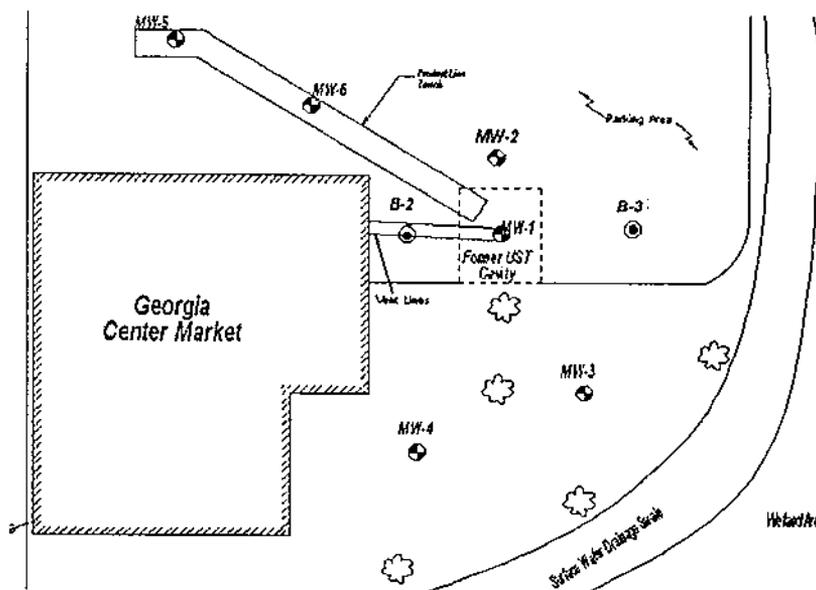
### 6.1 Advancement of Soil Borings

A total of eight (8) soil borings were advanced by TSEC in locations indicated on **Figure 2** using TSEC's Geoprobe<sup>®</sup>. Logs for these borings are presented in **Appendix B**. These borings were advanced to depths ranging from 7.5 to 13.0 ft bgs. All borings were logged, describing soil strata conditions, and field screened for VOCs with a PID using conventional headspace techniques (described further in **Section 7.1 – Field Screening Results**).

The area of investigation is bordered to the south and west by a surface water feature that is approximately 4 ft below SITE grade. The investigation was conducted with the assumption that groundwater would flow from the former UST cavity towards this surface water feature. A total of eight (8) soil borings were completed in the vicinity of the former gasoline UST and product piping run.

- Soil Boring B-1 was advanced within the former UST cavity to determine the quality of soil and groundwater within the suspected source area. This boring, drilled to a total depth of 13.0 ft bgs, was completed as groundwater monitoring well **MW-1**.

- Soil Boring **B-2** was completed between the former UST cavity and the SITE building in an attempt to determine the conditions in a presumed side-gradient direction. This boring, advanced to a total depth of 12.0 ft bgs, was backfilled with bentonite, drill cuttings, and sand to grade.
- Soil Boring **B-3** was completed to the south of the former UST cavity in an attempt to determine the conditions in a presumed side-gradient direction. This boring, encountered refusal at a depth of 7.5 ft bgs, and was backfilled with bentonite, drill cuttings, and sand to grade.
- Soil Boring **B-4** was advanced immediately to the east of the former UST cavity in an attempt to determine the subsurface conditions upgradient of the suspected source area. This boring, drilled to a total depth of 8.0 ft bgs, was completed as groundwater monitoring well **MW-2**.
- Soil Boring **B-5** was advanced to the southwest of the former UST in an attempt to determine downgradient conditions. This boring, drilled to a total depth of 8.0 ft bgs, was completed as groundwater monitoring well **MW-3**.



Inset 2 - SITE Plan with well and boring locations

- Soil Boring **B-6** was advanced to the northwest of the former UST in an attempt to determine downgradient conditions. This boring, drilled to a total depth of 8.0 ft bgs, was completed as groundwater monitoring well **MW-4**.
- Soil Boring **B-7** was advanced at the location of the former gasoline pump island. This boring, completed to a total depth of 8.0 ft bgs, was finished as groundwater monitoring well **MW-5**.
- Soil Boring **B-8** was advanced adjacent to the gasoline product lines that were still in place at the time of this investigation. Boring B-8 was completed to a total depth of 8.0 ft bgs, and, due to the elevated levels of petroleum contamination present, monitoring well **MW-6** was installed.

General soil conditions encountered at the SITE consisted of approximately 5 to 6 ft of mixed sands, silt, and gravel overlying a 1 to 2 ft layer of loose brown silty clay till with some sand and gravel. A

tight gray till consisting of silt, sand, gravel, and clay is present below that. Groundwater was encountered during drilling at depths ranging from 0.9 ft bgs at boring B-5 to 2.5 ft bgs at borings B-1, B-2, and B-3.

Contaminated soil (i.e.  $\text{PID} \geq 0.1$  ppmv) was encountered during the advancement of soil borings B-1, B-7, and B-8, with the highest concentrations of VOCs present in B-7, which is located adjacent to the former pump island. A headspace analysis performed on the samples collected from this boring indicated VOCs present at concentrations ranging from 41.3 ppmv (~8 ft bgs) to 641 ppmv (4-8 ft bgs). The remaining borings did not exhibit detectable levels of VOCs ( $\text{PID} < 0.1$  ppmv).

PID readings in the remaining borings ranged from  $< 0.1$  ppmv in several samples to 641 ppmv (B-8; 4-8 ft). Further description of subsurface materials and contaminant distribution can be found in Appendix B, Boring Logs, and a complete summary of all PID data obtained during drilling is presented in Table 1, Soil Boring Summary Table.

## 6.2 Monitoring Well Installation and Construction

All monitoring wells were completed by installing a 1-inch diameter schedule 40 polyvinylchloride (PVC) monitoring well with a 0.010-inch machine slotted screen. The annular space between the well screen and the borehole wall was filled by a clean sand filter pack. A 1-inch diameter PVC riser was placed above the screen, and a bentonite seal was placed around the riser to prevent surface infiltration. Wells were completed with a flush-mounted, water-tight curb box that was set in concrete, and fitted with an expansion plug to avoid surface infiltration to the aquifer.

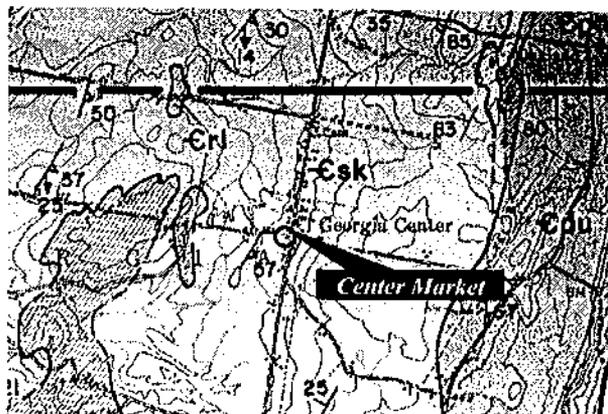
Following installation of the new monitoring wells, each monitoring well was developed using a peristaltic pump to remove fine particulates introduced into the formation during drilling and/or installation. In addition, well development was performed to hydraulically connect the aquifer and the well, allowing for more accurate determination of *in situ* conditions (i.e. water level, aquifer parameters, and chemical constituents). A minimum of three (3) well volumes of water was removed from each well, until the purge water was clear. Development water was discharged directly to the ground surface.

Further details of the well installations are presented in Appendix B—Monitoring Well Logs.

## 6.3 SITE Geology

A summary of the predominant geological units encountered during drilling activities indicated that the SITE is situated on top of approximately 5 to 6 ft of mixed sands, silt, and gravel overlying a 1 to 2 ft layer of loose brown silty clay till with some sand and gravel. A tight gray till consisting of silt, sand, gravel, and clay is present below that. Bedrock could not be confirmed during this investigation, however, driller's logs for supply wells in the area indicate that bedrock is present at depths ranging from 15 ft bgs to over 100 ft bgs. For a more detailed description of geological units, see Boring Logs, Appendix B.

Surficial geologic materials that underlie the SITE consist of glacial till, wave washed till, and marine beach gravel<sup>1</sup>. Reports available concerning the bedrock materials underlying the SITE indicated that materials present consist of the middle Cambrian age (523-540 million years old) Skeels Corners Formation<sup>2</sup>. The Skeels Corners formation is comprised of "black slates or shales with thin limonite-stained sandstones."



Inset 3 -Bedrock Geologic Map with SITE Location

#### 6.4 SITE Survey

A Topcon AT-G6 auto level was used to perform a stadia survey to identify the location and relative elevations of key SITE features. The collected data was used to update the SITE Plan (Figure 2) and obtain top of PVC riser elevations necessary to calculate water table elevations.

### 7.0 SOIL SAMPLING ACTIVITIES

#### 7.1 Field Screening Results

Soil samples were field screened using conventional headspace methods. A Thermo Environmental Instruments Model 580B Organic Vapor Meter with a 10.6 eV photoionization detector (PID) was employed to detect the presence of VOCs. The PID was calibrated to a 95 ppmv isobutylene standard, referenced to benzene. Data collected during the field screening indicates elevated levels of VOCs within the subsurface soils.

As mentioned above, the highest concentration of VOCs present in soil was found at B-7, 4-8 ft bgs (649 ppmv). PID readings in the remaining borings ranged from <0.1 ppmv in several samples to 641 ppmv (B-8; 4-8 ft).

#### 7.2 Laboratory Results

No soil samples were collected for laboratory analysis during this investigation.

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<sup>1</sup> Doll, C.G., editor, 1970, Surficial Geologic Map of Vermont, VT Geological Survey, SGL.

<sup>2</sup> Stone, S.W., and Dennis, J.G., 1964, The Geology of the Milton Quadrangle, Vermont: Vermont Geol. Survey, Bulletin No.26.

## 8.0 GROUNDWATER SAMPLING ACTIVITIES

Groundwater elevation measurements were collected on April 9, 1999 and April 30, 1999, during SITE survey and SITE sampling activities. On April 30, 1999 TSEC collected groundwater samples from all accessible monitoring wells and the site water supply for laboratory analysis via US EPA Method 8021B for VOCs. Endyne, Inc. of Williston, VT (Endyne) conducted all laboratory analyses for this project.

### 8.1 Water Table Elevation and SITE Hydrogeology

#### 8.1.1 Water Table Elevation – April 9, 1999

On April 9, 1999, all six (6) groundwater monitoring wells were located and accessed for fluid level measurements. Depth to groundwater in the six (6) monitoring wells was measured between 0.98 ft bgs (MW-3) and 2.05 ft bgs (MW-1 and MW-5). A full analysis of groundwater elevation data is presented in **Table 2**, Summary of Groundwater Elevations – April 9, 1999.

#### 8.1.2 Water Table Elevation – April 30, 1999

On April 30, 1999, all six (6) groundwater monitoring wells were located and accessed for fluid level measurements and groundwater sampling activities. Depth to groundwater in the six (6) monitoring wells was measured between 1.22 ft bgs (MW-3) and 2.38 ft bgs (MW-1). In the three (3) weeks between measurement events, the average water table elevation dropped by 0.24 ft. A full analysis of groundwater elevation data is presented in **Table 3**, Summary of Groundwater Elevations – April 30, 1999.

#### 8.1.3 SITE Hydrogeology

A groundwater contour plan has been prepared from the April 30, 1999 groundwater elevation data and is presented as **Figure 3**. The groundwater was calculated to be flowing to the west with a horizontal gradient of about 0.04  $l/l$  between MW-2 and MW-4. *(Note: The majority of the groundwater flow and contaminant transport is likely occurring through the upper five (5) to six (6) feet of coarser subsurface materials. Therefore, this is the zone for which groundwater flow velocities will be calculated. The less permeable till materials will be addressed in Section 10.0).*

Based on this measured hydraulic gradient (i), the published hydraulic conductivity (k) for silty sands and fine sands of 0.03 feet per day (ft/d) to 3 ft/d (Fetter<sup>3</sup>), and the assumed porosity value of 30% for this SITE ( $\eta$ ), the apparent groundwater flow velocity beneath the SITE can be calculated using the following equation:

$$\text{Equation: } V_{gw} = \frac{ki}{\eta}$$

<sup>3</sup> Fetter, C.W., 1994, Applied Hydrogeology – 3<sup>rd</sup> Edition. Englewood Cliffs, NJ: Prentice Hall. 691p.

The calculated apparent groundwater velocity through the upper five to six feet of the aquifer, according to the above equation, ranges from  $4.0 \times 10^{-3}$  ft/d to  $4.0 \times 10^{-1}$  ft/d (1.46 ft/yr to 146 ft/yr).

A graphical interpretation of the groundwater flow direction is presented on the Groundwater Contour Plan provided as **Figure 3**.

## **8.2 Groundwater Sampling Activities**

### **8.2.1 Groundwater Monitoring Wells**

Groundwater monitoring wells were purged of three (3) well volumes prior to sampling in order to collect a representative sample from the aquifer. The water initially in the well may have become chemically altered by coming into contact with atmospheric gasses and the well casing and screen; therefore all water from the well casing and surrounding sand pack were removed prior to sampling. Purge water from all wells was discharged directly to the ground surface.

### **8.2.2 SITE Supply Well**

A SITE supply well sample was also collected during SITE sampling activities. This sample was collected from the cold water tap in the store bathroom. Prior to collecting this sample, the tap was allowed to run for approximately 2 minutes, until the temperature stabilized.

## **8.3 Groundwater Analytical Results**

Results received from Endyne indicate that petroleum compounds are present in three (3) of the six (6) groundwater monitoring wells sampled. No compounds were detected in monitoring wells MW-2, MW-3, and MW-4, and no compounds were detected in the SITE supply well.

The maximum total dissolved levels of benzene, toluene, ethylbenzene, and total xylenes (BTEX) was detected in monitoring well MW-5 at 39,780 micrograms per liter ( $\mu\text{g/l}$ ). Concentrations of total BTEX were also reported in MW-1 (279  $\mu\text{g/l}$ ) and MW-6 (36,820  $\mu\text{g/l}$ ).

MTBE was not detected in any of the wells sampled. However, due to sample dilution at the laboratory, the method detection limits (MDLs) were raised in monitoring wells MW-1 (200  $\mu\text{g/l}$ ), MW-5 (2,000  $\mu\text{g/l}$ ), and MW-6 (2,000  $\mu\text{g/l}$ ).

Trimethylbenzene isomers were detected above their respective MDLs in MW-1, MW-5, and MW-6. Naphthalene was detected above its MDL in MW-5, and MW-6. The MDL for naphthalene was raised due to sample dilution at the laboratory in the sample collected from MW-1 (20  $\mu\text{g/l}$ ).

VOCs were detected at concentrations exceeding Vermont Groundwater Enforcement Standards (VGES) in groundwater monitoring wells MW-1, MW-5, and MW-6.

The complete analytical laboratory report from Endyne, is summarized in **Table 4**, and is provided as **Attachment 2**. A BTEX Concentration Plan has been presented as **Figure 4**.

## 8.4 QA/QC RESULTS

### 8.4.1 Field QA/QC

The Relative Percent Difference (RPD) for total aromatics (BTEX, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and naphthalene) in the sample collected from MW-1 and its duplicate, DUP-1 was calculated to be 54.2%. The RPD for MTBE between MW-1 and DUP-1 was not calculated since there were no detectable concentrations of MTBE in either sample. Typically, a RPD of up to 25% is considered to be an acceptable correlation between duplicate samples.

The elevated RPD can be attributed to several factors including a non-homogenous groundwater sample, increased silt content in the sample, or a small sample volume. Endyne was contacted to ensure that the final calculations were corrected for sample dilution, and this was completed.

BTEX and MTBE were not detected above method detection limits in the Field Blank.

### 8.4.2 Laboratory QA/QC

All laboratory data was evaluated for the following parameters prior to acceptance in this report:

- analysis within holding time;
- correct sample ID's;
- acceptable detection limit multipliers;
- acceptable matrix spike (MS) and matrix spike duplicate (MSD) recoveries;
- acceptable Relative Percent Difference between MS and MSD; and,
- acceptable surrogate recoveries where applicable.

## 9.0 POTENTIAL RECEPTORS

During this and previous investigations, a sensitive receptor evaluation was conducted in the immediate vicinity. This investigation focused on surface water receptors, breathing zones, groundwater supplies in the immediate vicinity, downgradient residential and commercial basements, and area subsurface utilities.

The nearest surface water receptor identified is the surface water drainage feature bordering the SITE to the south and west. A visual reconnaissance was performed along the SITE boundary in an attempt to identify locations where contaminated groundwater may be impacting surface water. No locations

were positively identified; however a significant outbreak with very heavy septic odor was observed to the southwest of the building.

The breathing zones within the store were surveyed with a PID, and no positive PID readings were encountered during this activity. An attempt was made to access the building basement, but due to the amount of material (debris, boxes, etc) covering the entrance, access could not be obtained.

TSEC conducted a review of the State of Vermont Water Supply well data records in December 1998 in an attempt to identify the location and ownership of water supply wells within a ½-mile radius of the SITE. A total of 18 wells were identified. The nearest well is on the adjacent property to the north, approximately 250 ft from the UST excavation. This also serves as the SITE water supply. The remaining wells are all greater than 500 ft away. As mentioned in Section 8.3, this well has not been impacted by the on-SITE contamination.

There are no subsurface utilities present immediately downgradient of the SITE.

## 10.0 CONCEPTUAL HYDROGEOLOGICAL MODEL

Groundwater at the SITE is contained primarily within a zone of mixed sands, silt, and gravel at depths ranging from 1 to 6 ft bgs. The lower extent of this zone was defined during this investigation as the top of the silt, sand, clay, and gravel till material.

The SITE topography is relatively flat with a gentle slope to the west. To the east, a slope rises to an elevation approximately 150 ft higher over a distance of 2,000 ft. Groundwater flow across the SITE follows the local surface water drainage patterns, and flows to the west. Within the monitoring well network, groundwater flows to the west, with an average horizontal hydraulic gradient of 0.04 ft/n (as measured on April 30, 1999 between MW-2 and MW-4). As calculated in Section 8.1, the average groundwater velocity beneath the SITE ranges from  $4.0 \times 10^{-3}$  ft/d to  $4.0 \times 10^{-1}$  ft/d (1.46 ft/yr to 146 ft/yr). For the purposes of the following section, the geometric mean value of  $4.0 \times 10^{-2}$  ft/d (14.6 ft/yr) will be used.

$$\text{geometric mean} = \sqrt{(4.0 \times 10^{-3}) \times (4.0 \times 10^{-1})} = 4.0 \times 10^{-2} \text{ ft/d}$$

Based on the equation below, the contaminant of concern ( $V_{coc}$ ) transport velocities can be calculated.

$$\text{Equation: } V_{coc} = \frac{V_{gw}}{R},$$

where  $R$  is a site specific retardation factor calculated for the contaminants of concern (for Benzene  $R=1.6$ , for o-xylene  $R=3.9$ ).

The contaminant transport velocity values presented below are based on a retardation factor ( $R$ ) calculated from published sources (see Note 1). Therefore, values may vary, depending on site specific values of the fraction of organic carbon ( $f_{oc}$ ), the soil bulk density ( $\rho_s$ ), and the formation porosity ( $\eta$ ). For these calculations,  $f_{oc}$  was estimated at 0.002 <sup>8</sup>/<sub>g</sub>,  $\rho_s$  was estimated to be 1.8g/cm<sup>3</sup>, and  $\eta$  was estimated to be 30%.

**TABLE – Estimation of Contaminant Transport Velocities**

<i>Subsurface Materials</i>	<i>Water Table Gradient (ft/ft)</i>	<i>k (ft/day)</i>	<i>V<sub>gw</sub> (ft/day)</i>	<i>V<sub>benzene</sub> (ft/day)</i>	<i>V<sub>o-xylene</sub> (ft/day)</i>
Silty Sands	0.04	0.3	4.0x10 <sup>-2</sup>	2.2x10 <sup>-2</sup>	1.0x10 <sup>-2</sup>
Glacial Till	0.04	0.03	4.0x10 <sup>-3</sup>	2.2x10 <sup>-3</sup>	1.0x10 <sup>-3</sup>

*Notes:*

- Parameter values used to estimate contaminant transport velocities were obtained from risk-based corrective action look-up tables in ASTM E1739, "Standard Guide for Risk Based Corrective Action Applied at Petroleum Release Sites" and the Illinois Environmental Protection Agency Bureau of Land "Tiered Approach to Cleanup Objectives Guidance Document."*
- Porosity values were estimated as follows: Silty Sands=30%.*

Based on these calculations, a molecule of groundwater flows through the silty sand (from MW-2 to MW-4) in approximately 3.8 years (at approximately 14.6 ft/yr over a distance of approximately 55 ft) and through the glacial till (from MW-2 to MW-4) in approximately 38 years (at approximately 1.4 ft/yr over a distance of 55 ft).

Surface water flows off-SITE to the west and northwest, ultimately discharging to a tributary of Mill Brook, approximately ½- mile south and west of the SITE. Mill Brook ultimately discharges into St. Albans Bay of Lake Champlain, approximately 7¼ miles northwest of the SITE. Groundwater flow in the vicinity will typically follow surface water flow, in both the overburden and shallow bedrock.

Gasoline compounds discovered in the soil and groundwater are most likely attributed to spills, drips, and overfills from activities related to the former gasoline UST, and from weeping threaded fittings that were observed connecting the former lines together. During the May 1999 product line closure assessment, the highest levels of VOCs were found adjacent to the threaded joints. The levels of contaminants are modest, but it does not appear as though any of the potential receptors identified during this investigation have been severely impacted by the release of petroleum at the Georgia Center Market.

The degree and extent of contamination present on site has not been defined. The dissolved contaminant plume extends beyond the existing groundwater monitoring well network. Additionally, conditions encountered during the removal of product lines appear to warrant additional investigation.

## 11.0 CONCLUSIONS

Based on the investigation conducted at this SITE, and the data obtained, TSEC provides the following conclusions regarding this SITE:

- One (1) 5,000 gallon capacity steel UST was removed from the ground in December 1998. Petroleum contaminated soils and groundwater were encountered during the removal activities. Product lines remained in the ground for subsequent removal and closure.
- TSEC completed a subsurface investigation program on April 8, 1999 that included the advancement of eight (8) soil borings and the installation of six (6) groundwater monitoring wells.
- PID readings in soils range from <0.1 ppmv to 649 ppmv in boring B-7 (4-8 ft bg). Boring B-7 was installed adjacent to the former product pump island.
- Groundwater samples collected on April 30, 1999 indicate that petroleum contamination is present within the monitoring well network at concentrations above the VGES.
- Benzene contamination was present above its VGES level of 5 µg/l in the sample collected from MW-5 (5,750 µg/l). The MDLs were raised above the VGES in samples collected from MW-1 (20 µg/l) and MW-6 (200 µg/l) due to laboratory sample dilution. Toluene, ethylbenzene, and total xylenes were also present above their respective VGES levels in MW-1, MW-5, and MW-6.
- MTBE was not present above its MDL in any of the samples collected. The MDL was raised above the VGES of 40 µg/l in monitoring wells MW-1 (200 µg/l), MW-5 (2,000 µg/l), and MW-6 (2,000 µg/l).
- Trimethylbenzene isomers and/or naphthalene were detected above their respective VGES in the following wells: MW-1, MW-5, and MW-6.
- No separate phase petroleum product was observed during groundwater sampling events. However, a product sheen was present in boring B-8 (MW-6) between 6.0 and 6.2 ft bgs.
- Potential receptors identified during this investigation include the SITE water supply, the drainage ditch located along the south and west SITE boundary, the breathing zones within the store, and the store basement. The drainage ditch and the supply well have not been adversely affected by the contamination on SITE, and the basement could not be accessed to determine impact. The interior air quality of the store also did not contain any detectable levels of VOCs, as evidenced by a PID.
- The limits of contamination present on SITE have not been reasonably defined at this time. The dissolved contaminant plume in groundwater appears to extend to the west of monitoring wells MW-5 and MW-6.

- The petroleum product lines were removed from the SITE on May 4, 1999. During a closure assessment performed by TSEC, contaminated soils were encountered adjacent to threaded pipe fittings. Approximately 7 yd<sup>3</sup> of contaminated soils were stockpiled on SITE, and subsequently disposed of at MTS, Inc. via asphalt batching. These soils were removed from the ground during line removal activities, but could not be replaced due to space constraints within the excavation.

## 12.0 RECOMMENDATIONS

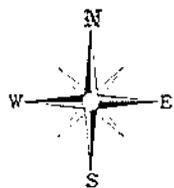
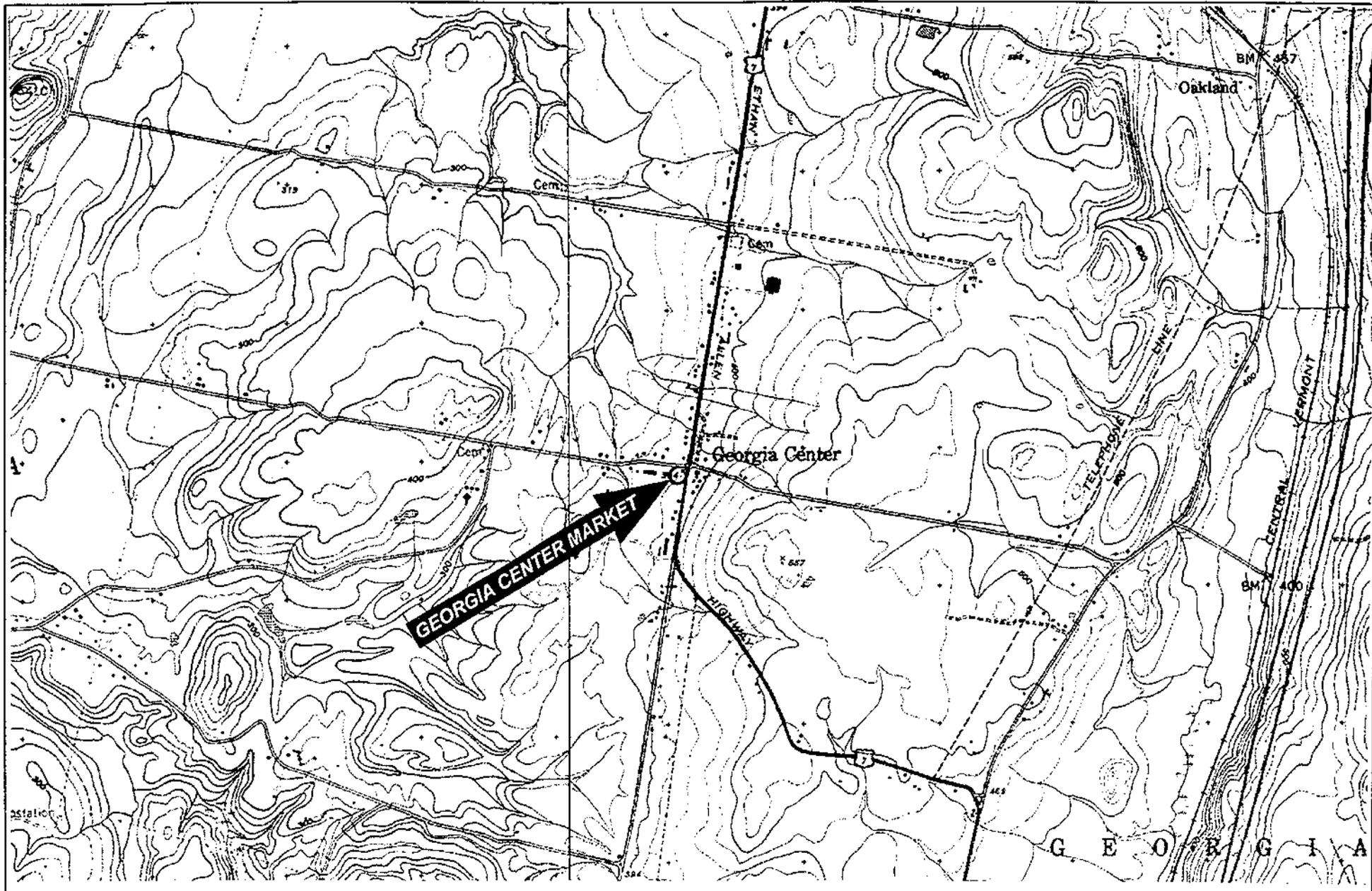
Based on the information available to date concerning this SITE and vicinity, TSEC offers the following recommendations:

- Expand the groundwater monitoring well network in an attempt to further define the groundwater contaminant plume downgradient of the former product lines. This would involve the installation of up to five (5) groundwater monitoring wells in the locations indicated on **Figure 5, Additional Well Locations**.
- Implement a groundwater monitoring program that will include the quarterly sampling of all accessible monitoring wells, the SITE supply and the surface water feature present along the southern and western SITE boundaries. Samples would be analyzed for BTEX, Trimethylbenzene isomers, and Naphthalene via US EPA Method 8021B.
- Begin collecting SITE data that will help to determine if the SITE is a candidate for remediation by natural attenuation (RNA).

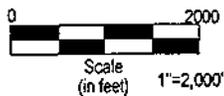
Following a period of one year, the sampling frequency and the monitoring wells sampled will be evaluated.

---

**FIGURES**



Source: USGS 7.5 Minute Topographic Series  
Milton and Georgia Plains, Vermont Quadrangles



Project No: 98-113  
 Designed By: jpb  
 Checked By: \_\_\_\_\_  
 Approved By: \_\_\_\_\_  
 Drawn By: jpb  
 Scale: as shown  
 Date: 12/22/98

TWIN STATE ENVIRONMENTAL CORP.  
 34 Roosevelt Highway  
 Colchester, Vermont 05446  
 (802) 654-8663

FIGURE 1  
 SITE LOCATION MAP  
 Georgia Center Market  
 Georgia, Vermont

Residence

Georgia United Methodist Church

To St. Albans

US ROUTE 7

ETHAN ALLEN HIGHWAY

To Interstate 89

Telephone Line (Abandoned)

Grass Median

PATTEE HILL ROAD



Residence

Georgia Center Market

Supply Well (75+/- ft)

B-7/  
MW-5

B-8/  
MW-6

Product Line Trench

B-4/  
MW-2

Parking Area

B-1/  
MW-1

B-2

B-3

Former UST Cavity

Vent Lines

B-5/  
MW-3

B-6/  
MW-4

Surface Water Drainage Swale

Wetland Area

**LEGEND**

MW-3



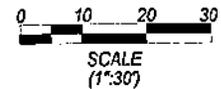
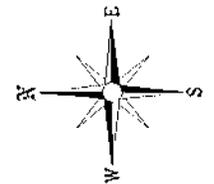
Groundwater Monitoring Well installed 4/99 by TSEC.

B-4



Location of Soil Boring

To Georgia Town Highway Garage and Fire Department



Project No: 98-113	Designed By: jpb	TWIN STATE ENVIRONMENTAL CORP. 34 Roosevelt Highway Colchester, Vermont 05446 (802) 654-8663	FIGURE 2 SITE PLAN Georgia Center Market Georgia, Vermont
	Checked By:		
	Approved By:		
	Drawn By: jpb		
	Scale: 1" = 30'		
	Date: 04/30/99		

Residence

Georgia United Methodist Church

To St. Albans

US ROUTE 7

ETHAN ALLEN HIGHWAY

To Interstate 89

Telephone Line (Abandoned)

Grass Median

PATTEE HILL ROAD



Residence

Supply Well (75+/- ft)



Georgia Center Market

B-7/  
MW-5  
(38,780)

B-8/  
MW-6  
(36,820)

B-4/  
MW-2  
(ND)

B-2

B-1/  
MW-1  
(279)

B-3

Vent Lines

Former UST Cavity

B-6/  
MW-4  
(ND)

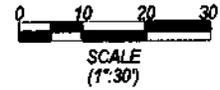
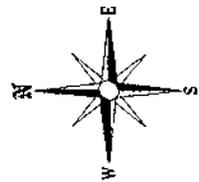
B-5/  
MW-3  
(ND)

Surface Water Drainage Swale

Wetland Area

**LEGEND**

- B-4 Location of Soil Boring
- B-5/  
MW-3 Groundwater Monitoring Well installed 4/99 by TSEC.  
with total dissolved BTEX concentration in groundwater  
(in ug/l) as measured on April 30, 1999
- (ND)



SCALE  
(1"=30')

To Georgia Town Highway Garage and Fire Department



Project No.:	98-113
Designed By:	job
Checked By:	
Approved By:	
Drawn By:	job
Scale:	1" = 30'
Date:	04/30/99

TWIN STATE ENVIRONMENTAL CORP.  
34 Roosevelt Highway  
Colchester, Vermont 05446  
(802) 654-8663

**FIGURE 4**  
**BTEX CONCENTRATION PLAN**  
Georgia Center Market  
Georgia, Vermont

Residence

Georgia United Methodist Church

To St. Albans

US ROUTE 7

ETHAN ALLEN HIGHWAY

To Interstate 89

Telephone Line (Abandoned)

Grass Median

PATTEE HILL ROAD

B-7/ MW-5 (98.11)  
B-2/ MW-6 (97.50)

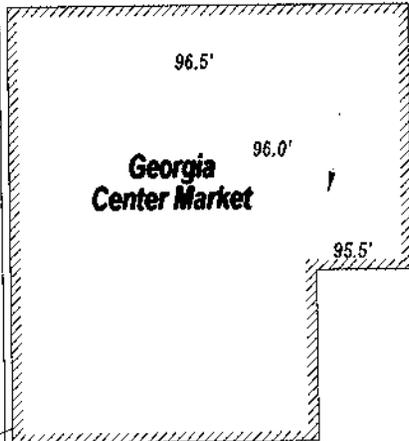
Product Line Trench

B-4/ MW-2 (97.26)

Parking Area



Residence



Georgia Center Market

B-1/ MW-1 (96.59)  
Former UST Cavity

B-3

Vent Lines

Supply Well (75+/- ft)

B-4/ MW-4 (94.80)

B-5/ MW-3 (95.79)

Groundwater Flow Direction

Surface Water Drainage Swale

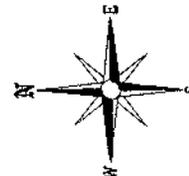
Wetland Area

**LEGEND**

B-4 Location of Soil Boring

B-5/ MW-3 Groundwater Monitoring Well installed 4/99 by TSEC. with groundwater elevation (in ft) as measured on April 30, 1999

98.0' Groundwater Equipotential Lines



0 10 20 30  
SCALE (1"=30')

Designed By: jpb  
Checked By:  
Approved By:  
Drawn By: jpb  
Scale: 1" = 30'  
Date: 04/30/99

TWIN STATE ENVIRONMENTAL CORP.  
34 Roosevelt Highway  
Colchester, Vermont 05446  
(802) 664-9663

**FIGURE 3**  
**GROUNDWATER CONTOUR PLAN**  
Georgia Center Market  
Georgia, Vermont

Residence

Georgia United Methodist Church

To St. Albans

US ROUTE 7

ETHAN ALLEN HIGHWAY

To Interstate 89

Telephone Line (Abandoned)

*X-tran couple of borings*

PATTEE HILL ROAD



Residence

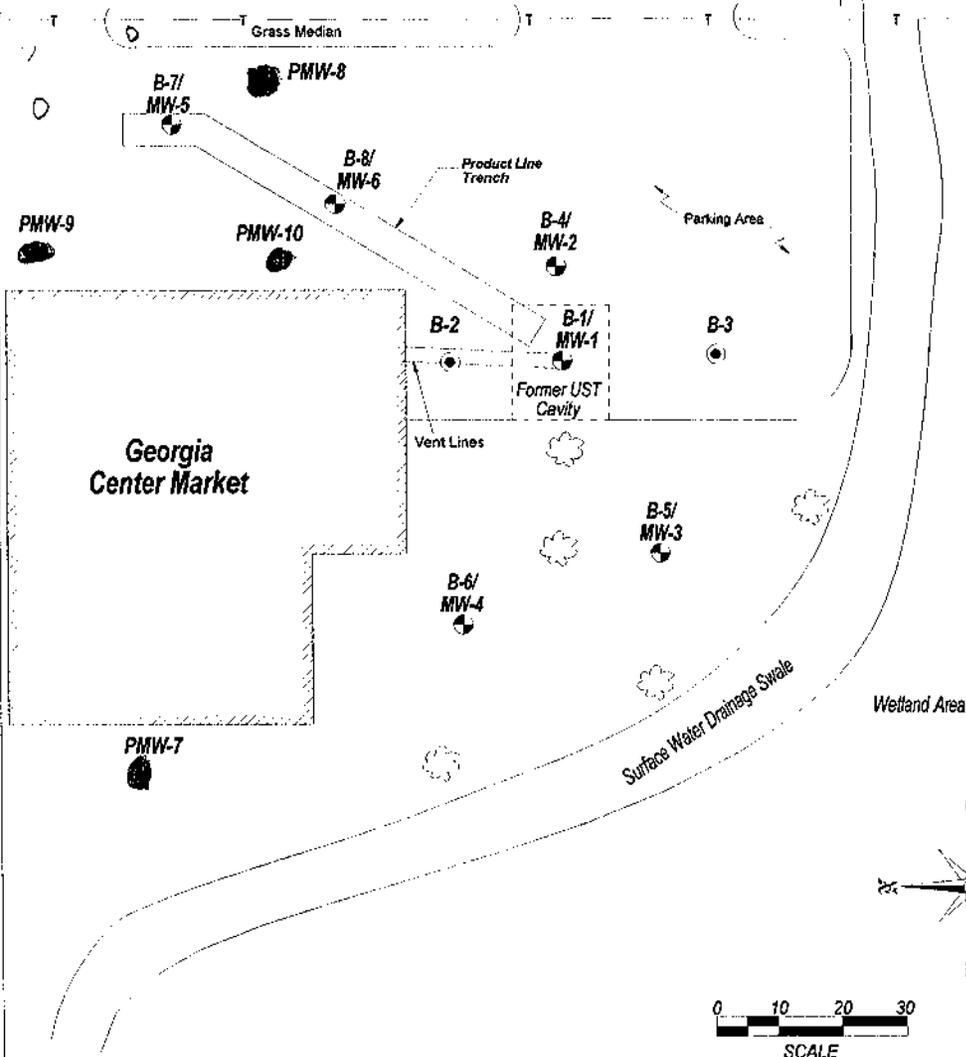
Supply Well (75+/- ft)

**LEGEND**

B-4 Location of Soil Boring

B-5/ MW-3 Groundwater Monitoring Well installed 4/99 by TSEC.

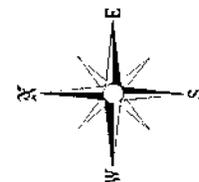
PMW-7 Proposed Groundwater Monitoring Well location.



Georgia Center Market

PMW-7

To Georgia Town Highway Garage and Fire Department



Project No.: 98-113	Designed By: jpb	TWIN STATE ENVIRONMENTAL CORP. 34 Roosevelt Highway Colchester, Vermont 05446  (802) 654-8663	FIGURE 5 ADDITIONAL WELL LOCATIONS  Georgia Center Market Georgia, Vermont
	Checked By:		
	Approved By:		
	Drawn By: jpb		
	Scale: 1" = 30'		
	Date: 04/30/99		

---

**TABLES**

TABLE 1

GEORGIA CENTER MARKET  
 GEORGIA CENTER, VERMONT  
 VT SMS SITE #98-2569

Soil Boring Summary Table

April 8, 1999

Boring Identification	Depth of Sample (ft bgs)	PID Reading (in ppmv)
B-1	0-4	54.2
	4-8	162.9
	8-12	290.0
	12-13	18.9
B-2	0-4	<0.1
	4-8	<0.1
	8-12	<0.1
B-3	0-4	<0.1
	4-8	<0.1
B-4	0-4	<0.1
	4-8	<0.1
B-5	0-4	<0.1
	4-8	<0.1
B-6	0-4	<0.1
	4-8	<0.1
B-7	0-4	639
	4-8	649
	8	41.3
B-8	0-4	626.0
	4-8	641.0
	8	31.2

- Notes: 1. PID readings were obtained with a Thermo-Environmental Instruments Model 580B PID calibrated to a 95 ppmv isobutylene standard referenced to benzene.
2. Conventional headspace techniques were used.

jpb:\project\98108\report tables.xls\soil boring summary

TABLE 2

GEORGIA CENTER MARKET  
 GEORGIA CENTER, VERMONT  
 VT SMS SITE #98-2569

Summary of Groundwater Elevations

April 9, 1999

Well Identification	Top of Riser Elevation	Depth to Product	Depth to Water	Depth of Well	Thickness of Water in Well	Water Table Elev.
MW-1	98.97	ND	2.05	11.75	9.70	96.92
MW-2	99.20	ND	1.75	7.00	5.25	97.45
MW-3	97.01	ND	0.98	6.40	5.42	96.03
MW-4	96.86	ND	1.85	6.30	4.45	95.01
MW-5	100.17	ND	2.05	6.55	4.50	98.12
MW-6	99.42	ND	1.46	6.20	4.74	97.96
DRAINAGE	96.45	NM	DRY	NA	NA	<96.45

- Notes:
1. Elevation data is referenced to a TBM. Units are in feet.
  2. ND - not detected.
  3. NA - not applicable.
  4. Measurements recorded are referenced to a marking on top of PVC riser for each well.
  5. Depth to fluid measurements were obtained using a Solinst Interface Probe.

jp:\project\98113\report tables.xls\water table elevations-0399

TABLE 3

GEORGIA CENTER MARKET  
 GEORGIA CENTER, VERMONT  
 VT SMS SITE #98-2569

Summary of Groundwater Elevations

April 30, 1999

Well Identification	Top of Riser Elevation	Depth to Product	Depth to Water	Depth of Well	Thickness of Water in Well	Water Table Elev.
MW-1	98.97	ND	2.38	11.75	9.37	96.59
MW-2	99.20	ND	1.94	7.00	5.06	97.26
MW-3	97.01	ND	1.22	6.40	5.18	95.79
MW-4	96.86	ND	2.06	6.30	4.24	94.80
MW-5	100.17	ND	2.06	6.55	4.49	98.11
MW-6	99.42	ND	1.92	6.20	4.28	97.50
DRAINAGE	96.45	NM	DRY	NA	NA	<96.45

- Notes:
1. Elevation data is referenced to a TBM. Units are in feet.
  2. ND - not detected.
  3. NA - not applicable.
  4. Measurements recorded are referenced to a marking on top of PVC riser for each well.
  5. Depth to fluid measurements were obtained using a Solinst Interface Probe.

job:\project\98113\report tables\dstwater table elevations-0399

TABLE 4  
 GEORGIA CENTER MARKET  
 GEORGIA CENTER, VERMONT  
 VT SMS SITE #98-2569

Summary of Groundwater Quality

April 30, 1999

Compound	Benzene	Toluene	Ethyl- benzene	Total Xylenes	Total BTEX	MTBE	1,3,5- Trimethylbenzene	1,2,4- Trimethylbenzene	Naphthalene
MW-1	<20	TBQ<20	46.6	232	279	<200	<b>58.6</b>	<b>146</b>	TBQ<20
MW-2	<1	<1	<1	<1	--	<10	<1	<1	<1
MW-3	<1	<1	<1	<1	--	<10	<1	<1	<1
MW-4	<1	<1	<1	<1	--	<10	<1	<1	<1
MW-5	<b>5,750</b>	<b>17,200</b>	<b>2,330</b>	<b>14,500</b>	39,780	<2,000	<b>953</b>	<b>2,970</b>	<b>421</b>
MW-6	<200	<b>19,000</b>	<b>2,920</b>	<b>14,900</b>	36,820	<2,000	<b>772</b>	<b>2,620</b>	<b>282</b>
Supply	<1	<1	<1	<1	--	<10	<1	<1	<1
DUP-1 <sup>(4)</sup>	<20	<20	28	135	163	<200	<b>31.8</b>	<b>82.2</b>	<20
Trip	<1	<1	<1	<1	--	<10	<1	<1	<1
VGES <sup>(1)</sup>	5.0	1,000	700	10,000	ne <sup>(2)</sup>	40	4.0	5.0	20

- Notes:
1. VGES - Vermont Groundwater Enforcement Standard.
  2. ne - VGES not established.
  3. **Bold and Italic** numbers indicate concentrations that exceed VGES.
  4. DUP-1 - Duplicate sample of monitoring well MW-1. Collected for Quality Assurance/Quality Control.
  5. All samples were analyzed via US EPA Method 8021B.

52.4% =RPD

job:\project\98113\report tables.xls\groundwater quality-0499

---

**APPENDIX A**

**SITE PHOTOGRAPHS**

**GEORGIA CENTER MARKET  
GEORGIA CENTER, VERMONT  
SMS SITE #98-2569**

April 1999



**PHOTOGRAPH 1** – SITE Layout looking west. Former UST cavity is between tree and loader.



**PHOTOGRAPH 2** – View of lines and former pump island from former UST location. Note well locations.

---

**APPENDIX B**



# TWIN STATE ENVIRONMENTAL CORPORATION

34 Roosevelt Highway Colchester, Vermont 05446  
 (802) 654-8663 FAX: (802) 654-8667

## MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-1/MW-1	WELL DEPTH:	11.75 ft	BORING DEPTH:	13.0 feet
PROJECT NAME:	Georgia Center Mkt.	DEPTH TO WATER:	(during drilling) Approx. 2.5 ft bgs		
PROJECT NO:	98113	SCREEN DIA:	1-inch	DEPTH:	2.0-12.0 ft bgs
INSTALL DATE:	April 8, 1999	SCREEN TYPE/SIZE:	Schedule 40 PVC; 0.010" slot		
TSEC REP:	Jon Berntsen	RISER TYPE:	Schedule 40 PVC		
DRILLING CO:	TSEC	RISER DIA:	1-inch	DEPTH:	0.5-2.0 ft bgs
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	Flush mount road box set in concrete		
SAMPLING METHOD:	Macrocore	RISER CAP:	Locking expansion plug		
REMARKS:	Boring was completed as a groundwater monitoring well.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND	
0		0-4	54.2	2.0 ft recovery	0.0-2.0: Fine to medium SAND (UST Cavity fill). Brown, dry (wet at 2.5' on core).	CEMENT GROUT NATIVE BACKFILL BENTONITE SEAL SAND PACK WELL SCREEN RISER PIPE HEAD SPACE WATER LEVEL (APPROXIMATE)	
1							
2							
3							
4			4-8	162.9	2.0 ft recovery	4.0-6.0: Medium to coarse SAND with little gravel and trace of silt. Brown, loose, saturated.	
5							
6							
7							
8			8-12	290	4.0 ft recovery	8.0-9.5: Fine SAND with some medium and coarse sand and trace silt and fine gravel. Brown, saturated, petroleum odor.	
9						9.5-11.0: Medium SAND with some fine and coarse sand and trace silt and fine gravel. Brown, saturated, petroleum odor.	
10						11.0-12.0: Coarse and very coarse SAND. Gray, petroleum odor.	
11						12.0-13.0: Coarse and very coarse SAND. Gray, petroleum odor.	
12			12-14	18.9	1.0 ft recovery	13.0- : Red dolomitic rock (Skeels Corner Formation?)	
13					End of Sampling - 13.0 feet End of Boring - 13.0 feet		
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
<b>GRANULAR SOILS</b> BLOWS/FT DENSITY 0-4 V.LOOSE 4-10 LOOSE 10-30 M.DENSE 30-50 DENSE >50 V.DENSE		<b>COHESIVE SOILS</b> BLOWS/FT DENSITY <2 V.SOFT 2-4 SOFT 4-8 M.STIFF 8-15 STIFF 15-30 V.STIFF >30 HARD		<b>PROPORTIONS USED</b> TRACE 0-10% LITTLE 10-20% SOME 20-35% AND 35-50%		<b>NOTES:</b> 1. See Figure 2, SITE Plan, for boring locations 2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.	



# TWIN STATE ENVIRONMENTAL CORPORATION

34 Roosevelt Highway Colchester, Vermont 05446  
 (802) 654-8663 FAX: (802) 654-8667

## MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-2	WELL DEPTH:	N/A	BORING DEPTH:	12.0 feet
PROJECT NAME:	Georgia Center Mkt.	DEPTH TO WATER:	(during drilling) Approx. 2.5 ft bgs		
PROJECT NO:	98113	SCREEN DIA:	N/A	DEPTH:	N/A
INSTALL DATE:	April 8, 1999	SCREEN TYPE/SIZE:	N/A		
TSEC REP:	Jon Berntsen	RISER TYPE:	N/A		
DRILLING CO:	TSEC	RISER DIA.:	N/A	DEPTH:	N/A
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	N/A		
SAMPLING METHOD:	Macrocore	RISER CAP:	N/A		
REMARKS:	Boring was backfilled with drill cuttings, sand, and bentonite, then finished to match existing grade.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND
0	N	0-4	<0.1	1.8 ft recovery	0.0-0.3: Crushed parking lot GRAVEL.	CEMENT GROUT NATIVE BACKFILL BENTONITE SEAL SAND PACK WELL SCREEN RISER PIPE HS HEAD SPACE WATER LEVEL (APPROXIMATE)
1	O				0.3-1.0: Fine to coarse SAND (poorly sorted). Tan, dry.	
2	▼				1.0-1.8: Fine to very fine silty SAND. Trace of clay. Tight, gray, perched WT @1.0 ft.	
3	W	4-8	<0.1	3.0 ft recovery	4.0-5.3: Sandy SILT. Brown, saturated.	
4	E				5.3-6.3: SAND, coarsening downward. Gray, saturated.	
5	L				6.3-7.0: SAND, SILT, CLAY, and GRAVEL (till). Brown, tight, drier with depth.	
6	L					
7	.	8-12	<0.1	4.0 ft recovery	8.0-12.0: SAND, SILT, CLAY, and GRAVEL (till). Gray, tight, drier with depth.	
8	I					
9	N					
10	S					
11	T					
12	A	End of Sampling = 12.0 feet End of Boring = 12.0 feet				
13	L					
14	L					
15	E					
16	D					
17						
18						
19						
20						
21						
22						
23						
24						
25						

<b>GRANULAR SOILS</b> BLOWS/FT    DENSITY 0-4            V.LOOSE 4-10           LOOSE 10-30          M.DENSE 30-50          DENSE >50            V.DENSE		<b>COHESIVE SOILS</b> BLOWS/FT    DENSITY <2            V.SOFT 2-4            SOFT 4-8            M.STIFF 8-15          STIFF 15-30        V.STIFF >30           HARD		<b>PROPORTIONS USED</b> TRACE        0-10% LITTLE       10-20% SOME         20-35% AND           35-50%		<b>NOTES:</b> 1. See Figure 2, SITE Plan, for boring locations 2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.
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# TWIN STATE ENVIRONMENTAL CORPORATION

34 Roosevelt Highway Colchester, Vermont 05446  
 (802) 654-8663 FAX: (802) 654-8667

## MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-3	WELL DEPTH:	N/A	BORING DEPTH:	7.5 feet
PROJECT NAME:	Georgia Center Mkt.	DEPTH TO WATER:	(during drilling) Approx. 2.5 ft bgs		
PROJECT NO:	98113	SCREEN DIA:	N/A	DEPTH:	N/A
INSTALL DATE:	April 8, 1999	SCREEN TYPE/SIZE:	N/A		
TSEC REP:	Jon Berntsen	RISER TYPE:	N/A		
DRILLING CO:	TSEC	RISER DIA:	N/A	DEPTH:	N/A
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	N/A		
SAMPLING METHOD:	Macrocore	RISER CAP:	N/A		
REMARKS:	Boring was backfilled with drill cuttings, sand, and bentonite, then finished to match existing grade.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND
0	N	0-4	<0.1	0.8 ft recovery	0.0-0.8: Crushed parking lot GRAVEL and fine to coarse SAND (poorly sorted). Tan, dry.	CEMENT GROUT
1	O					NATIVE BACKFILL
2	W					BENTONITE SEAL
3	E	4-8	<0.1	3.0 ft recovery	4.0-4.8: SILT with trace of sand. Brown, saturated, loose. 4.8-6.0: SAND, coarsening downward. Gray, saturated. 6.0-6.2: SAND, SILT, CLAY, and GRAVEL (till). Brown, loose, saturated. 6.2-7.0: SAND, SILT, CLAY, and GRAVEL (till). Gray, tight, drier with depth. End of Sampling = 8.0 feet End of Boring = 8.0 feet	SAND PACK
4	L					WELL SCREEN
5	L					RISER PIPE
6	I					HS HEAD SPACE
7	N					WATER LEVEL (APPROXIMATE)
8	S					
9	T					
10	A					
11	L					
12	L					
13	E					
14	D					
15						
16						
17						
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24						
25						

GRANULAR SOILS		COHESIVE SOILS		PROPORTIONS USED	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	TRACE	0-10%
0-4	V.LOOSE	<2	V.SOFT	LITTLE	10-20%
4-10	LOOSE	2-4	SOFT	SOME	20-35%
10-30	M.DENSE	4-8	M.STIFF	AND	35-50%
30-50	DENSE	8-15	STIFF		
>50	V.DENSE	15-30	V.STIFF		
		>30	HARD		

NOTES:	1. See Figure 2, SITE Plan, for boring locations 2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.
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# TWIN STATE ENVIRONMENTAL CORPORATION

34 Roosevelt Highway Colchester, Vermont 05446  
(802) 654-8663 FAX: (802) 654-8667

## MONITORING WELL/SOIL BORING LOG

WELL/BORING NO: B-4/MW-2	WELL DEPTH: 7.0 ft	BORING DEPTH: 8.0 feet
PROJECT NAME: Georgia Center Mkt.	DEPTH TO WATER: (during drilling) Approx. 1.9 ft bgs	
PROJECT NO: 98113	SCREEN DIA: 1-inch	DEPTH: 2.0-7.0 ft bgs
INSTALL DATE: April 8, 1999	SCREEN TYPE/SIZE: Schedule 40 PVC; 0.010" slot	
TSEC REP: Jon Berntsen	RISER TYPE: Schedule 40 PVC	
DRILLING CO: TSEC	RISER DIA.: 1-inch	DEPTH: 0.5-2.0 ft bgs
DRILLING METHOD: Geoprobe®	GUARD TYPE: Flush mount road box set in concrete	
SAMPLING METHOD: Macrocore	RISER CAP: Locking expansion plug	
REMARKS: Boring was completed as a groundwater monitoring well.		

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND
0		0-4	<0.1	2.5 ft recovery	0.0-1.0: ASPHALT and GRAVEL base. 1.0-3.0: Silty SAND and fill material (bricks, etc.). Brown, wet at 1.9'.	CEMENT GROUT NATIVE BACKFILL BENTONITE SEAL SAND PACK WELL SCREEN RISER PIPE HS HEAD SPACE WATER LEVEL (APPROXIMATE)
1		4-8	<0.1	3.0 ft recovery	4.0-4.6: SILT and very fine SAND. Gray, saturated. 4.6-5.5: Coarse and very coarse SAND. Gray, saturated. 5.5-7.0: SILT, CLAY, SAND, GRAVEL till. Tight, gray, dry at 6.5 ft.	
2						End of Sampling = 8.0 feet End of Boring = 8.0 feet
3						
4						
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23						
24						
25						

GRANULAR SOILS		COHESIVE SOILS		PROPORTIONS USED	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	TRACE	0-10%
0-4	V.LOOSE	<2	V.SOFT	LITTLE	10-20%
4-10	LOOSE	2-4	SOFT	SOME	20-35%
10-30	M.DENSE	4-8	M.STIFF	AND	35-50%
30-50	DENSE	8-15	STIFF		
>50	V.DENSE	15-30	V.STIFF		
		>30	HARD		

<b>NOTES:</b> <ol style="list-style-type: none"> <li>See Figure 2, SITE Plan, for boring locations</li> <li>PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.</li> </ol>
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# TWIN STATE ENVIRONMENTAL CORPORATION

34 Roosevelt Highway Colchester, Vermont 05446  
(802) 654-8663 FAX: (802) 654-8667

## MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-5/MW-3	WELL DEPTH:	6.4 ft	BORING DEPTH:	8.0 feet
PROJECT NAME:	Georgia Center Mkt.	DEPTH TO WATER:	(during drilling) Approx. 0.9 ft bgs		
PROJECT NO:	98113	SCREEN DIA:	1-inch	DEPTH:	1.4-6.4 ft bgs
INSTALL DATE:	April 8, 1999	SCREEN TYPE/SIZE:	Schedule 40 PVC; 0.010" slot		
TSEC REP:	Jon Berntsen	RISER TYPE:	Schedule 40 PVC		
DRILLING CO:	TSEC	RISER DIA.:	1-inch	DEPTH:	0.5-1.4 ft bgs
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	Flush mount road box set in concrete		
SAMPLING METHOD:	Macrocore	RISER CAP:	Locking expansion plug		
REMARKS:	Boring was completed as a groundwater monitoring well.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND	
0		0-4	<0.1	3.0 ft recovery	0.0-2.5: Silt, clay, and sand topsoil. Wet at 1.5', brown, loose.. 2.5-3.0: Coarse SAND. Gray, saturated.	CEMENT GROUT NATIVE BACKFILL BENTONITE SEAL SAND PACK WELL SCREEN RISER PIPE HS HEAD SPACE WATER LEVEL (APPROXIMATE)	
1							
2							
3							
4			4-8	<0.1	4.0 ft recovery	4.0-4.8: Coarse and very coarse SAND. Gray, saturated. 4.8-5.9: SILT, CLAY, SAND, GRAVEL till. Soft, lt. brown. 5.9-8.0: SILT, CLAY, SAND, GRAVEL till. Tight, gray, dry.	
5							
6							
7							
8					End of Sampling = 8.0 feet End of Boring = 8.0 feet		
9							
10							
11							
12							
13							
14							
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16							
17							
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19							
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23							
24							
25							
<b>GRANULAR SOILS</b> BLOWS/FT    DENSITY 0-4        V.LOOSE 4-10        LOOSE 10-30       M.DENSE 30-50       DENSE >50        V.DENSE		<b>COHESIVE SOILS</b> BLOWS/FT    DENSITY <2            V.SOFT 2-4            SOFT 4-8            M.STIFF 8-15          STIFF 15-30        V.STIFF >30          HARD		<b>PROPORTIONS USED</b> TRACE        0-10% LITTLE       10-20% SOME         20-35% AND          35-50%		<b>NOTES:</b> <ol style="list-style-type: none"> <li>See Figure 2, SITE Plan, for boring locations</li> <li>PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.</li> </ol>	



# TWIN STATE ENVIRONMENTAL CORPORATION

34 Roosevelt Highway Colchester, Vermont 05446  
 (802) 654-8663 FAX: (802) 654-8667

## MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-6/MW-4	WELL DEPTH:	6.3 ft	BORING DEPTH:	8.0 feet
PROJECT NAME:	Georgia Center Mkt.	DEPTH TO WATER:	(during drilling) Approx. 1.9 ft bgs		
PROJECT NO:	98113	SCREEN DIA:	1-inch	DEPTH:	1.3-6.3 ft bgs
INSTALL DATE:	April 8, 1999	SCREEN TYPE/SIZE:	Schedule 40 PVC; 0.010" slot		
TSEC REP:	Jon Berntsen	RISER TYPE:	Schedule 40 PVC		
DRILLING CO:	TSEC	RISER DIA.:	1-inch	DEPTH:	0.5-1.3 ft bgs
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	Flush mount road box set in concrete		
SAMPLING METHOD:	Macrocore	RISER CAP:	Locking expansion plug		
REMARKS:	Boring was completed as a groundwater monitoring well.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND	
0		0-4	<0.1	3.0 ft recovery	0.0-2.5: Silt, clay, and sand topsoil. Wet at 1.5', brown, loose.. 2.5-3.0: Coarse SAND. Gray, saturated.		
1							
2							
3							
4		4-8	<0.1	3.0 ft recovery	4.0-5.0: Coarse and very coarse SAND. Gray, saturated. 5.0-6.5: SILT, CLAY, SAND, GRAVEL till. Soft, lt. brown. 6.5-7.0: SILT, CLAY, SAND, GRAVEL till. Tight, gray, dry.		
5							
6							
7							
8					End of Sampling = 8.0 feet End of Boring = 8.0 feet		
9							
10							
11							
12							
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14							
15							
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18							
19							
20							
21							
22							
23							
24							
25							

<b>GRANULAR SOILS</b> BLOWS/FT    DENSITY 0-4            V.LOOSE 4-10          LOOSE 10-30        M.DENSE 30-50        DENSE >50          V.DENSE		<b>COHESIVE SOILS</b> BLOWS/FT    DENSITY <2            V.SOFT 2-4            SOFT 4-8            M.STIFF 8-15          STIFF 15-30        V.STIFF >30          HARD		<b>PROPORTIONS USED</b> TRACE        0-10% LITTLE       10-20% SOME         20-35% AND           35-50%		<b>NOTES:</b> 1. See Figure 2, SITE Plan, for boring locations 2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.
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# TWIN STATE ENVIRONMENTAL CORPORATION

34 Roosevelt Highway Colchester, Vermont 05446  
 (802) 654-8663 FAX: (802) 654-8667

## MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-7/MW-5	WELL DEPTH:	6.55 ft	BORING DEPTH:	8.0 feet
PROJECT NAME:	Georgia Center Mkt.	DEPTH TO WATER: (during drilling)	Approx. 1.9 ft bgs		
PROJECT NO:	98113	SCREEN DIA:	1-inch	DEPTH:	1.55-6.55 ft bgs
INSTALL DATE:	April 8, 1999	SCREEN TYPE/SIZE:	Schedule 40 PVC; 0.010" slot		
TSEC REP:	Jon Berntsen	RISER TYPE:	Schedule 40 PVC		
DRILLING CO:	TSEC	RISER DIA.:	1-inch	DEPTH:	0.5-1.55 ft bgs
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	Flush mount road box set in concrete		
SAMPLING METHOD:	Macrocore	RISER CAP:	Locking expansion plug		
REMARKS:	Boring was completed as a groundwater monitoring well.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND	
0		0-4	639	3.0 ft recovery	0.0-0.7: GRAVEL Fill Material. 0.7-1.5: Medium and coarse SAND, gravel, and wood, heavy petroleum odor. 1.5-3.0: Medium SAND with trace of silt. Tight, gray, petroleum odor.	CEMENT GROUT NATIVE BACKFILL BENTONITE SEAL SAND PACK WELL SCREEN RISER PIPE HEAD SPACE WATER LEVEL (APPROXIMATE)	
1							
2							
3							
4			4-8	649	3.0 ft recovery	4.0-5.5: Mixed SAND. Loose, gray, saturated. Heavy petroleum odor. 5.5-7.0: SAND, GRAVEL, SILT, CLAY till. Tight, tan.	
5							
6							
7							
8				41.3		End of Sampling = 8.0 feet End of Boring = 8.0 feet	
9							
10							
11							
12							
13							
14							
15							
16							
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21							
22							
23							
24							
25							
<b>GRANULAR SOILS</b> BLOWS/FT DENSITY 0-4 V.LOOSE 4-10 LOOSE 10-30 M.DENSE 30-50 DENSE >50 V.DENSE		<b>COHESIVE SOILS</b> BLOWS/FT DENSITY <2 V.SOFT 2-4 SOFT 4-8 M.STIFF 8-15 STIFF 15-30 V.STIFF >30 HARD		<b>PROPORTIONS USED</b> TRACE 0-10% LITTLE 10-20% SOME 20-35% AND 35-50%		<b>NOTES:</b> 1. See Figure 2, SITE Plan, for boring locations 2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.	



# TWIN STATE ENVIRONMENTAL CORPORATION

34 Roosevelt Highway Colchester, Vermont 05446  
 (802) 654-8663 FAX: (802) 654-8667

## MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-8/MW-6	WELL DEPTH:	6.2 ft	BORING DEPTH:	8.0 feet
PROJECT NAME:	Georgia Center Mkt.	DEPTH TO WATER: (during drilling)	Approx. 1.5 ft bgs		
PROJECT NO:	98113	SCREEN DIA:	1-inch	DEPTH:	1.2-6.2 ft bgs
INSTALL DATE:	April 8, 1999	SCREEN TYPE/SIZE:	Schedule 40 PVC; 0.010" slot		
TSEC REP:	Jon Berntsen	RISER TYPE:	Schedule 40 PVC		
DRILLING CO:	TSEC	RISER DIA.:	1-inch	DEPTH:	0.5-1.2 ft bgs
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	Flush mount road box set in concrete		
SAMPLING METHOD:	Macrocore	RISER CAP:	Locking expansion plug		
REMARKS:	Boring was completed as a groundwater monitoring well.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND	
0		0-4	626	2.0 ft recovery	0.0-0.8: ASPHALT and GRAVEL base. 0.8-2.0: Silty medium and coarse SAND and GRAVEL. Petro. odor, gray, saturated @2'.	CEMENT GROUT NATIVE BACKFILL BENTONITE SEAL SAND PACK WELL SCREEN RISER PIPE HS HEAD SPACE WATER LEVEL (APPROXIMATE)	
1							
2							
3							
4			4-8	641	3.0 ft recovery	4.0-4.8: Mixed SAND. Loose, gray, saturated. Heavy petroleum odor. 4.8-6.2: Fine to coarse SAND. Gray, saturated, product from 6.0-6.2'. 6.2-7.0: SAND, GRAVEL, SILT, CLAY till. Tight, tan.	
5							
6							
7							
8			31.2		End of Sampling = 8.0 feet End of Boring = 8.0 feet		
9							
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25							
<b>GRANULAR SOILS</b> BLOWS/FT DENSITY 0-4 V.LOOSE 4-10 LOOSE 10-30 M.DENSE 30-50 DENSE >50 V.DENSE		<b>COHESIVE SOILS</b> BLOWS/FT DENSITY <2 V.SOFT 2-4 SOFT 4-8 M.STIFF 8-15 STIFF 15-30 V.STIFF >30 HARD		<b>PROPORTIONS USED</b> TRACE 0-10% LITTLE 10-20% SOME 20-35% AND 35-50%		<b>NOTES:</b> 1. See Figure 2, SITE Plan, for boring locations 2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.	

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**ATTACHMENT 1**

98113  
BLUE

FEB 23 1999

Waste Management Division  
103 South Main Street/West Office  
Waterbury, Vermont 05671-0404  
(802) 241-3888  
FAX (802) 241-3296

February 23, 1999

Mr. Tim Vallee  
R.L. Vallee  
P.O. Box 192  
St. Albans, Vermont 05478

RE: Petroleum Contamination at The Center Market  
Georgia, Vermont  
SMS Site # 98-2569

Dear Mr. Vallee:

The Sites Management Section (SMS) has received the Underground Storage Tank (UST) closure site report outlining subsurface conditions for the above referenced site. The fieldwork was conducted by Twin State Environmental Inc. on December 21, 1998. This report, dated December 28, 1998 and summarizes the degree and extent of contamination encountered. The USTs removed include:

- UST #1 - 5,000 gallon gasoline UST

During the site activities, soils screened had concentrations up to 635 parts per million (ppm) as measured by a photoionization detector (PID). The peak PID reading was measured at a depth of 8 feet below ground surface (fbgs) in the excavation. The limits of soil contamination were not defined. All soil was used for backfill at the conclusion of the program.

Site soils consisted of sand and gravel. Groundwater was encountered at depth of approximately 4.5 fbgs where a sheen was observed.

The The Center Market was inspected for potentially sensitive receptors. The receptors potentially affected include groundwater, basements of adjacent buildings, soil, and public or private drinking water wells which are located within the vicinity of the site.

Based on the report information, the SMS has determined that additional work is necessary at the site in order to determine the severity of contamination present. Due to the possibility of contaminant impact to nearby receptors, the SMS is requesting that R.L. Vallee retain the services of a qualified environmental consultant to perform the following:

- Further define the degree and extent of contamination to the soil.
- As appropriate, determine if the airspace beneath the site building(s) or site adjacent buildings has been impacted by the release using a PID. Wall and floor construction as well as susceptibility to vapor migration should be noted. If the ambient airspace has been impacted, SMS requests that confirmatory sampling and laboratory analyses be performed using EPA Method TO-2.
- Determine the degree and extent of contamination, if any, to groundwater. A sufficient number of monitoring sites should be installed to adequately define the severity of contamination. All groundwater samples taken should be analyzed for BTEX and MTBE compounds. At sites with nearby water supply sources, data should be collected to determine the hydrologic relationship of the contaminated area to the

water supply source. Pumping influences should be considered in the evaluation.

- Assess the potential for sensitive receptors to be impacted by the contamination. Base this update on all available information. This assessment should include basements of adjacent buildings, nearby surface water, any public or private drinking water wells which are located within the vicinity of the site, wetlands, sensitive ecologic areas, outdoor or indoor air, sewers, or utility corridors. If any water supplies appear at risk from this contamination, they should be sampled and analyzed for TPH, BTEX and MTBE compounds.
- Determine the need for a long term treatment and/or monitoring plan which addresses the groundwater contamination.
- Submit to the SMS a summary report which outlines the work performed, as well as provides conclusions and recommendations. Included should be analytical data, a site map showing the location of any potential sensitive receptors, stockpiled soils and monitoring or sample locations, an area map, detailed well logs (if appropriate) and a groundwater contour map.

Please have your consultant submit a preliminary work plan and cost estimate or a site investigation expressway notification form within fifteen days of your receipt of this letter so that it may be approved prior to the initiation of onsite work. Enclosed please find a list of consultants who perform this type of work in the area as well as the brochure "*Selecting Your UST Cleanup Contractor*," which will help you in choosing an environmental consultant.

Based on current information, the underground storage tanks at The Center Market are eligible for participation in the Petroleum Cleanup Fund (PCF). You must provide written proof to the SMS that you hold no other applicable insurance in order to receive reimbursement from the PCF. The owner or permittee must pay for the removal and/or repair of the failed tank(s), and for the initial \$10,000.00 of the cleanup. The fund will reimburse the tank owner or permittee for additional eligible cleanup costs of up to \$1 million. All expenditures must be pre-approved by the Agency or performed in accordance with the "*Site Investigation Guidance*" expressway program. Please refer to the enclosed guidance document titled, "*Procedures for Reimbursement from the Petroleum Cleanup Fund*" for additional information concerning the PCF.

The Secretary of the Agency of Natural Resources reserves the right to seek cost recovery of fund monies spent at the The Center Market site if the Secretary concludes that R.L. Vallee is in significant violation of the Vermont Underground Storage Tank Regulations or the Underground Storage Tank statute (10 V.S.A., Chapter 59).

We realize that this is a lot to absorb and respond to. We are here to help make this process as effective and uncomplicated as possible. Please review the enclosed documents and call me with any questions you may have. I can be reached at (802) 241-3876.

Sincerely,

Chuck Schwer, Supervisor  
Sites Management Section

Enclosures (3)

cc: Georgia Selectboard w/o enclosure  
Georgia Health Officer w/o enclosure  
DEC Regional Office w/o enclosure (transmitted electronically)   
Jon Berntsen, Twin State Environmental Inc. w/o enclosure (transmitted electronically)



State of Vermont

MAR 31 1999  
APR 02 1999

Department of Fish and Wildlife  
Department of Forests, Parks and Recreation  
Department of Environmental Conservation  
State Geologist  
RELAY SERVICE FOR THE HEARING IMPAIRED  
1-800-253-0191   TDD>Voice  
1-800-253-0195   Voice>TDD

AGENCY OF NATURAL RESOURCES  
Department of Environmental Conservation

Waste Management Division  
103 South Main Street / West Bldg.  
Waterbury, VT 05671-0404  
(802)241-3888  
FAX (802)241-3296

April 1, 1999

Jon Berntsen  
Twin State Environmental Corp.  
34 Roosevelt Highway  
Colchester, VT 05446

RE: Georgia Center Market (Site #98-2569)

Dear Mr. Berntsen:

The Sites Management Section (SMS) has received the March 11, 1999 work scope and cost estimate for the Georgia Center Market site. The SMS concurs with the work outlined and the estimated costs.

Please feel free to call if you have any questions.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Lynda Provencher'.

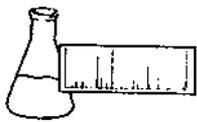
Lynda Provencher, Haz. Mat. Spec.  
Sites Management Section

c: Tim Vallee, R.L. Vallee

lp/sites/982569/4199.ltr

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**ATTACHMENT 2**



**ENDYNE, INC.**

MAY 24 1999

Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Twin State Environmental Corp.  
PROJECT NAME: Center Mkt/98113.05  
REPORT DATE: May 13, 1999  
DATE SAMPLED: April 30, 1999

ORDER ID: 2181  
REF.#: 137,753 - 137,761

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

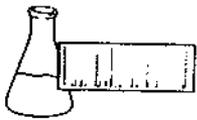
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director

enclosures



### EPA METHOD 8021B--PURGEABLE AROMATICS

CLIENT: Twin State Environmental Corp.  
PROJECT NAME: Center Mkt/98113.05  
CLIENT PROJ. #: 98113.05

DATE RECEIVED: April 30, 1999  
REPORT DATE: May 13, 1999  
ORDER ID: 2181

Ref. #:	137,753	137,754	137,755	137,756	137,757
Site:	MW-1	MW-2	MW-3	MW-4	MW-5
Date Sampled:	4/30/99	4/30/99	4/30/99	4/30/99	4/30/99
Time Sampled:	9:11	9:46	9:29	9:58	10:35
Sampler:	JB	JB	JB	JB	JB
Date Analyzed:	5/10/99	5/10/99	5/10/99	5/10/99	5/10/99
UIP Count:	>10	0	0	0	>10
Dil. Factor (%):	5	100	100	100	0.5
Surr % Rec. (%):	108	111	85	107	111
Parameter	Conc. (ug/L)				
MTBE	<200	<10	<10	<10	<2000
Benzene	<20	<1	<1	<1	5,750.
Toluene	TBQ <20	<1	<1	<1	17,200.
Ethylbenzene	46.6	<1	<1	<1	2,330.
Xylenes	232.	<1	<1	<1	14,500.
1,3,5 Trimethyl Benzene	58.6	<1	<1	<1	953.
1,2,4 Trimethyl Benzene	146.	<1	<1	<1	2,970.
Naphthalene	TBQ <20	<1	<1	<1	421.

Ref. #:	137,758	137,759	137,760	137,761	
Site:	MW-6	F.B.	Dup-1	Supply	
Date Sampled:	4/30/99	4/30/99	4/30/99	4/30/99	
Time Sampled:	10:15	8:19	11:15	8:33	
Sampler:	JB	JB	JB	JB	
Date Analyzed:	5/11/99	5/11/99	5/12/99	5/11/99	
UIP Count:	>10	0	>10	0	
Dil. Factor (%):	0.5	100	5	100	
Surr % Rec. (%):	101	109	100	112	
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	
MTBE	<2000	<10	<200	<10	
Benzene	<200	<1	<20	<1	
Toluene	19,000.	<1	<20	<1	
Ethylbenzene	2,920.	<1	28.0	<1	
Xylenes	14,900.	<1	135.	<1	
1,3,5 Trimethyl Benzene	772.	<1	31.8	<1	
1,2,4 Trimethyl Benzene	2,620.	<1	82.2	<1	
Naphthalene	282.	<1	<20	<1	

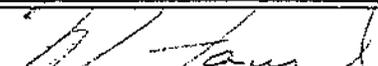
Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

**CHAIN-OF-CUSTODY RECORD**

1-01g 31875

Project Name: <u>CENTER MARKET</u> Site Location: <u>GEORGIA VT 98113.05</u> <small>TSC#</small>	Reporting Address: <u>34 ROOSEVELT HIGHWAY</u> <u>CUMMESTER VT 05446</u>	Billing Address: <u>SAME AS</u>
Endyne Project Number: <u>2181</u>	Company: <u>TWIN STATE ENVIRONMENTAL</u> Contact Name/Phone #: <u>JIM BEERTSEN 654-8663</u>	Sampler Name: <u>JIM BEERTSEN</u> Phone #: <u>(802) 654-8663 x104</u>

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
137753	MW-1	GW	X		4/30/99 0911	2	VOA/UV		8021B	HCl	
137754	MW-2				0940						
137755	MW-3				0929						
137756	MW-4				0958						
137757	MW-5				1035			Shwn			
137758	MW-10				1015			Shwn			
137759	FIELD BLANK				0919						
137760	DUP-1				1115						
137761	SUPPLY				0833			S.I.F. or O.H.C.			

Relinquished by: Signature 	Received by: Signature 	Date/Time <u>4/30/99 2:00 AM</u>
Relinquished by: Signature _____	Received by: Signature _____	Date/Time _____

 New York State Project: Yes  No 
**Requested Analyses**

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD <sub>5</sub>	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCPLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										