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**ENVIRONMENTAL COMPLIANCE SERVICES, INC.**

June 21, 1999  
Project #40103.10  
Document: Site\_inv.doc

Mr. Chuck Schwer, Supervisor  
Sites Management Section  
VT DEC Waste Management Division  
103 South Main Street  
Waterbury, VT 05671-0404

**RE: Site Investigation Report  
Main Street Service Center, Route 5, Putney, VT  
SMS Site #98-2439**

Dear Mr. Schwer:

Enclosed please find the above-referenced report for your review. If you have any questions or require further information, please call me at 802-257-1195.

Sincerely,  
ENVIRONMENTAL COMPLIANCE SERVICES, INC.

David C. Balk, P.G.  
Project Manager

enclosure

cc: Lee Merrill, Barrows Coal Company

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**  
 Main Street Service Center  
 Route 5  
 Putney, Vermont  
 SMS Site #98-2439

*Prepared for:*

Barrows Coal Company  
 35 Main Street  
 Brattleboro, Vermont 05301  
 Contact: Lee Merrill  
 Phone: (802) 254-4574

*Prepared by:*

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

Project No.: 40103.10

June 21, 1999

**Site Investigation Report  
Main Street Service Center, Putney  
Site #98-2439**

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## 1.0 Introduction

Three 5,000 gallon gasoline underground storage tanks (USTs) were removed in July 1998 at Main Street Service Center ("the site;" see locus map, Appendix A) by Barrows Coal Company. Soils from the tank graves and associated piping excavation were screened with an HNu Systems Inc. Model PI 101 photoionization detector (PID) for the presence of Volatile Organic Compound (VOC) concentrations. The levels of contamination ranged from 0 to 800 parts per million (ppm). A tank closure report was submitted by ECS to the VT DEC who requested subsurface investigations to assess the extent and degree of petroleum contamination in soil and/or groundwater at the site.

Environmental Compliance Services, Inc. (ECS) of Brattleboro, VT submitted a work plan for these additional investigations to the VT DEC on behalf of Barrows Coal Company. The work plan included soil boring advancement, groundwater monitoring well installation, groundwater sampling and analysis, and a sensitive receptor survey. The work plan was approved by the Sites Management Section (SMS) on February 1, 1999.

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 374 feet above mean sea level. The Main Street Service Center site has one building which is divided into an office space and two service bays. The site is surrounded by commercial and residential property. To the west is Main Street (Route 5) with the residential property beyond that. To the south is a 2 apartment rental property and to the east is an apartment building. North of the site is Recollections, a commercial property. The site building is connected to the town sewer system. Drinking water is supplied by an onsite drinking water well located topographically downgradient of the tank grave, approximately 60 feet away.

Observations made during the tank removal in July 1998 indicate that the soils were dark brown, silt, sand and gravel to 15 feet below ground surface (bgs). No ledge or groundwater was encountered in the tank grave.

## 3.0 Work Performed

### 3.1 Soil Borings and Monitoring Wells

Using a hollow stem auger drill rig on March 17, 1999, ECS installed four monitoring wells, designated ECS-1, ECS-2, ECS-3, and ECS-4. Monitoring well locations are shown on the site plan in Appendix B. The wells are 15- 17 feet deep, respectively, and constructed of 2 inch diameter schedule 40 PVC slotted screen (size 10) with flush mounted road boxes. Monitoring well construction logs are presented in Appendix C.

### 3.2 Field Screening of Soil Samples

During drilling, split-spoon soil samples were obtained at the surface and five-foot intervals there after from each of the boreholes. The samples were field screened for VOCs with a Photovac Model photoionization detector (PID), using bag headspace protocol. VOC levels ranging from 3 to 130 ppm were detected in the borings. The highest readings were detected in boring ECS-1.

### 3.3 Groundwater Gauging and Sampling

Groundwater gauging and sampling was performed by ECS personnel on April 15, 1999. Depth to groundwater in each well was measured with a Slope electronic water level indicator from the top of the PVC well casings. The instrument is accurate to 0.01 foot.

Groundwater samples were obtained with disposable plastic bailers after three borehole volumes of groundwater were evacuated from each well. A duplicate groundwater sample from ECS-1 was obtained for quality control purposes. All samples were stored on ice immediately upon collection, and refrigerated until delivery was made to Spectrum Analytical, Inc. in Agawam, Massachusetts for analysis of BTEX compounds, MTBE, Trimethylbenzenes and Naphthalene by EPA Method 8021B.

### 3.4 Stockpile Soil Screening

The contaminated soil stockpiled at Bill Aiken's property on River Road was sampled on May 11, 1999. Nine samples were field screened using a Photovac Model 2020 photoionization detector (PID) for the presence of VOCs. Field screening results ranged from 0.1 to 23 ppm and a slight odor was detected from the samples collected. Sample locations and PID readings of individual samples are listed on the ECS Soil Pile Status Form presented in Appendix D.

## 4.0 Results

### 4.1 Groundwater Potentiometric Data

Data from the April 15, 1999 gauging of groundwater levels are presented in Table 1. Depth to groundwater ranged from 7.97 feet in ECS-1 to 10.52 feet in ECS-3.

Table 1. Groundwater potentiometric data.

Date	ECS-1	ECS-2	ECS-3	ECS-4
PVC elevation	105.73	105.31	105.51	105.43
4/15/99	97.76	96.50	94.99	95.40
Elevations measured in feet from an arbitrary datum.				

A groundwater potentiometric surface map is presented in Appendix B. The map shows that the groundwater flow direction is to the east, toward the Connecticut River.

### 4.2 Laboratory Analysis of Groundwater and Drinking Water Samples

The groundwater samples obtained on April 15, 1999 were analyzed for VOCs by EPA Method 8021B. The onsite water supply well sample that was collected from the sink was analyzed for VOCs via EPA Method 8021B, and TPH via Method 8100M. Results are presented in Table 2, which includes Primary Groundwater Quality Standards (PGQS) for reference. An isoconcentration map was created

from the results presented in Table 2 and is presented in Appendix B. The complete laboratory data sheets and chain of custody record are presented in Appendix E.

Date	Compound	PGQS	ECS-1	ECS-2	ECS-3	ECS-4	DW
4/15/99	Benzene	5.0	ND	ND	ND	<b>52</b>	ND
	Toluene	1000	ND	ND	ND	85	ND
	Ethylbenzene	7000	ND	ND	ND	30	ND
	Xylenes	10,000	ND	ND	ND	980	ND
	Total BTEX		ND	ND	ND	1,147	ND
	Naphthalene	20	ND	ND	ND	13	ND
	1,2,4-Trimethylbenzene	5.0	ND	ND	ND	<b>120</b>	ND
	1,3,5-Trimethylbenzene	4.0	ND	ND	ND	<b>41</b>	ND
	MTBE	40	ND	ND	ND	<b>2,500</b>	<b>130</b>
	TPH		NS	NS	NS	NS	NS

Results reported in ug/L (ppb), except TPH which are in mg/l (ppm)  
 ND = Not detected.  
 NS = Not sampled  
 DW = Drinking water  
 Split cells indicate duplicate analyses.  
 Boldface type indicates PGQS exceedances.

## 5.0 Risk Evaluation

### 5.1 Potential Sources

Benzene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene were detected in groundwater above PGQS standards for samples collected from monitoring well ECS-3. MTBE levels exceeded PGQS standards in both ECS-3 and ECS-4. This contamination is apparently be related to the tanks and piping which were removed and replaced. Elevated VOC levels were detected with a PID in soil around the piping and tanks.

### 5.2 Potential Receptors

The potential sensitive receptors of most immediate concern are site workers. The water supply well is located downgradient of and 60 feet from the tank grave. Air in the building was screened for VOCs with a PID, and none were detected.

The closest residential properties are located across gradient of the site approximately 150 feet. There are numerous water supplies known to be located within a 1/2 mile radius of the site.

The Sacketts Brook, located approximately 800 feet downgradient and to the east, is the nearest potential sensitive environmental receptor. No evidence of sheen or odors was observed in the Sacketts Brook.

## 6.0 Conclusions and Recommendations

### 6.1 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 east, in the same direction as the onsite drinking water well and Sacketts Brook. Depth to groundwater at the tank grave is approximately 10 feet.
- Benzene, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, and MTBE levels were detected at concentrations greater than PGQS at wells downgradient of the UST system. No compounds tested for were detected in the on-site drinking water well.
- Bedrock refusal was encountered at 15 feet in the west and north ends of the site during soil boring advancement.
- No VOCs were detected in the indoor air of the site building, the nearest structure to the USTs and pump island.
- The probable source of the release, piping associated to the USTs, has been removed from the site.

### 6.2 Recommendations

ECS recommends that two additional monitoring wells be installed between monitoring well ECS-3 and the drinking water well and one well at the rear of the site building to further define the extent of contamination at this site.

— 2 down-gradient  
— 1 in tank grave

\\40103.10\Site-inv.wpd

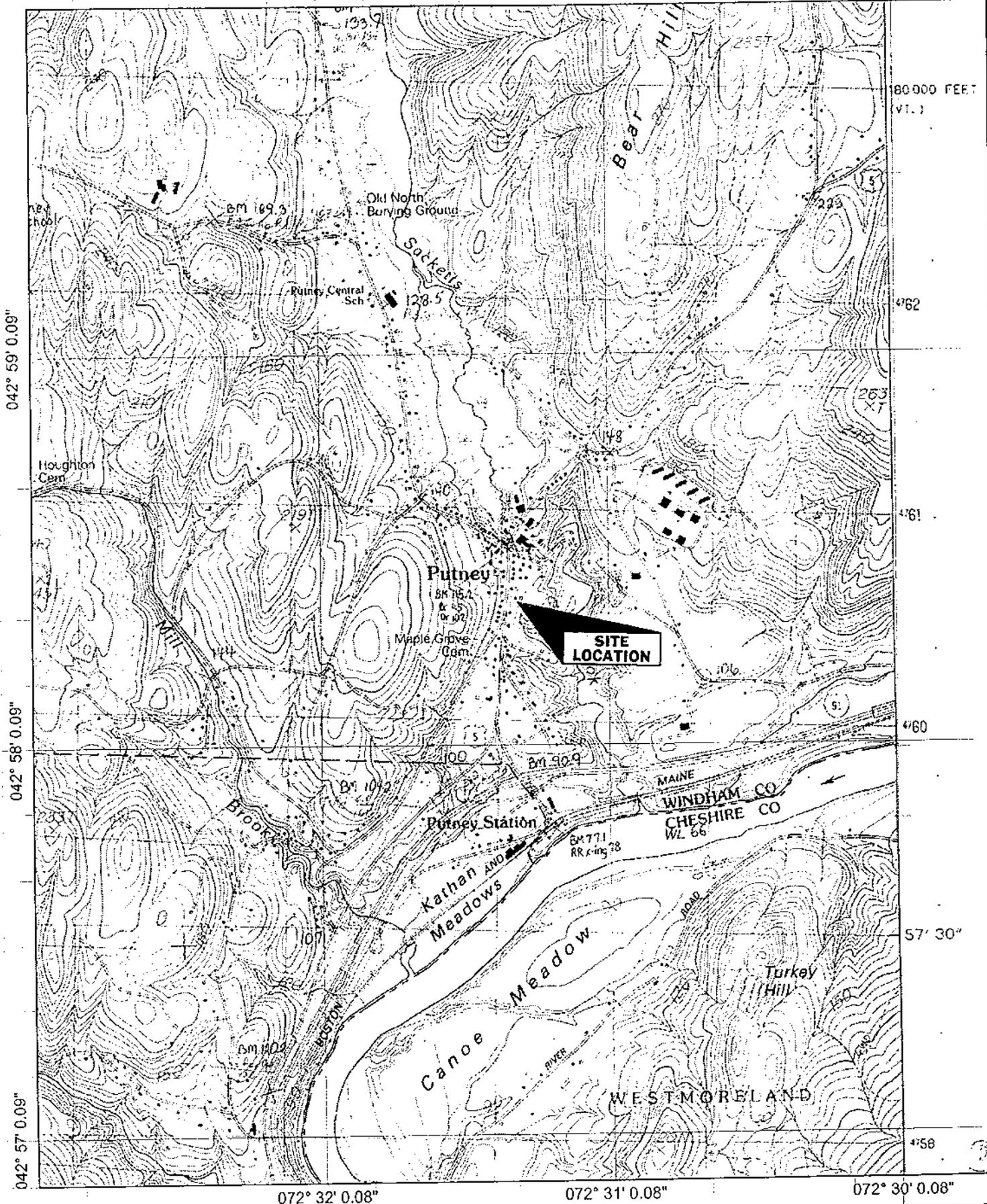
*Appendix A*

*Site Locus Map*

072° 32' 0.08"

072° 31' 0.08"

072° 30' 0.08"



042° 59' 0.09"

042° 59' 0.09"

042° 58' 0.09"

042° 58' 0.09"

042° 57' 0.09"

042° 57' 0.09"

072° 32' 0.08"

072° 31' 0.08"

072° 30' 0.08"

Name: NEWFANE  
 Date: 7/22/98  
 Scale: 1 inch equals 2000 feet

Location: 042° 58' 23.0" N 072° 31' 20.1" W  
 Caption: Main Street Service Station  
 Route 5  
 Putney, VT

*Appendix B*

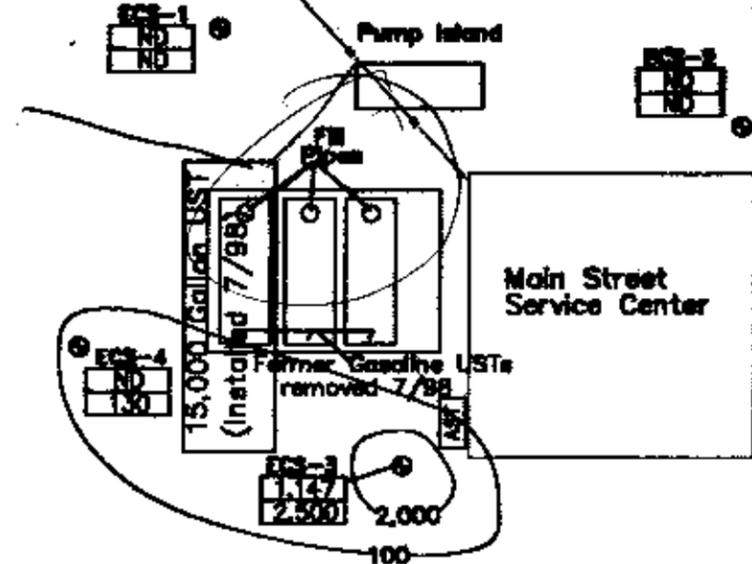
*Site Plans*



Route 5 (Main Street)

Apartment Building

*lots of underground  
& overhead  
pipes & utilities*



Main Street Service Center

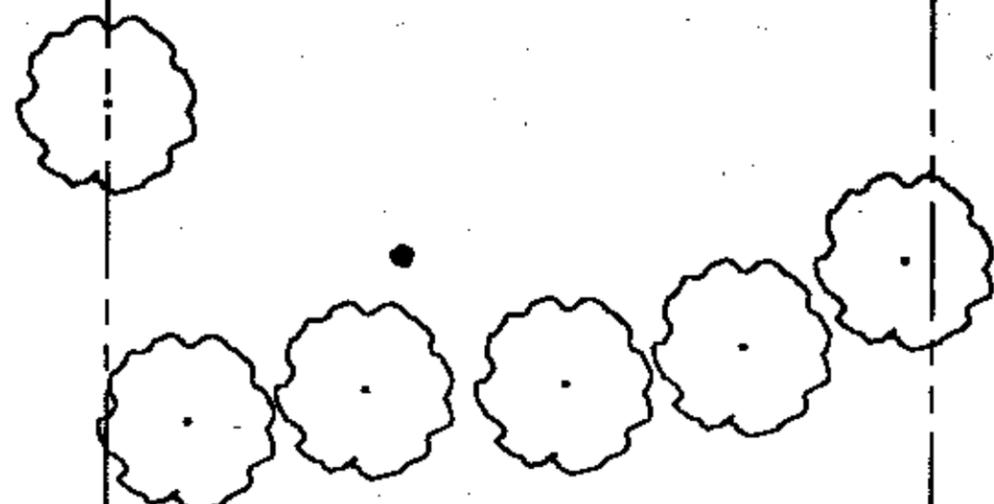
Paved Parking

Former Tank Grove

Recollections Antique Store

(Former Cray's Gas Station)

Apartment Building



**Legend**

- Approximate Property Line
  - Overhead Electric Line
  - Grading Stake Well
  - Utility Pole
  - ⊙ Monitoring Well
- ECS-3**
- |       |                   |
|-------|-------------------|
| 1,147 | Total STEC (ug/L) |
| 2,500 | WTEC (ug/L)       |
- Total STEC Immediation Contour (ug/L)
  - STEC Immediation Contour (ug/L)
  - Former UST Area

**General Notes**

Site plan prepared from information obtained from the Town of Putney Assessor's Office and a site survey taken by ECS, Inc. personnel.

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

Horizontal, and vertical locations of wells, and selected site features determined through measurements made by ECS personnel.



ENVIRONMENTAL COMPLIANCE SERVICES, INC.  
207 Old Bedford Road, Rt. 200, Putney, VT

**Main Street Service Center**  
Route 5 (Main Street)  
Putney, VT

Total STEC & WTEC Immediation Map 4/18/98

Sharon Cell Company



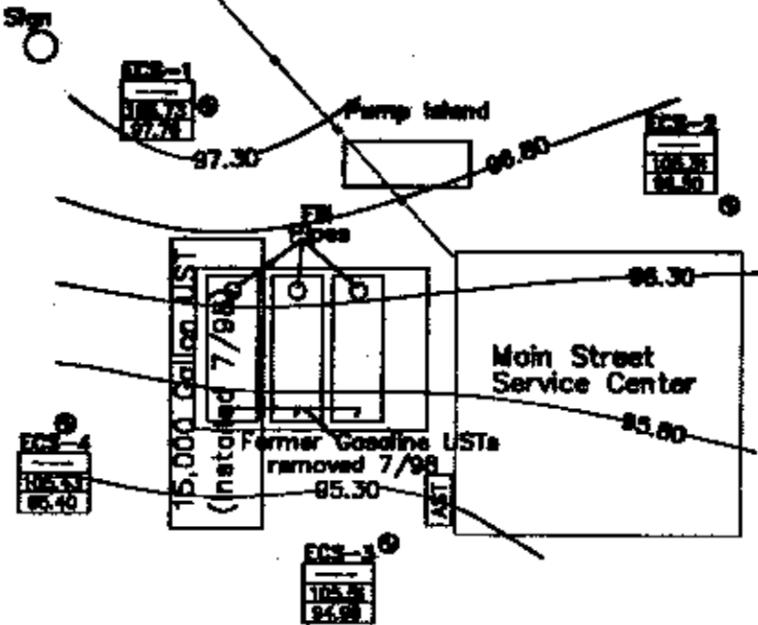
DATE	DESIGNED BY	CHECKED BY	APPROVED BY
CS	CS	DCB	DCB
DATE	SCALE	JOB NO.	PROJECT NO.
1" = 20'	May 1998	40103.00	3



Route 5 (Main Street)

Apartment Building

Apartment Building



Former Tank Grave

Paved Parking

Recollections Antique Store  
(Former Gray's Gas Station)

**Legend**

- Approximate Property Line
- Overhead Electric Line
- Existing Water Well
- ⊙ Utility Pole
- ⊙ Marking Well
- ⊙ Well L.D.  
Rin. Bowler  
PVC Bowler  
Water Table Downline
- Groundwater Contour (ft. RL)
- Former LIST Structure

**General Notes**

This plan prepared from information obtained from the Town of Putney Assessor's Office and a site survey by ECS, Inc. personnel.

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

Horizontal, and vertical locations of wells, and selected site features determined through measurements made by ECS personnel.

Groundwater contours are based on measurements made on 4/15/98. Fluctuations in the level of groundwater may occur due to factors not accounted for at the time the measurements were made.

Groundwater contours and flow direction assumed homogeneous, isotropic aquifer conditions, and horizontal flow.

Groundwater contours are interpolated between data points, and inferred in other areas.



ENVIRONMENTAL COMPLIANCE SERVICES, INC.  
207 Old Mill Pond Road, Putney, Vermont

**Main Street Service Center**  
Route 5 (Main Street)  
Putney, VT

Site Plan with Groundwater Contours: 4/15/98

Client: Bureau Coal Company

DATE	BY	CHECKED BY	APPROVED BY
CS	CS	DCB	DCB
DATE	BY	DATE	BY
1" = 20'	May 1998	40103.00	2

*Appendix C*

*Soil Boring/Monitoring Well Construction Logs*





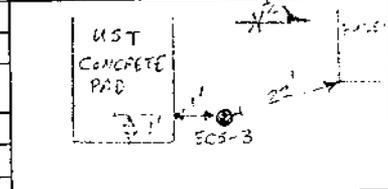


**Environmental Compliance Services, Inc.**  
388 Silver Street, Agawam, Massachusetts 01001

## SOIL BORING / MONITORING WELL LOG

BORING NO.:	ECS-3
DOCUMENT NO.:	
SHEET	1 OF 1

BORING COMPANY:	ECS	JOB NUMBER:	40103.10
BORING COMPANY ADDRESS:	Agawam, MA	PROJECT NAME:	Main Street Service Center
FOREMAN:	Stanley Werbicki	PROJECT ADDRESS:	Main Street, Putney, VT
ECS INSPECTOR:	David Balk	CLIENT NAME:	Barrows Coal Company



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	March 17, 1999
Date Completed	March 17, 1999

Depth	Sample Number	Sample Depths From - To	Penetration Recovery	Blows per 6" Penetration	Strata Changes	Soil Description	Well As Built	Field Testing	Notes
	S-1	0-2'	NA	NA	Dry	coarse medium brown sand, gravel and some cobbles		ND	
	S-2	5-7'	10"	6/ 6/ 6/ 2	Dry	brown silt and fine sand w/ some gravel		ND	
	S-3	10'-12'	24"	5/ 9/ 6/ 7	Moist	brown silt and clay		ND	
	S-4	15'-17'	10"	2/ 2/ 5/ 5	Wet	brown silt and clay		10 ppmv	slight odor

**REMARKS:**  
Work completed using mobile hollow stem rotary auger drill rig.

Total Well Depth: 17'    Screen Diameter: 2"    Length: 10'    Riser Diameter: 2"    Length: 7'    PID: Hnu    Slot Size: 0.01

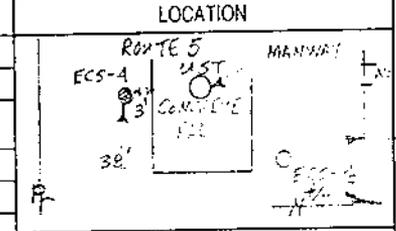


**Environmental Compliance Services, Inc.**  
588 Silver Street, Agawam, Massachusetts 01001

# SOIL BORING / MONITORING WELL LOG

BORING NO.: ECS-4  
DOCUMENT NO.:  
SHEET 1 OF 1

BORING COMPANY: ECS  
BORING COMPANY ADDRESS: Agawam, MA  
FOREMAN: Stanley Werbicki  
ECS INSPECTOR: David Balk  
JOB NUMBER: 40103.10  
PROJECT NAME: Main Street Service Center  
PROJECT ADDRESS: Main Street, Putney, VT  
CLIENT NAME: Barrows Coal Company



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

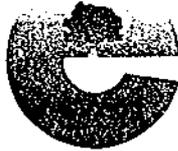
Casing Elevation (ft):  
Surface Elevation (ft):  
Date Started: March 17, 1999  
Date Completed: March 17, 1999

Depth	Sample Number	Sample Depths From - To	Penetration Recovery	Blows per 6" Penetration	Strata Changes	Soil Description	Well As Built	Field Testing	Notes
	S-1	0-2'	NA	NA	Dry	coarse medium brown sand, gravel and some cobbles	32"	ND	
	S-2	5-7'	18"	6/ 6/ 8/ 6	Moist	gray silt and well sorted sand w/ some gravel	38"	38 ppmv	strong odor
	S-3	10'-12'	24"	1/ 5/ 7/ 9	Wet	brown silt and clay	3"	3 ppmv	
	S-4	15'-17'	24"	3/ 4/ 4/ 5	Wet	brown silt and clay	6"	6 ppmv	slight odor

REMARKS:  
Work completed using mobile hollow stem rotary auger drill rig.  
Total Well Depth: 17' Screen Diameter: 2" Length: 10' Riser Diameter: 2" Length: 7' PID: Hnu Slot Size: 0.01

*Appendix D*

*Soil Pile Status Form*



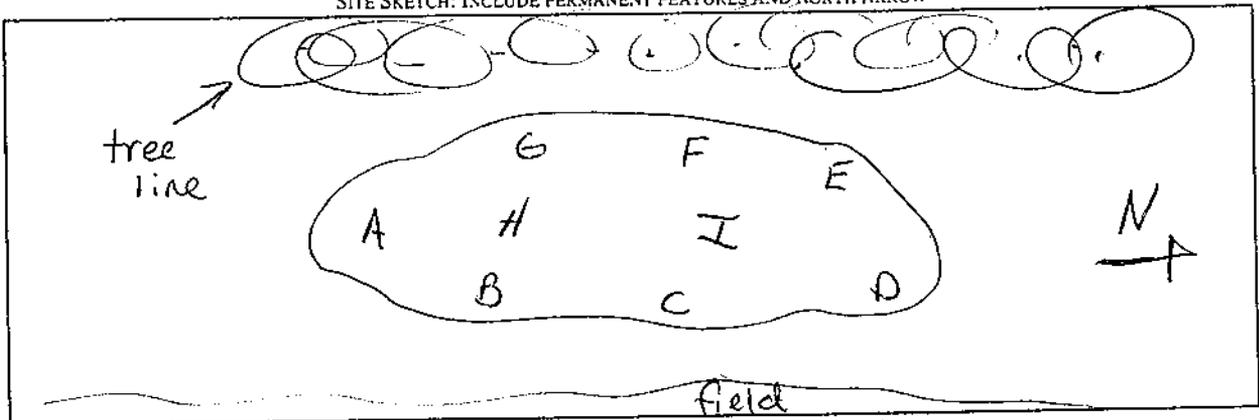
**ENVIRONMENTAL COMPLIANCE SERVICES, INC.**

**SOIL PILE STATUS REPORT**

SITE NAME: Putney Gulf VT DEC # 98-2439 JOB # 40103.10  
 SITE LOCATION: Bill Aiken's Farm ON SITE: 11:00 am OFF SITE: 1 pm  
 SCREENING DATE: 5/11/99 PID USED: 2020 CONTAMINANT: gasoline VOLUME: 300 yards  
 DATE OF STOCKPILE: 7/16/98 SAMPLE NEEDED FOR THIN SPREADING? YES \_\_\_ NO X

FIELD SCREENING RESULTS (VOCs IN PPMV)				
SAMPLE LOCATION SEE SKETCH BELOW	DEPTH OF SAMPLE (FEET)			
	0-1	1-2	2-3	3-4
A	0.0	—		
B	0.0	—		
C	0.1	—		
D	—	0.0		
E	—	0.0		
F	—	10.9		
G	—	0.0		
H	—	—	17	
I	—	—	23	
J				

SITE SKETCH: INCLUDE PERMANENT FEATURES AND NORTH ARROW



COMMENTS: pile was covered with new plastic  
 POLY SHEETING NEEDED     ADDITIONAL SCREENING WARRANTED     SUMMARY LETTER

SOIL ANALYSIS FOR OFF SITE STOCKPILE:  
 VOC BY 8021 WITH MTBE\* (#2 FUEL OIL AND GASOLINE\*)  
 VOC BY 8260 (USED OIL AND #6 FUEL OIL)  
 TPH BY 8100M (ALL PETROLEUM CONTAMINATION)

SOIL ANALYSIS FOR ON SITE STOCKPILE:  
 MAY REQUIRE COMPOUND SPECIFIC AND TPH: (USED OIL, #4, #6 FUEL OIL)

SAMPLER NAME: J. Prior

*Appendix E*

*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 10 1999

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

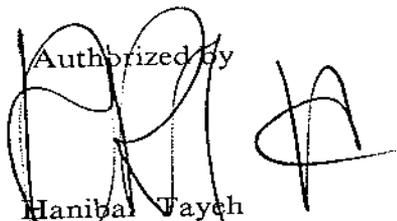
May 3, 1999

Attn: David Balk

Client Project No.: 40103

Location: Putney Gulf - Putney, VT

<u>Lab ID No.</u>	<u>Client ID</u>	<u>Analysis Requested</u>
AB40344	ECS-1	EPA Method 8021B
AB40345	ECS-2	EPA Method 8021B
AB40346	ECS-3	EPA Method 8021B
AB40347	ECS-4	EPA Method 8021B
AB40348	DUP	EPA Method 8021B
AB40349	TRIP	EPA Method 8021B
AB40350	DW	EPA Method 8021B TPH by GC

Authorized by  
  
 Hanibal Tayeh  
 President/Laboratory Director

ENVIRONMENTAL ANALYSES

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: ECS-1  
Lab ID No: AB40344

Location: Putney Gulf - Putney, VT  
Client Job No: 40103

Matrix: Ground Water  
Sampled on 04/15/99 by ECS  
Received on 04/15/99 by KC  
QC and Data Review by AM

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

### Volatile Organics

EPA Method 8021B

Parameter for AB40344	Result (in ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	1.0	04/29/99	CH
Toluene	Not detected	1.0	04/29/99	CH
Ethylbenzene	Not detected	1.0	04/29/99	CH
m,p-Xylenes	Not detected	2.0	04/29/99	CH
o-Xylene	Not detected	1.0	04/29/99	CH
Naphthalene	Not detected	1.0	04/29/99	CH
1,2,4-Trimethylbenzene	Not detected	1.0	04/29/99	CH
1,3,5-Trimethylbenzene	Not detected	1.0	04/29/99	CH
Methyl-t-butyl ether	Not detected	1.0	04/29/99	CH
Bromofluorobenzene (%SR)	111		04/29/99	CH

**SPECTRUM ANALYTICAL, INC.**

Laboratory Report

Client ID: ECS-2  
Lab ID No: AB40345

Location: Putney Gulf - Putney, VT  
Client Job No: 40103

Matrix: Ground Water  
Sampled on 04/15/99 by ECS  
Received on 04/15/99 by KC  
QC and Data Review by AM

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

**Volatile Organics**

EPA Method 8021B

Parameter for AB40345	Result (in ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	1.0	04/29/99	GW
Toluene	Not detected	1.0	04/29/99	GW
Ethylbenzene	Not detected	1.0	04/29/99	GW
m,p-Xylenes	Not detected	2.0	04/29/99	GW
o-Xylene	Not detected	1.0	04/29/99	GW
Naphthalene	Not detected	2.0	04/29/99	GW
1,2,4-Trimethylbenzene	Not detected	2.0	04/29/99	GW
1,3,5-Trimethylbenzene	Not detected	1.0	04/29/99	GW
Methyl-t-butyl ether	Not detected	1.0	04/29/99	GW
Bromofluorobenzene (%SR)	92		04/29/99	GW

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: ECS-3  
Lab ID No: AB40346

Location: Putney Gulf - Putney, VT  
Client Job No: 40103

Matrix: Ground Water  
Sampled on 04/15/99 by ECS  
Received on 04/15/99 by KC  
QC and Data Review by AM

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

### Volatile Organics

EPA Method 8021B

Parameter for AB40346	Result (in ug/L)	MDL	Analyzed	Analyst
Benzene	52	5.0	04/29/99	GW
Toluene	85	5.0	04/29/99	GW
Ethylbenzene	30	5.0	04/29/99	GW
m,p-Xylenes	660	10.0	04/29/99	GW
o-Xylene	320	5.0	04/29/99	GW
Naphthalene	13	5.0	04/29/99	GW
1,2,4-Trimethylbenzene	120	5.0	04/29/99	GW
1,3,5-Trimethylbenzene	41	5.0	04/29/99	GW
Methyl-t-butyl ether	2,500	5.0	04/29/99	GW
Bromofluorobenzene (%SR)	89		04/29/99	GW

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: ECS-4  
Lab ID No: AB40347

Location: Putney Gulf - Putney, VT  
Client Job No: 40103

Matrix: Ground Water  
Sampled on 04/15/99 by ECS  
Received on 04/15/99 by KC  
QC and Data Review by AM

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

### Volatile Organics

EPA Method 8021B

Parameter for AB40347	Result (in ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	2.0	04/29/99	GW
Toluene	Not detected	1.0	04/29/99	GW
Ethylbenzene	Not detected	1.0	04/29/99	GW
m,p-Xylenes	Not detected	2.0	04/29/99	GW
o-Xylene	Not detected	1.0	04/29/99	GW
Naphthalene	Not detected	1.0	04/29/99	GW
1,2,4-Trimethylbenzene	Not detected	1.0	04/29/99	GW
1,3,5-Trimethylbenzene	Not detected	1.0	04/29/99	GW
Methyl-t-butyl ether	130	1.0	04/29/99	GW
Bromofluorobenzene (%SR)	89		04/29/99	GW

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: **DUP**  
Lab ID No: **AB40348**

Location: **Putney Gulf - Putney, VT**  
Client Job No: **40103**

Matrix: **Ground Water**  
Sampled on 04/15/99 by **ECS**  
Received on 04/15/99 by **KC**  
QC and Data Review by **AM**

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

### Volatile Organics

EPA Method 8021B

Parameter for AB40348	Result (in ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	1.0	04/29/99	CH
Toluene	Not detected	1.0	04/29/99	CH
Ethylbenzene	Not detected	1.0	04/29/99	CH
m,p-Xylenes	Not detected	2.0	04/29/99	CH
o-Xylene	Not detected	1.0	04/29/99	CH
Naphthalene	Not detected	1.0	04/29/99	CH
1,2,4-Trimethylbenzene	Not detected	1.0	04/29/99	CH
1,3,5-Trimethylbenzene	Not detected	1.0	04/29/99	CH
Methyl-t-butyl ether	Not detected	1.0	04/29/99	CH
Bromofluorobenzene (%SR)	108		04/29/99	CH

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: **TRIP**  
Lab ID No: **AB40349**

Location: **Putney Gulf - Putney, VT**  
Client Job No: **40103**

Matrix: **Ground Water**  
Sampled on 04/15/99 by **ECS**  
Received on 04/15/99 by **KC**  
QC and Data Review by **AM**

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

### Volatile Organics

EPA Method 8021B

Parameter for AB40349	Result (in ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	1.0	04/29/99	CH
Toluene	Not detected	1.0	04/29/99	CH
Ethylbenzene	Not detected	1.0	04/29/99	CH
m,p-Xylenes	Not detected	2.0	04/29/99	CH
o-Xylene	Not detected	1.0	04/29/99	CH
Naphthalene	Not detected	1.0	04/29/99	CH
1,2,4-Trimethylbenzene	Not detected	1.0	04/29/99	CH
1,3,5-Trimethylbenzene	Not detected	1.0	04/29/99	CH
Methyl-t-butyl ether	Not detected	1.0	04/29/99	CH
Bromofluorobenzene (%SR)	111		04/29/99	CH

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: DW  
Lab ID No: AB40350

Location: Putney Gulf - Putney, VT  
Client Job No: 40103

Matrix: Drinking Water  
Sampled on 04/15/99 by ECS  
Received on 04/15/99 by KC  
QC and Data Review by

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

### Volatile Organics

EPA Method 8021B

Parameter for AB40350	Result (in ug/L)	MDL	Analyzed	Analyst
Benzene	Not detected	2.0	04/29/99	GW
Toluene	Not detected	1.0	04/29/99	GW
Ethylbenzene	Not detected	1.0	04/29/99	GW
m,p-Xylenes	Not detected	2.0	04/29/99	GW
o-Xylene	Not detected	1.0	04/29/99	GW
Naphthalene	Not detected	1.0	04/29/99	GW
1,2,4-Trimethylbenzene	Not detected	1.0	04/29/99	GW
1,3,5-Trimethylbenzene	Not detected	1.0	04/29/99	GW
Methyl-t-butyl ether	Not detected	1.0	04/29/99	GW
Bromofluorobenzene (%SR)	93		04/29/99	GW

# SPECTRUM ANALYTICAL, INC.

## Laboratory Report

Client ID: DW  
Lab ID No.: AB40350

Location: Putney Gulf - Putney, VT  
Client Job No.: 40103

Matrix: Drinking Water  
Collected: 04/15/99 by ECS  
Received on 04/15/99 by KC  
QC and Data Review by

Preservative: Refrigeration  
Container: 1 Amber Glass  
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)	Not detected		04/21/99	04/29/99	LR

### Fingerprint based quantification:

Gasoline	Not detected	0.2	04/21/99	04/29/99	LR
Fuel Oil #2	Not detected	0.4	04/21/99	04/29/99	LR
Fuel Oil #4	Not detected	0.7	04/21/99	04/29/99	LR
Fuel Oil #6	Not detected	0.7	04/21/99	04/29/99	LR
Motor Oil	Not detected	0.7	04/21/99	04/29/99	LR
Ligroin	Not detected	0.4	04/21/99	04/29/99	LR
Aviation Fuel	Not detected	0.4	04/21/99	04/29/99	LR
Other Oil	Not detected	0.7	04/21/99	04/29/99	LR
Unidentified	Not detected		04/21/99	04/29/99	LR

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 Supplement

### References

- Methods for the Determination of Organic Compounds in Drinking Water. EPA-600/4-88/039. EMSL 1988.
- Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. EMSL 1983.
- Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater. EPA 600/4-82-057. EMSL 1982.
- Test Methods for Evaluating Solid Waste. Physical/Chemical Methods. EPA SW-846. 1986.
- Standard Methods for the Examination of Water and Wastes. APHA-AWWA-WPCF. 16th Edition. 1985.
- Standard Methods for Comparison of Waterborne Petroleum Oils by Gas Chromatography. ASTM D 3328. 1982.
- Oil Spill Identification System. U.S. Coast Guard CG-D-52-77. 1977.
- Handbook for Analytical Quality Control in Water and Wastewater Laboratories. EPA 600/4-79-019. EMSL 1979.
- Choosing Cost-Effective QA/QC (Quality Assurance/Quality Control) Programs for Chemical Analyses. EPA 600/4-85/056. EMSL 1985.

### Report Notations

Not Detected,	=	<i>The compound was not detected at a concentration equal to or above the established method detection limit.</i>	
Not Det, ND or nd	=	<i>Not Calculated</i>	
NC	=	<i>EPA Maximum Contamination Level</i>	
MCL	=	<i>Volatile Organic Analysis</i>	
VOA	=	<i>4-Bromofluorobenzene</i>	<i>(An EPA 624 Surrogate)</i>
BFB	=	<i>1,4-Difluorobenzene</i>	<i>(An EPA 624 Surrogate)</i>
p-DFB	=	<i>Chlorobenzene-d5</i>	<i>(An EPA 624 Surrogate)</i>
CLB-d5	=	<i>2-Bromo-1-chloropropane</i>	<i>(An EPA 601 Surrogate)</i>
BCP	=	<i>a,a,a-Trifluorotoluene</i>	<i>(An EPA 602 Surrogate)</i>
TFT	=	<i>(an EPA 608/8080 Surrogate)</i>	
Decachlorobiphenyl	=		

### Definitions

**Surrogate Recovery** = The recovery (expressed as a percent) of a non-method analyte (see surrogates listed above) added to the sample for the purpose of monitoring system performance.

**Matrix Spike Recovery** = The recovery (expressed as a percent) of method analytes added to the sample for the purpose of determining any effect of sample composition on analyte recovery.

**Laboratory Replicate** = Two sample aliquots taken in the analytical laboratory and analyzed separately with identical procedures. Analyses of laboratory duplicates give a measure of the precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures.

**Field Duplicate** = Two separate samples collected at the same time and place under identical circumstances and treated exactly the same throughout field and laboratory procedures. Analysis of Field duplicates give a measure of the precision associated with sample collection, preservation and storage, as well as with laboratory procedures.

**Relative Percent Difference (% RPD)** = The precision measurement obtained on duplicate/replicate analyses. %RPD is calculated as:

$$\%RPD = \frac{(\text{value1} - \text{value2})}{\text{ave. value}} * 100\%$$

