

**ENVIRONMENTAL COMPLIANCE SERVICES, INC.**

June 3, 1998  
Project Number: 40058.10  
Document: Summary.rpt

Mr. Richard Spiese, Project Manager  
Sites Management Section  
VT DEC WMD  
103 South Main Street/West Office  
Waterbury, VT 05671-0404

WASTE MANAGEMENT  
DIVISION

JUN 5 10 13 AM '98

**RE: Site Investigation Report  
Marlboro College, Schrader Dorm, Marlboro, VT  
DEC Site #97-2224**

Dear Mr. Spiese:

Enclosed please find the above referenced report for your review. Should you have any questions regarding this information, please feel free to call me at 802-257-1195.

Sincerely,  
*ENVIRONMENTAL COMPLIANCE SERVICES, Inc.*

David C. Balk, P.G.  
Project Manager

DCB

enclosure

cc: Hendrick W. van Loon, Marlboro College

Phase	Type
<input checked="" type="checkbox"/> <b>Initial Site Investigation</b> <input type="checkbox"/> Corrective Action Feasibility Investigation <input type="checkbox"/> Corrective Action Plan <input type="checkbox"/> Corrective Action Summary Report <input type="checkbox"/> Operations and Monitoring Report	<input type="checkbox"/> Work Scope <input checked="" type="checkbox"/> <b>Technical Report</b> <input type="checkbox"/> PCF Reimbursement Request <input type="checkbox"/> General Correspondence

**Site Investigation Report**

**May 1998**

Marlboro College  
 Schrader Dorm  
 Marlboro, Vermont  
 SMS Site #97-2224

*Prepared for:*

Marlboro College  
 Schrader Dorm  
 Marlboro, Vermont 05344  
 Contact: Hendrick W. van Loon  
 Phone: (802) 257-4333

*Prepared by:*

Environmental Compliance Services, Inc.  
 157 Old Guilford Road #6  
 Brattleboro, VT 05301  
 Contact: David C. Balk, P.G.  
 Phone: (802) 257-1195

June 3, 1998

WASTE MANAGEMENT  
 DIVISION

JUN 5 10 13 AM '98

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## 1.0 Introduction

On June 26, 1997 a 1,000 gallon #2 fuel oil underground storage tank (UST) was removed from outside Shrader Dormitory at Marlboro College ("the site"; see site locus map, Appendix A). Soils from the tank excavation were screened with a Thermo Environmental Model 580B Organic Vapor Meter (OVM) for the presence of Volatile Organic Compound (VOC) concentrations. The levels of contamination ranged from 4 to 114 parts per million (ppm). A tank closure report was submitted to the VT DEC, which resulted in the request for subsurface investigations to assess the extent and degree of petroleum contamination in soil and/or groundwater at the site.

Environmental Compliance Services, Inc. of Brattleboro, VT submitted a work plan for these additional investigations to the VT DEC on behalf of Hendrick W. van Loon of Marlboro College. The work plan included soil boring advancement, groundwater monitoring well installation, groundwater sampling and analysis, and a sensitive receptor survey. It was approved by the Sites Management Section (SMS) on January 1, 1998.

This report documents the work performed by ECS at the site and presents results, conclusions and recommendations.

## 2.0 Site Description

The subject property exists at an elevation of approximately 1,710 feet above mean sea level. The Marlboro College campus is composed of over twenty five buildings, approximately one quarter of which serve as dormitories. The site is surrounded by undeveloped land. To the north of the Schrader Dorm is upward sloping woodland area. To the south is the college campus, particularly Happy Valley music hall which is located approximately 30 feet downgradient of the fuel oil UST grave. Drinking water is supplied to the campus by a well located topographically upgradient approximately ½ mile away.

Observations made during the removal of the fuel oil UST in June 1997 indicate that the soils in the tank pit were brown coarse sand and gravel with large cobbles to 7 feet below surface with compact till from 7-10 feet depth range. During the tank removal activities the pit was excavated to the depth of 10 feet. Groundwater was encountered at a depth of approximately seven feet.

## 3.0 Work Performed

### 3.1 Monitoring well and soil borings

On March 27, 1998, ECS installed one monitoring well, designated MW-1, in the former tank grave and drilled three soil borings downgradient of the tank grave. Monitoring well and soil boring locations are shown on the site plan in Appendix B. The well was constructed of 2 inch

diameter schedule 40 PVC slotted screen (size 10) with flush mounted road box. Split spoon samples were screened for VOCs with a Photovac Model 2020 Photoionization Detector (PID), using bag headspace protocol. A maximum level of 13 ppm was detected in the boring for MW-1, and a slight odor was observed from the auger flights during the drilling. No VOCs were detected during drilling of the three downgradient soil borings. No monitoring wells were installed in the downgradient soil borings due to the lack of a noticeable water table in the split spoon samples. Soil borings SB-1, SB-2, and SB-3 were advanced to refusal at depths of 7.5 feet, 10 feet, and 13 feet below grade, respectively. The soils consisted of a compact glacial till deposited on bedrock. Soil boring/monitoring well construction logs are presented in Appendix C.

### 3.2 Groundwater Table and Flow Direction

The monitoring well installed in the tank grave contained sufficient water for sampling. However, no groundwater was evident in the downgradient soil borings. The groundwater table in the tank grave is apparently higher than in the surrounding area due to the less restrictive backfill material. The tank grave appears to act as a sump within the surrounding dense compact till. General topography and soil types indicate groundwater flow at the site is to the south/southeast.

### 3.3 Groundwater and Soil Sampling and Analysis

Soil samples were collected from borings SB-1, -2, and -4 at depths of 7, 10, and 13 feet, respectively, on March 27, 1998. Groundwater from monitoring well MW-1 was sampled on April 4, 1998, by ECS personnel using a disposable plastic bailer. A duplicate groundwater sample from MW-1 was obtained for quality control purposes. All samples were stored on ice immediately upon collection, and submitted to Spectrum Analytical, Inc. in Agawam, Massachusetts for analysis of VOCs plus MTBE by EPA Method 8020 and Total Petroleum Hydrocarbons (TPH) by EPA Method 8100M. The laboratory data sheets and chain of custody record are presented in Appendix D. Results are summarized in Table 1.

Compound	SB-1	SB-2	SB-4	MW-1	Duplicate	PGQS
Benzene	ND	ND	ND	ND	ND	5
Toluene	ND	ND	ND	ND	ND	1,000
Ethylbenzene	ND	ND	ND	ND	ND	700
Xylenes	ND	ND	ND	ND	ND	10,000
Total BTEX	ND	ND	ND	ND	ND	-
MTBE	ND	ND	ND	ND	ND	40
TPH (#2 fuel oil)	ND	ND	ND	24 ppm	21 ppm	-

ND= not detected  
 PGQS=Primary Groundwater Quality Standard

## 4.0 Risk Evaluation

### 4.1 Potential Sources

Evidence of soil and groundwater contamination was detected at MW-1, located in the tank grave. During the removal of the 1,000 gallon #2 fuel oil UST in June of 1997, contamination was observed at the base of the tank. It was not determined whether the precise source of the release was the UST itself or related fuel lines; however, both the UST and lines have been removed from the site. An aboveground tank in the basement is now used to store fuel oil for Schrader Dorm.

### 3.2 Potential Receptors

The potential sensitive receptors of most immediate concern are the residents and occupants of the site, as no neighboring properties are located within a 1/4 mile radius. The Happy Valley music hall is located approximately 30 feet topographically and hydrogeologically downgradient from the tank grave. The drinking water supply is located upgradient and approximately 1/2 mile from the tank grave. There are no other residences or water supplies within a 1/2 mile radius of the site. This campus is occupied year-round; however, the dorms are not occupied by the same residents through the year. The closest downgradient structure is the Happy Valley music hall. Air in the music hall was screened for VOCs with a PID. No VOCs were detected in the Happy Valley music hall.

The Pond Brook, located approximately 2,000 feet downgradient and to the south, is the nearest potential sensitive environmental receptor.

## 5.0 Conclusions

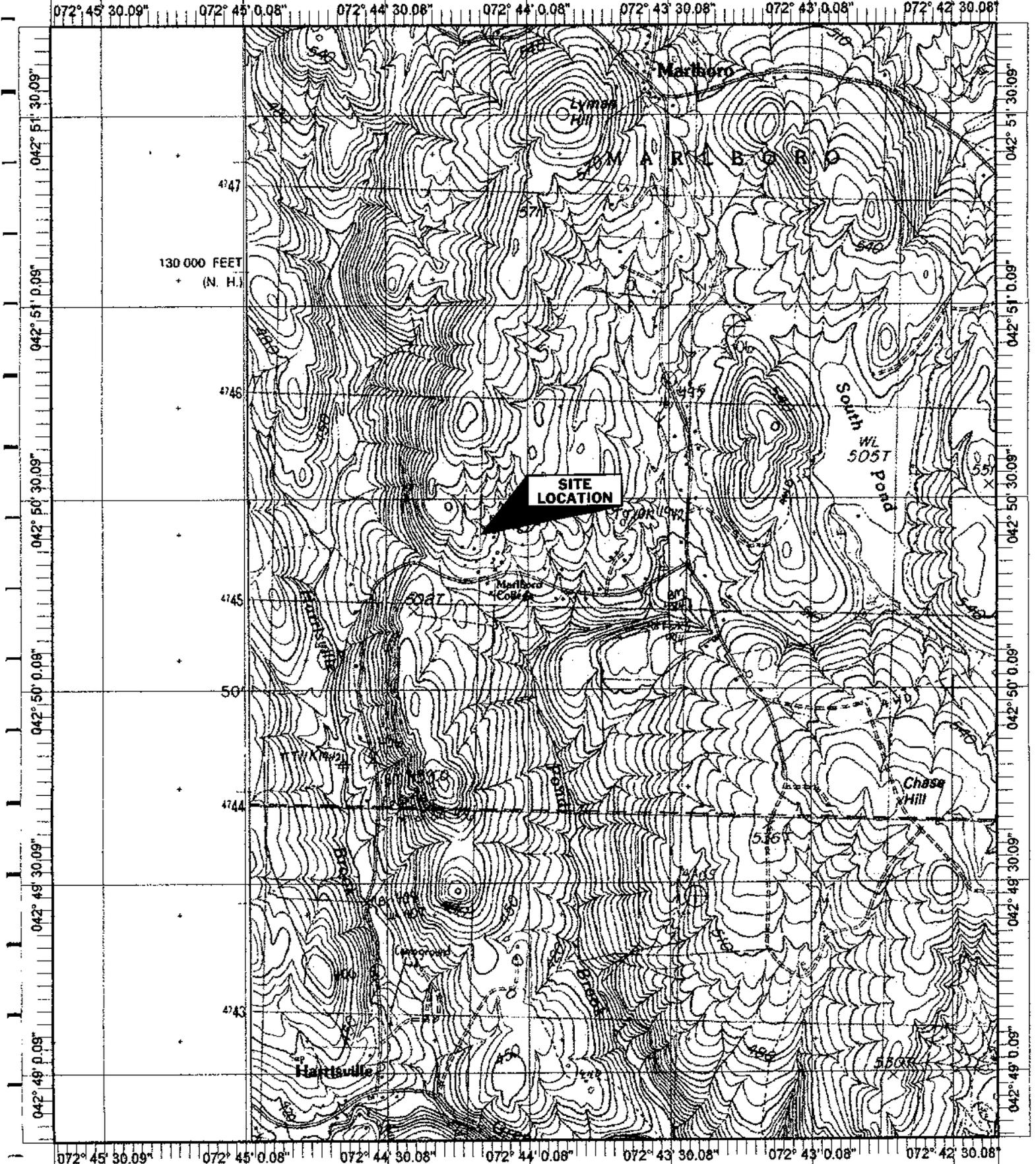
ECS presents the following conclusions based on the information obtained at the site to date:

- groundwater flow direction at the site can be interpreted to be to the south-southeast;
- PGQS were not exceeded in groundwater from a monitoring well installed in the former location of the fuel oil UST removed from the site in June 1997;
- soil type and topography in the vicinity of MW-1 indicate a confining layer of dense till material on the side walls and bottom of the tank grave, limiting groundwater flow from the area of the release. No VOCs or TPH were detected in soil samples from downgradient soil borings;
- no VOCs were detected in the indoor air of the Happy Valley music hall, the nearest downgradient structure from the tank grave.

## 6.0 Recommendations

ECS recommends that this site be considered for closure. Contamination of soil and groundwater appears to be restricted to the tank grave, and PGQS are not exceeded in groundwater from the monitoring well in the tank grave. At this time it does not appear that contaminated soil or groundwater at the site poses a threat to any surrounding sensitive receptors.

**Appendix A**  
**Site Locus Map**

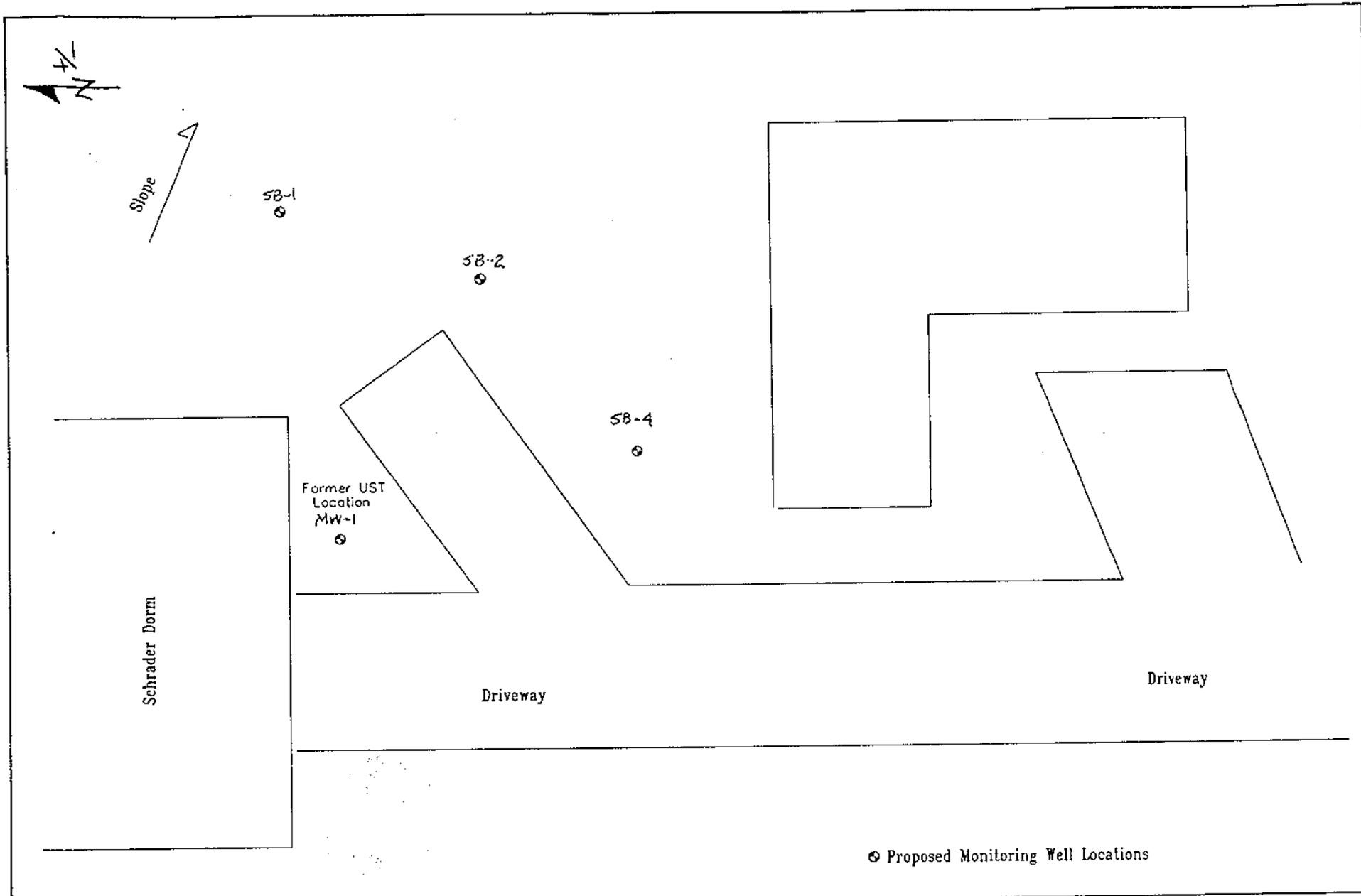


Name: BRATTLEBORO  
 Date: 5/29/98  
 Scale: 1 inch equals 2000 feet

Location: 042° 50' 18.6" N 072° 44' 00.7" W  
 Caption: Schrader Dorm  
 Marlboro College  
 Marlboro, VT

**Appendix B**

**Site Plan**



⊙ Proposed Monitoring Well Locations



ENVIRONMENTAL COMPLIANCE SERVICES, INC.  
157 Old Guilford Road, #6, Brattleboro, VT 05301

REVISIONS		
No.	Date	Description

PROJECT:	Schrader Dorm Marlboro College Marlboro, VT
TITLE:	Site Plan

COMPUTER CADFILE : S-40058.10			
DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
cs	dcb	bet	bet
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
N.T.S.	Dec. 1997	97-P-0023	1

**Appendix C**

**Soil Boring/Monitoring Well Construction Logs**

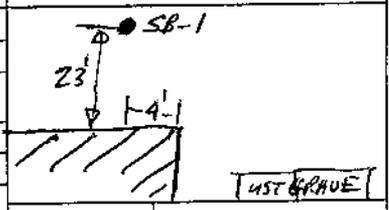


**Environmental Compliance Services, Inc.**  
 157 Old Guilford Road, #6, Brattleboro, Vermont 05301  
 Telephone No.: (802) 257-1195 Fax No.: (802) 257-1603  
 Visit Our Home Web Page: <http://www.ecs-inc.net>

**SOIL BORING / MONITORING WELL LOG**

BORING NO.: **SB-1**  
 DOCUMENT NO.:  
 SHEET **1** OF **1**  
 LOCATION

BORING COMPANY: **ECS** JOB NUMBER: **40058**  
 BORING COMPANY ADDRESS: **AGAWAM, MASS** PROJECT NAME: **Schrader Dorm**  
 FOREMAN: **STAN** PROJECT ADDRESS: **South Road**  
 ECS INSPECTOR: **DAVID** CLIENT NAME:



GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BARREL
Date	Depth	Stabilization Time	TYPE		
			SIZE INSIDE DIAMETER		
			HAMMER WEIGHT		
			HAMMER FALL		
SPECIAL NOTES:					

Casing Elevation (ft.)  
 Surface Elevation (ft.)  
 Date Started **3/27/98**  
 Date Completed

Depth	Sample Number	Sample Depths From - To	Penetration Recovery	Blows per 6" Penetration	Strata Changes	Soil Description	Well As Built	Field Testing PPM	Notes
		<b>0-2</b>	<b>GRAB</b>	<b>—</b>		<b>DARK BROWN FINE SAND AND SILT</b>		<b>0</b>	
		<b>5-7</b>	<b>8"</b>	<b>50 Perc 3"</b>		<b>" " with red rock shale in bottom 2"</b>		<b>0</b>	
						<b>Refusal at 7 1/2'</b>			
						<b>SOILS DRY</b>			
						<b>NO WELL SET</b>			

REMARKS: Total Well Depth: \_\_\_\_\_ Screen Diameter: \_\_\_\_\_ Length: \_\_\_\_\_ Riser Diameter: \_\_\_\_\_ Length: \_\_\_\_\_ PID Type: \_\_\_\_\_ Slot Size: \_\_\_\_\_

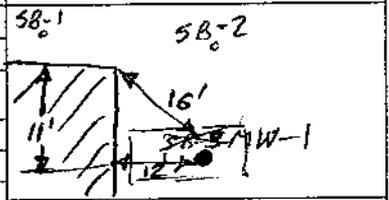


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**SOIL BORING / MONITORING WELL LOG**

BORING NO.: ~~38-3~~ (MW-1)  
 DOCUMENT NO.:  
 SHEET 1 OF 1  
 LOCATION

BORING COMPANY: **ECS** JOB NUMBER: **400 50**  
 BORING COMPANY ADDRESS: **AGAWAM, MASS** PROJECT NAME: **SCHRADER DORM**  
 FOREMAN: **STAN** PROJECT ADDRESS: **South Road**  
 ECS INSPECTOR: **DAVID** CLIENT NAME:



GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BARREL
Date	Depth	Stabilization Time	TYPE		
			SIZE INSIDE DIAMETER		
			HAMMER WEIGHT		
			HAMMER FALL		
SPECIAL NOTES:					

Casing Elevation (ft.)  
 Surface Elevation (ft.)  
 Date Started  
 Date Completed

Depth	Sample Number	Sample Depths From - To	Penetration Recovery	Blows per 6' Penetration	Strata Changes	Soil Description	Well As Built	Field Testing ppm	Notes
		0-2	GRAB	—		Dark Brown Fine Sand and silt		13	
		5-7	18	1 for 2'		Dark Brown Coarse Sand w/Gravel		7	
		10-12		9 18 18 for 3"		Refusal at 11 1/2 Tank Graves soils wet set well to get better Idea of Contamination at the site		9	
						SET WELL			

REMARKS: Total Well Depth: 11 Screen Diameter: 2 Length: 7 Riser Diameter: 2 Length: 3 1/2 PID Type: \_\_\_\_\_ Slot Size: \_\_\_\_\_  
 Bentonite Seal 2 to 3



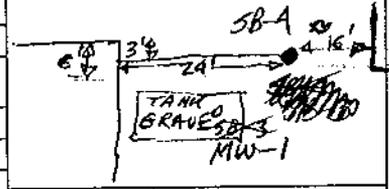
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 Visit Our Home Web Page: <http://www.ecs-inc.net>

**SOIL BORING / MONITORING WELL LOG**

BORING NO.: ~~SB-4~~ **SB-2**  
 DOCUMENT NO.:  
 SHEET 1 OF 1  
 LOCATION

BORING COMPANY: **ECS**  
 BORING COMPANY ADDRESS: **AGAWAM, MASS**  
 FOREMAN: **STAN**  
 ECS INSPECTOR: **DAVID**

JOB NUMBER: **40058**  
 PROJECT NAME: **SCHRADER DORM**  
 PROJECT ADDRESS: **SOUTH ROAD**  
 CLIENT NAME:



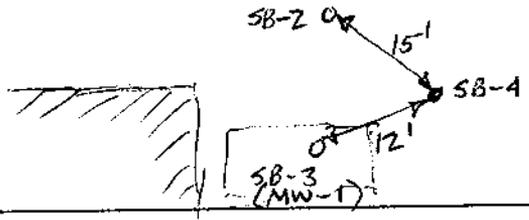
GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BARREL
Date	Depth	Stabilization Time	TYPE		
			SIZE INSIDE DIAMETER		
			HAMMER WEIGHT		
			HAMMER FALL		
SPECIAL NOTES:					

Casing Elevation (ft.)  
 Surface Elevation (ft.)  
 Date Started  
 Date Completed

Depth	Sample Number	Sample Depths From - To	Penetration Recovery	Blows per 6" Penetration	Strata Changes	Soil Description	Well As Built	Field Testing ppm	Notes
		0-2	GRAB			DARK BROWN FINE SAND AND SILT		0	
		5-7	18"	14 23 17 24		" "		0	
		10-12	3"	15 21 28 50 <del>blows</del>		" " Moist bottom 1"		0	
						Refusal at 13'			

REMARKS: Total Well Depth: \_\_\_\_\_ Screen Diameter: \_\_\_\_\_ Length: \_\_\_\_\_ Riser Diameter: \_\_\_\_\_ Length: \_\_\_\_\_ PID Type: \_\_\_\_\_ Slot Size: \_\_\_\_\_

18 miles  
 ECS off site 12:30



**Appendix D**

**Laboratory Data Sheets and Chain of Custody Record**



SPECTRUM ANALYTICAL, INC.

Massachusetts Certification M-MA 138  
Connecticut Approval # PH 0777  
Rhode Island # 98 & Maine # n/a  
New Hampshire ID # 2538  
New York ID #11393  
Florida HRS87448

RECEIVED MAY 1 1998

ECS, Inc.  
157 Old Guilford Road, #6  
Brattleboro, VT 05301

April 23, 1998

Attn: David Balk

Client Project No.: 40058

Location: Marlboro College-Marlboro, VT

<u>Lab ID No.</u>	<u>Client ID</u>	<u>Analysis Requested</u>
AB01982	SB-1-7	Modified SW846/8021B TPH by GC
AB01983	SB-2-10	Modified SW846/8021B TPH by GC
AB01984	SB-4-13	Modified SW846/8021B TPH by GC
AB01985	MW-1	EPA Method 602 TPH by GC
AB01986	DUP-MW-1	EPA Method 602 TPH by GC
AB01987	TRIP	EPA Method 602

Authorized by

Hanibal Tayeh

President/Laboratory Director

ENVIRONMENTAL ANALYSES

**SPECTRUM ANALYTICAL, INC.**

## Laboratory Report

Sample ID: **SB-1-7**  
Lab ID No.: **AB01982**Location: **Marlboro College-Marlboro, VT**  
Client Job No.: **40058**Matrix: Soil  
Sampled on 03/27/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDRPreservative: Refrigeration  
Container: 1 Glass Soil Jar  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier**Volatile Aromatics**

Modified SW 846/8021B

<b>Parameter</b>	<b>Result (ug/Kg)</b>	<b>MDL</b>	<b>Extracted</b>	<b>Analyzed</b>	<b>Analyst</b>
Methyl-t-butyl ether	Not detected	14	04/09/98	04/09/98	DG
Benzene	Not detected	14	04/09/98	04/09/98	DG
Toluene	Not detected	14	04/09/98	04/09/98	DG
Ethylbenzene	Not detected	14	04/09/98	04/09/98	DG
m,p-Xylenes	Not detected	14	04/09/98	04/09/98	DG
o-Xylene	Not detected	14	04/09/98	04/09/98	DG
Chlorobenzene	Not detected	14	04/09/98	04/09/98	DG
1,2-Dichlorobenzene	Not detected	14	04/09/98	04/09/98	DG
1,3-Dichlorobenzene	Not detected	14	04/09/98	04/09/98	DG
1,4-Dichlorobenzene	Not detected	14	04/09/98	04/09/98	DG
TFT Surrogate Recovery (%)	115		04/09/98	04/09/98	DG
BFB Surrogate Recovery (%)	Not detected		04/09/98	04/09/98	DG
% Solids	85.8	0.1	04/09/98	04/10/98	CD

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: **SB-1-7**  
Lab ID No.: **AB01982**

Location: **Marlboro College-Marlboro, VT**  
Client Job No.: **40058**

Matrix: Soil  
Collected: 03/27/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration  
Container: 1 Glass Soil Jar  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Total Hydrocarbons by GC

Modified EPA Method 8100

Parameter	Result (mg/Kg)	MDL	Extracted	Analyzed	Analyst
Total Hydrocarbons (GC)	Not detected		04/09/98	04/15/98	ATP
<b>Fingerprint based quantification:</b>					
Gasoline	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #2	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #4	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #6	Not detected	80	04/09/98	04/15/98	ATP
Motor Oil	Not detected	80	04/09/98	04/15/98	ATP
Ligroin	Not detected	40	04/09/98	04/15/98	ATP
Aviation Fuel	Not detected	40	04/09/98	04/15/98	ATP
Other Oil	Not detected	80	04/09/98	04/15/98	ATP
Unidentified	Not detected		04/09/98	04/15/98	ATP
% Solids	85.8	0.1	04/09/98	04/10/98	CD

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from petroleum products. Possible match categories are as follows;

- Gasoline - includes regular, unleaded, premium, etc.
- Fuel Oil #2 - includes home heating oil, #2 fuel oil and diesel.
- Fuel Oil #4 - Includes #4 Fuel Oil.
- Fuel Oil #6 - includes #6 oil and bunker "C" oil.
- Motor Oil - includes virgin and waste automobile.
- Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha.
- Aviation Fuels - includes Kerosene, Jet A and JP-4.
- Other Oil - includes lubricating and cutting oil and silicon oil.

Factors such as microbial degradation, weathering and solubility generally prevent specific identification within a petroleum category. A finding of "unidentified" means that the sample fingerprint was characteristic of a petroleum product, but could not be matched to a fingerprint in the library.

After fingerprint identification, the amount present in the sample is quantified using a calibration curve prepared from a petroleum product of the same category as the identified petroleum. Unidentified petroleum is quantified using a petroleum calibration that approximates the distribution of compounds in the sample.

A \* in the results column indicates the petroleum calibration used to quantify unidentified samples.

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Sample ID: **SB-2-10**  
Lab ID No.: **AB01983**

Location: **Marlboro College-Marlboro, VT**  
Client Job No.: **40058**

Matrix: Soil  
Sampled on 03/27/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration  
Container: 1 Glass Soil Jar  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Volatile Aromatics

Modified SW 846/8021B

Parameter	Result (ug/Kg)	MDL	Extracted	Analyzed	Analyst
Methyl-t-butyl ether	Not detected	60	04/09/98	04/09/98	DG
Benzene	Not detected	60	04/09/98	04/09/98	DG
Toluene	Not detected	60	04/09/98	04/09/98	DG
Ethylbenzene	Not detected	60	04/09/98	04/09/98	DG
m,p-Xylenes	Not detected	60	04/09/98	04/09/98	DG
o-Xylene	Not detected	60	04/09/98	04/09/98	DG
Chlorobenzene	Not detected	60	04/09/98	04/09/98	DG
1,2-Dichlorobenzene	Not detected	60	04/09/98	04/09/98	DG
1,3-Dichlorobenzene	Not detected	60	04/09/98	04/09/98	DG
1,4-Dichlorobenzene	Not detected	60	04/09/98	04/09/98	DG
TFT Surrogate Recovery (%)	117		04/09/98	04/09/98	DG
BFB Surrogate Recovery (%)	Not detected		04/09/98	04/09/98	DG
% Solids	89	0.1	04/09/98	04/10/98	CD

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: **SB-2-10**  
Lab ID No.: **AB01983**

Location: **Marlboro College-Marlboro, VT**  
Client Job No.: **40058**

Matrix: Soil  
Collected: 03/27/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration  
Container: 1 Glass Soil Jar  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Total Hydrocarbons by GC

Modified EPA Method 8100

Parameter	Result (mg/Kg)	MDL	Extracted	Analyzed	Analyst
Total Hydrocarbons (GC)	Not detected		04/09/98	04/15/98	ATP
<b>Fingerprint based quantification:</b>					
Gasoline	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #2	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #4	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #6	Not detected	80	04/09/98	04/15/98	ATP
Motor Oil	Not detected	80	04/09/98	04/15/98	ATP
Ligroin	Not detected	40	04/09/98	04/15/98	ATP
Aviation Fuel	Not detected	40	04/09/98	04/15/98	ATP
Other Oil	Not detected	80	04/09/98	04/15/98	ATP
Unidentified	Not detected		04/09/98	04/15/98	ATP
% Solids	89	0.1	04/09/98	04/10/98	CD

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from petroleum products. Possible match categories are as follows;

Gasoline - includes regular, unleaded, premium, etc.

Fuel Oil #2 - includes home heating oil, #2 fuel oil and diesel.

Fuel Oil #4 - Includes #4 Fuel Oil.

Fuel Oil #6 - includes #6 oil and bunker "C" oil.

Motor Oil - includes virgin and waste automobile.

Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha.

Aviation Fuels - includes Kerosene, Jet A and JP-4.

Other Oil - includes lubricating and cutting oil and silicon oil.

Factors such as microbial degradation, weathering and solubility generally prevent specific identification within a petroleum category. A finding of "unidentified" means that the sample fingerprint was characteristic of a petroleum product, but could not be matched to a fingerprint in the library.

After fingerprint identification, the amount present in the sample is quantified using a calibration curve prepared from a petroleum product of the same category as the identified petroleum. Unidentified petroleum is quantified using a petroleum calibration that approximates the distribution of compounds in the sample.

A \* in the results column indicates the petroleum calibration used to quantify unidentified samples.

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Sample ID: **SB-4-13**  
Lab ID No.: **AB01984**

Location: **Marlboro College-Marlboro, VT**  
Client Job No.: **40058**

Matrix: Soil  
Sampled on 03/27/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration  
Container: 1 Glass Soil Jar  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Volatile Aromatics

Modified SW 846/8021B

Parameter	Result (ug/Kg)	MDL	Extracted	Analyzed	Analyst
Methyl-t-butyl ether	Not detected	12	04/09/98	04/09/98	DG
Benzene	Not detected	12	04/09/98	04/09/98	DG
Toluene	Not detected	12	04/09/98	04/09/98	DG
Ethylbenzene	Not detected	12	04/09/98	04/09/98	DG
m,p-Xylenes	Not detected	12	04/09/98	04/09/98	DG
o-Xylene	Not detected	12	04/09/98	04/09/98	DG
Chlorobenzene	Not detected	12	04/09/98	04/09/98	DG
1,2-Dichlorobenzene	Not detected	12	04/09/98	04/09/98	DG
1,3-Dichlorobenzene	Not detected	12	04/09/98	04/09/98	DG
1,4-Dichlorobenzene	Not detected	12	04/09/98	04/09/98	DG
TFT Surrogate Recovery (%)	110		04/09/98	04/09/98	DG
BFB Surrogate Recovery (%)	Not detected		04/09/98	04/09/98	DG
% Solids	90.2	0.1	04/09/98	04/10/98	CD

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: **SB-4-13**  
Lab ID No.: **AB01984**

Location: **Marlboro College-Marlboro, VT**  
Client Job No.: **40058**

Matrix: Soil  
Collected: 03/27/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration  
Container: 1 Glass Soil Jar  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Total Hydrocarbons by GC

Modified EPA Method 8100

Parameter	Result (mg/Kg)	MDL	Extracted	Analyzed	Analyst
Total Hydrocarbons (GC)	Not detected		04/09/98	04/15/98	ATP
<b>Fingerprint based quantificaton:</b>					
Gasoline	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #2	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #4	Not detected	40	04/09/98	04/15/98	ATP
Fuel Oil #6	Not detected	80	04/09/98	04/15/98	ATP
Motor Oil	Not detected	80	04/09/98	04/15/98	ATP
Ligroin	Not detected	40	04/09/98	04/15/98	ATP
Aviation Fuel	Not detected	40	04/09/98	04/15/98	ATP
Other Oil	Not detected	80	04/09/98	04/15/98	ATP
Unidentified	Not detected		04/09/98	04/15/98	ATP
% Solids	90.2	0.1	04/09/98	04/10/98	CD

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from petroleum products. Possible match categories are as follows;

Gasoline - includes regular, unleaded, premium, etc.

Fuel Oil #2 - includes home heating oil, #2 fuel oil and diesel.

Fuel Oil #4 - Includes #4 Fuel Oil.

Fuel Oil #6 - includes #6 oil and bunker "C" oil.

Motor Oil - includes virgin and waste automobile.

Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha.

Aviation Fuels - includes Kerosene, Jet A and JP-4.

Other Oil - includes lubricating and cutting oil and silicon oil.

Factors such as microbial degradation, weathering and solubility generally prevent specific identification within a petroleum category. A finding of "unidentified" means that the sample fingerprint was characteristic of a petroleum product, but could not be matched to a fingerprint in the library.

After fingerprint identification, the amount present in the sample is quantified using a calibration curve prepared from a petroleum product of the same category as the identified petroleum. Unidentified petroleum is quantified using a petroleum calibration that approximates the distribution of compounds in the sample.

A \* in the results column indicates the petroleum calibration used to quantify unidentified samples.

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Sample ID: MW-1  
Lab ID No: AB01985

Location: Marlboro College-Marlboro, VT  
Client Job No: 40058

Matrix: Water  
Sampled on 04/03/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration, HCl  
Container: 2 VOA Vials  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Volatile Aromatics

EPA Method 602

Parameter	Result (ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	1	04/14/98	DG
Toluene	Not detected	2	04/14/98	DG
Ethylbenzene	Not detected	1	04/14/98	DG
m,p-Xylenes	Not detected	2	04/14/98	DG
o-Xylene	Not detected	2	04/14/98	DG
Chlorobenzene	Not detected	1	04/14/98	DG
1,2-Dichlorobenzene	Not detected	1	04/14/98	DG
1,3-Dichlorobenzene	Not detected	1	04/14/98	DG
1,4-Dichlorobenzene	Not detected	1	04/14/98	DG
Methyl-t-butyl-ether	Not detected	1	04/14/98	DG
TFT Surrogate Recovery (%)	110		04/14/98	DG
BFB Surrogate Recovery (%)	Not detected		04/14/98	DG

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: MW-1  
Lab ID No.: AB01985

Location: Marlboro College-Marlboro, VT  
Client Job No.: 40058

Matrix: Water  
Collected: 04/03/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration  
Container: 1 Amber Glass Liter  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Total Hydrocarbons by GC

Modified EPA Method 8100

Parameter	Result (mg/L)	MDL	Extracted	Analyzed	Analyst
Total Hydrocarbons (GC)	24		04/13/98	04/15/98	ATP
<b>Fingerprint based quantification:</b>					
Gasoline	Not detected	0.2	04/13/98	04/15/98	ATP
Fuel Oil #2	24	0.4	04/13/98	04/15/98	ATP
Fuel Oil #4	Not detected	0.7	04/13/98	04/15/98	ATP
Fuel Oil #6	Not detected	0.7	04/13/98	04/15/98	ATP
Motor Oil	Not detected	0.7	04/13/98	04/15/98	ATP
Ligroin	Not detected	0.4	04/13/98	04/15/98	ATP
Aviation Fuel	Not detected	0.4	04/13/98	04/15/98	ATP
Other Oil	Not detected	0.7	04/13/98	04/15/98	ATP
Unidentified	Not detected		04/13/98	04/15/98	ATP

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from petroleum products. Possible match categories are as follows;

Gasoline - includes regular, unleaded, premium, etc.

Fuel Oil #2 - includes home heating oil, #2 fuel oil and diesel.

Fuel Oil #4 - Includes #4 Fuel Oil.

Fuel Oil #6 - includes #6 oil and bunker "C" oil.

Motor Oil - includes virgin and waste automobile.

Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha.

Aviation Fuels - includes Kerosene, Jet A and JP-4.

Other Oil - includes lubricating and cutting oil and silicon oil.

Factors such as microbial degradation, weathering and solubility generally prevent specific identification within a petroleum category. A finding of "unidentified" means that the sample fingerprint was characteristic of a petroleum product, but could not be matched to a fingerprint in the library.

After fingerprint identification, the amount present in the sample is quantified using a calibration curve prepared from a petroleum product of the same category as the identified petroleum. Unidentified petroleum is quantified using a petroleum calibration that approximates the distribution of compounds in the sample.

A \* in the results column indicates the petroleum calibration used to quantify unidentified samples.

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Sample ID: **DUP-MW-1**  
Lab ID No: **AB01986**

Location: **Marlboro College-Marlboro, VT**  
Client Job No: **40058**

Matrix: Water  
Sampled on 04/03/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration, HCl  
Container: 2 VOA Vials  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Volatile Aromatics

EPA Method 602

Parameter	Result (ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	1	04/14/98	DG
Toluene	Not detected	2	04/14/98	DG
Ethylbenzene	Not detected	1	04/14/98	DG
m,p-Xylenes	Not detected	2	04/14/98	DG
o-Xylene	Not detected	2	04/14/98	DG
Chlorobenzene	Not detected	2	04/14/98	DG
1,2-Dichlorobenzene	Not detected	2	04/14/98	DG
1,3-Dichlorobenzene	Not detected	2	04/14/98	DG
1,4-Dichlorobenzene	Not detected	2	04/14/98	DG
Methyl-t-butyl-ether	Not detected	2	04/14/98	DG
TFT Surrogate Recovery (%)	112		04/14/98	DG
BFB Surrogate Recovery (%)	Not detected		04/14/98	DG

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: **DUP-MW-1**  
Lab ID No.: **AB01986**

Location: **Marlboro College-Marlboro, VT**  
Client Job No.: **40058**

Matrix: Water  
Collected: 04/03/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration  
Container: 1 Amber Glass Liter  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Total Hydrocarbons by GC

Modified EPA Method 8100

Parameter	Result (mg/L)	MDL	Extracted	Analyzed	Analyst
Total Hydrocarbons (GC)	21		04/13/98	04/15/98	ATP

#### Fingerprint based quantification:

Gasoline	Not detected	0.2	04/13/98	04/15/98	ATP
Fuel Oil #2	21	0.4	04/13/98	04/15/98	ATP
Fuel Oil #4	Not detected	0.7	04/13/98	04/15/98	ATP
Fuel Oil #6	Not detected	0.7	04/13/98	04/15/98	ATP
Motor Oil	Not detected	0.7	04/13/98	04/15/98	ATP
Ligroin	Not detected	0.4	04/13/98	04/15/98	ATP
Aviation Fuel	Not detected	0.4	04/13/98	04/15/98	ATP
Other Oil	Not detected	0.7	04/13/98	04/15/98	ATP
Unidentified	Not detected		04/13/98	04/15/98	ATP

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from petroleum products. Possible match categories are as follows;

Gasoline - includes regular, unleaded, premium, etc.

Fuel Oil #2 - includes home heating oil, #2 fuel oil and diesel.

Fuel Oil #4 - Includes #4 Fuel Oil.

Fuel Oil #6 - includes #6 oil and bunker "C" oil.

Motor Oil - includes virgin and waste automobile.

Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha.

Aviation Fuels - includes Kerosene, Jet A and JP-4.

Other Oil - includes lubricating and cutting oil and silicon oil.

Factors such as microbial degradation, weathering and solubility generally prevent specific identification within a petroleum category. A finding of "unidentified" means that the sample fingerprint was characteristic of a petroleum product, but could not be matched to a fingerprint in the library.

After fingerprint identification, the amount present in the sample is quantified using a calibration curve prepared from a petroleum product of the same category as the identified petroleum. Unidentified petroleum is quantified using a petroleum calibration that approximates the distribution of compounds in the sample.

A \* in the results column indicates the petroleum calibration used to quantify unidentified samples.

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Sample ID: **TRIP**  
Lab ID No: **AB01987**

Location: **Marlboro College-Marlboro, VT**  
Client Job No: **40058**

Matrix: Water  
Sampled on 04/03/98 by ECS-VT  
Received on 04/06/98 by MBR  
QC and Data Review by DDR

Preservative: Refrigeration, HCl  
Container: 1 VOA Vial  
Condition of Sample as Received: Satisfactory  
Delivered by: Courier

### Volatile Aromatics

EPA Method 602

Parameter	Result (ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	1	04/13/98	DG
Toluene	Not detected	1	04/13/98	DG
Ethylbenzene	Not detected	1	04/13/98	DG
m,p-Xylenes	Not detected	2	04/13/98	DG
o-Xylene	Not detected	1	04/13/98	DG
Chlorobenzene	Not detected	1	04/13/98	DG
1,2-Dichlorobenzene	Not detected	1	04/13/98	DG
1,3-Dichlorobenzene	Not detected	1	04/13/98	DG
1,4-Dichlorobenzene	Not detected	1	04/13/98	DG
Methyl-t-butyl-ether	Not detected	1	04/13/98	DG
TFT Surrogate Recovery (%)	112		04/13/98	DG
BFB Surrogate Recovery (%)	Not detected		04/13/98	DG

# CHAIN OF CUSTODY RECORD



Page 1 of 1

PROJECT NO.: 40058	REPORT TO: ECS BRATT
SITE NAME: <del>Marlboro</del> Marlboro College - Schrader	
LOCATION: Marlboro STATE VT	ADDRESS:
REFERENCE QUOTE NUMBER (RQN):	CITY STATE ZIP
PURCHASE ORDER NO.:	INVOICE TO: ECS BRATT

PROJECT Mgr: David Balk	CITY STATE ZIP
SAMPLER(s): David Balk	CITY STATE ZIP

SAMPLE TYPE & MATRIX CODES: 1 = 4°C 2 = HCl 3 = H <sub>2</sub> SO <sub>4</sub> 4 = HNO <sub>3</sub> 5 = OTHER	CONTAINERS	VOC's	SVOC's	TPH	METALS	OTHER
	# 40 ml VOA VIALS	# OF AMBER GLASS LITERS	# OF PLASTIC LITERS	# OF GLASS SOIL JARS	1 - Soluble 2 - Total 3 - TCLP	1 - PH 2 - FLASH 3 - REACT

C = COMPOSITE G = GRAB

1 = AQUEOUS 3 = SLUDGE 5 = OTHER  
2 = SOIL 4 = SEDIMENT

LAB USE ONLY	SAMPLE I.D.	DATE	TIME	MATRIX	SAMPLE TYPE	PRESERVATIVE	# 40 ml VOA VIALS	# OF AMBER GLASS LITERS	# OF PLASTIC LITERS	# OF GLASS SOIL JARS	1-601/8010	2-602/8020	1-502/8021	2-524	1-624/8240	2-8260	1-MTBE	2-KETONES	1-8270	2-BN	3-PAHS	1-PCBS	2-PEST (608/8080)	1-GC(8100M)	2-GC(8015M)	1-VPH	2-EPH	3-ID	1-IR(418.1)	2-OIL/GREASE	PP13	RCRA8	As, Cd, Cr, Hg, Pb	1-PH	2-FLASH	3-REACT			
AA 01982	SB-1-7	3/27/98	10:00	Z	G	1				Z	Z																												
AA 01983	SB-2-10	3/27/98	10:30	Z	G	1				Z	Z																												
AA 01984	SB-4-13	3/27/98	11:00	Z	G	1					Z																												
AA 01985	MW-1	4/3/98	49:30	1	G	2	2	1			Z																												
AA 01986	DYP-MW-1	4/3/98	98:31	1	G	2	2	1			Z																												
AA 01987	TRIP	4/3/98	9:00	1	G	2	1				Z																												
AA																																							
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RELINQUISHED BY: David C. Balk	RECEIVED BY: [Signature]	DATE: 4-6-98	TIME: 1:35
		DATE: 4-6-98	TIME: 2:30

SPECIAL INSTRUCTIONS: 2D Turnaround per Hamilton 4/6/98

SPECIAL HANDLING:  Return Sample after Analysis  Dispose of Sample after 60 days  Standard TAT - 7 to 10 Business days  Special TAT - 24 hr - 48 hr - 72 hr - 5 b. days

DATE RESULTS NEEDED: \_\_\_\_\_