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HAZARDOUS MATERIALS
MANAGEMENT DIVISION

November 16, 1994

Mr. Chuck Schwer
State of Vermont
Department of Environmental Conservation
Hazardous Materials Management Division
103 South Main Street
Waterbury, VT 05671-0404

Dear Mr. Schwer:

Enclosed please find Griffin's report on the investigation of subsurface petroleum contamination at Morrystown Corner Store in Morrisville, Vermont. Mr. Matt Germon was the previous state site manager for this site. Please forward this report on to the appropriate site manager.

If you have any questions about this report, please call.

Sincerely,

Kevin McGraw
Hydrogeologist

Attachment

**REPORT ON THE
INVESTIGATION OF SUBSURFACE
PETROLEUM CONTAMINATION**

at

**MORRISTOWN CORNER STORE
STAGECOACH ROAD
MORRISVILLE, VERMONT**

(VTDEC Site # 93-1469)

NOVEMBER 1994

Prepared by:

GRIFFIN INTERNATIONAL, INC.

P.O. Box 943

Williston, Vermont 05495

(802) 865-4288

Griffin Project #: 7944550

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Site Map

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I. INTRODUCTION

This report summarizes the investigation of subsurface petroleum contamination at Morrystown Corner Store in Morrisville, Vermont. Included in the report are the findings from the hollow-stem auger drilling along with the results of groundwater sampling conducted on the property. This work has been conducted for Ms. Jeannette Lepine by Griffin International, Inc. (Griffin).

II. SITE BACKGROUND

A. Site Description

The former underground storage tanks (USTs) at the site were located near the intersection of Stagecoach Road and Walton Road in Morrisville, Vermont (see Site Location Map, Appendix A). These tanks were not replaced and Morrystown Corner Store is no longer an active gasoline station.

The Surficial Geologic Map of Vermont maps the surrounding area as littoral sediment, predominantly pebbly sand. Actual subsurface materials consist of layers of silty fine sand, very fine sand, and dense silt and clay.

The immediate area surrounding the site consists mostly of a rural residential community with several small businesses as well. Nearby residences and businesses are reportedly served entirely by a community water system.

B. Site History

On September 29, 1993, two (2) 1,000-gallon gasoline USTs were removed from the property. The age of the tanks was unknown, but believed to be in excess of 15 years. The tanks were located near the northeast corner of the store building (see Site Map, Appendix A).

Mr. Tim McNamara of the Vermont Department of Environmental Conservation (VTDEC) was on-site during the removal of the tanks and Griffin performed the tank closure assessment. During the assessment, volatile organic compounds (VOCs) were detected in the soils surrounding the tanks using a photoionization detector (PID). The tanks were found to be in fair to good condition with no visible holes. It was determined that the contamination evident in the soils was most likely a result of overfills or leakage in the piping which led to the pumps. Groundwater was not encountered in the tank pit area. All soils removed from the excavation, approximately 50 cubic yards, were backfilled into the excavation due to the lack of space on-site for stockpiling. The tanks were not replaced.

In response to the petroleum contamination detected in the tank pit, the Sites Management Section (SMS) of the VTDEC requested further investigation. Griffin was contracted to

perform the following investigation which included the installation of one monitoring well (MW-1). The results of the investigation are presented in this report.

III. SUBSURFACE INVESTIGATION

On September 29, 1994, one monitoring well was installed using a hollow-stem auger drill rig. The monitoring well, designated MW-1, was installed to help define the vertical degree and extent of petroleum contamination in the soils directly beneath the former USTs. Soil samples were obtained in the boring at five-foot intervals using a split-spoon. These soil samples were screened for VOCs using an HNU (Model PI-101) PID. The location of the new well is shown on the Site Map in Appendix A.

Silty sands were predominant from ground surface to 10 feet below grade. From 10 to 25 feet below grade, dense clay and silt was predominant. From 25 to 37 feet below grade, silty fine sands were observed. Groundwater was encountered at approximately 30 feet below grade. Contamination was detected in the soils from every split spoon. A maximum PID reading of 150 parts per million (ppm) was measured in the split-spoon sample from 20 to 22 feet below grade. Vapor concentrations decreased from 150 ppm at 22 feet to 2 ppm at 30 feet below grade where water was encountered.

The monitoring well was constructed with two-inch diameter, Schedule 40 PVC riser and 0.010" slotted screen. The well is screened from 28 to 38 feet below grade. A silica sand pack was placed around the screened portion of each well to above the top of the screen. Native soil was used as backfill above the sand pack to 3 feet below grade. A bentonite seal was set in the annular space from 1 to 3 feet below grade. To complete the construction of the well, a road box was set in concrete at grade level. In addition, a locking well cap was placed on the monitoring well. The boring log and well construction details for MW-1 are included in Appendix B.

IV. WATER QUALITY

On October 5, 1994, Griffin collected a groundwater sample from MW-1. The sample was analyzed for petroleum compounds by EPA Method 602.

Low levels of benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl tertiary butyl ether (MTBE, which is a gasoline additive) were detected in the water sample from MW-1. Benzene was detected at 138 parts per billion (ppb) which is greater than the Vermont Groundwater Enforcement Standard (VTGES) of 5 ppb for this compound. MTBE was detected at 42.7 ppb, just over the VTGES of 40 ppb for this compound. Toluene, ethylbenzene and xylenes were all detected at levels well below their respective standards. A groundwater quality summary for this sampling event is presented in Appendix C.

A duplicate sample was taken from MW-1 for quality assurance/quality control purposes. Analytical results of this sample indicate that proper QA/QC was maintained. The laboratory analytical report is included in Appendix D.

V. RISK ASSESSMENT

From the subsurface investigation conducted by Griffin, it is apparent that the soils and groundwater in the vicinity of the former USTs at Morristown Corner Store have been impacted by a probable leak or spill of gasoline. The major potential sensitive receptors of the gasoline contamination at this site are the basements of adjacent buildings and an unnamed brook located approximately 1,500 feet south of the site.

All residences and businesses in the area reportedly obtain water from the community water supply whose source is approximately 1/2-mile west of the store. This supply does not appear to be at risk from the contamination at this site since groundwater most likely flows toward the south-southeast. There are no other known sources of drinking water in the immediate vicinity of this site, however, there may be some private drinking water wells within 1/2-mile of the site.

During the Griffin site visit on September 29, 1994, the basement of Morristown Corner Store was screened for VOCs using a PID. No elevated PID readings were measured. The risk of vapors entering the building is deemed to be relatively low at this time.

The estimated groundwater flow direction to the south-southeast indicates that dissolved groundwater contamination may be headed toward the unnamed brook 1,500 feet to the south. This brook flows into Ryder Brook which then flows into Lake Lamoille. Since only low levels of petroleum contamination were detected in the groundwater directly beneath the former tank pit, the risk to these potential receptors appears to be negligible. Kenfield Brook, located approximately 1,500 feet north of the site, is not deemed to be at risk from the contamination at the site based on the estimated flow direction.

VI. CONCLUSIONS

Based on the investigation at this site to date, Griffin has reached the following conclusions:

1. There has been a release of gasoline to the subsurface at Morristown Corner Store. The source of this contamination is the former UST system at the site. The duration and amount of the release is unknown. This release of product has resulted in the contamination of soils in the vicinity of the former UST tank area from grade to the water table at 30 feet below grade. The horizontal extent of soil contamination is unknown.
2. The vertical rate of contaminant migration is likely very slow given the significant layers of dense silt and clay encountered in the boring.
3. Dissolved groundwater contamination was detected in the sample from MW-1 at relatively low levels. The lateral extent of contamination has not been determined.

however, higher levels of dissolved contamination are not likely present in the groundwater at other locations since this well was installed directly in the source area.

4. The greatest potential risk posed by the on-site contamination appears to be (1) to the occupants of adjacent buildings if petroleum vapors enter the basement and (2) the unnamed brook located 1,500 feet to the south.

During a Griffin site visit, the store building (the building closest to the former tank pit) was screened for the presence of VOCs. No VOCs were detected. Therefore, at this time, Griffin believes that the risk to the nearby buildings is relatively low.

In addition, the risk to the unnamed brook 1,500 feet downgradient from the site is deemed to be very low at this time since groundwater directly beneath the former tank pit has apparently been only slightly impacted to date.

VII. RECOMMENDATIONS

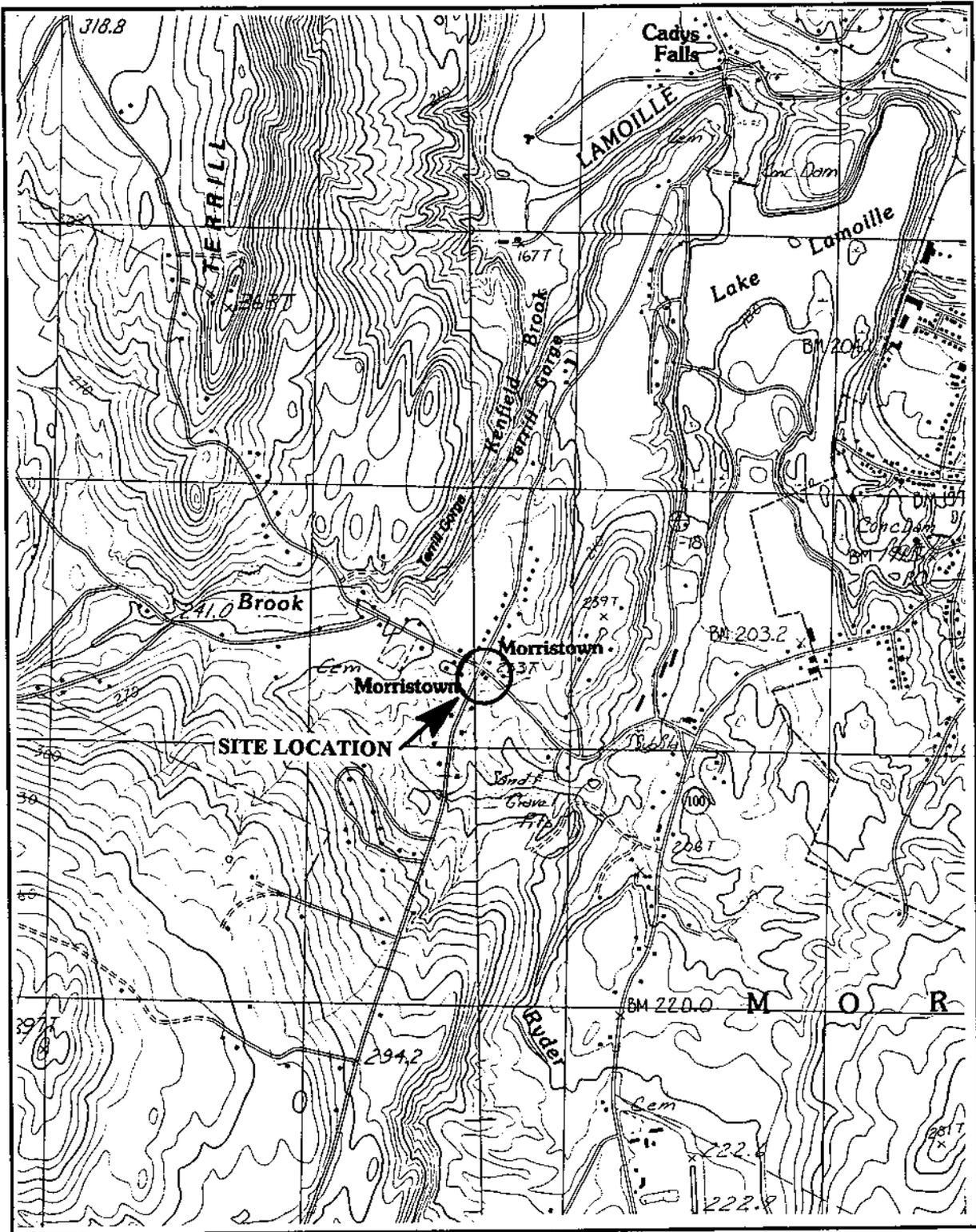
Due to the relatively low levels of contamination detected in the groundwater and the lack of VOC impact on the nearest building's basement, Griffin does not recommend any further investigation at this time. The above-mentioned potential receptors appear to be the ones that are at greatest risk and none appear to be impacted at this time. However, Griffin does recommend the following:

1. Confirm the absence of private drinking water wells within a 500 foot radius of the site.
2. MW-1 should be sampled on a quarterly basis for a period of one year to monitor any changes in dissolved contaminant concentrations in the groundwater beneath the former UST area. For quality control purposes, a duplicate sample should be obtained as well. Samples should be analyzed for petroleum compounds by EPA Method 602. After one year, the frequency of monitoring at this site should be re-evaluated. In addition, the basement of the store building should be screened for the presence of VOCs using a PID during each quarterly site visit.

APPENDIX A

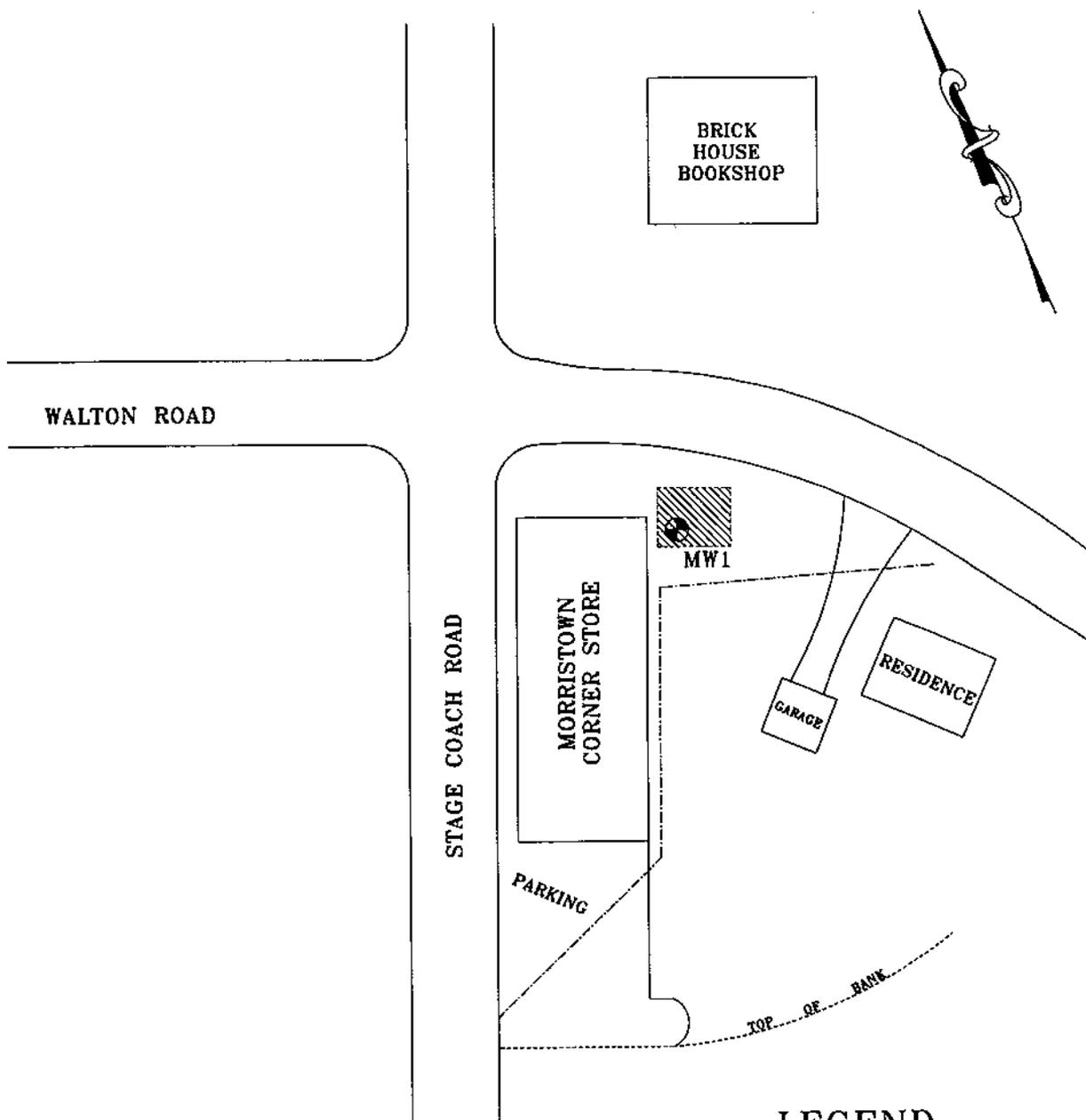
Maps

Site Location Map
Site Map



SITE LOCATION MAP
Morrystown Corner Store, Morrisville, Vermont

SOURCES: U.S.G.S. - MORRISVILLE, VERMONT (1986), SCALE 1:24,000
 U.S.G.S. - STERLING MOUNTAIN, VERMONT (1986), SCALE 1:24,000



LEGEND

-  MW1 MONITORING WELL
-  FORMER UST LOCATION
-  ASSUMED WATER MAIN LOCATION

JOB #: 7944550



MORRISTOWN CORNER STORE

MORRISVILLE, VERMONT

SITE MAP

DATE: 11/3/94	DWG.#: 2	NOT TO SCALE	DRN.: SB	APP.:KM
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APPENDIX B

Well Log

PROJECT MORRISTOWN CORNER STORE

LOCATION MORRISVILLE, VERMONT

DATE DRILLED 9/29/94 TOTAL DEPTH OF HOLE 38'

DIAMETER 6"

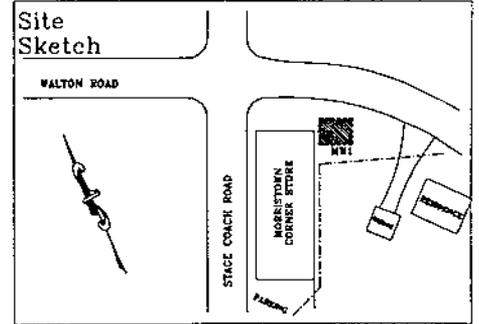
SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 27.5' TYPE sch 40 pvc

DRILLING CO. GMB DRILLING METHOD HSA

DRILLER R. GARNEAU LOG BY P. HACK

WELL NUMBER MW1



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
0		LOCKING WELL CAP			0
0		CONCRETE			0
2		BENTONITE	0'-5' 100-140 ppm	Light brown SAND, damp, to dark brown silty coarse SAND.	2
6		NATIVE BACKFILL	5'-7'- 2/1/1/1 50-100 ppm	Brown medium SAND, some silt, damp.	6
10			10'-12'- 3/4/4/3 35 ppm	Brown/gray dense CLAY, wet.	10
14		WELL RISER	15'-17'- 2/5/6/7 50 ppm	Gray dense SILT, some fine sands, moist.	14
20			20'-22'- 7/15/14/20 110-150 ppm	Sand and SILT to gray silty CLAY, then a 6" layer of dense fine SAND.	20
26			25'-27'- 9/10/9/12 15-75 ppm	Gray/green very fine SAND and SILT, damp/moist.	26
30		SAND PACK	30'-32'- 5/9/12/15 2 ppm	30.0' WATER TABLE	30
32		WELL SCREEN		Very fine SAND with some silt, wet.	32
36		BOTTOM CAP	35'-37'- 3/3/6/10 2.5 ppm	Gray/brown silty fine SAND, wet.	36
38		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 38' END OF EXPLORATION AT 38'	38
40					40
42					42
44					44
46					46
48					48
50					50

APPENDIX C

Groundwater Quality Summary

**Groundwater Quality Summary
Morristown Corner Store
Morrisville, Vermont**

PARAMETER	October 5, 1994		Vermont Drinking Water Standards
	MW-1	Duplicate of MW-1	
Benzene	138.	138.	5.0*
Chlorobenzene	ND	ND	100*
1,2-DCB	ND	ND	600*
1,3-DCB	ND	ND	600**
1,4-DCB	ND	ND	75*
Ethylbenzene	19.7	19.9	700*
Toluene	189.	191.	1,000*
Xylenes	127.	128.	10,000*
Total BTEX	473.7	476.9	-
MTBE	42.7	38.5	40**
BTEX+MTBE	516.4	515.4	-

All Values Reported in ug/L (ppb)

ND - None Detected

* - Maximum Contaminant Level (MCL)

** - Vermont Health Advisory Level

APPENDIX D
Laboratory Report



Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Morristown Corner Store
REPORT DATE: October 12, 1994
DATE SAMPLED: October 5, 1994

PROJECT CODE: GIMC1762
REF.#: 65,455 - 65,456

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated samples were preserved 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



Laboratory Services

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

LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Morristown Corner Store
REPORT DATE: October 12, 1994
DATE SAMPLED: October 5, 1994
DATE RECEIVED: October 5, 1994
DATE ANALYZED: October 12, 1994

PROJECT CODE: GIMC1762
REF.#: 65,455
STATION: MW-1
TIME SAMPLED: 11:31
SAMPLER: Jim Valley

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	138.
Chlorobenzene	1	ND ¹
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	19.7
Toluene	1	189.
Xylenes	1	127.
MTBE	10	42.7

Bromobenzene Surrogate Recovery: 97%

NUMBER OF UNIDENTIFIED PEAKS FOUND: > 10

NOTES:

1 None detected

RECEIVED OCT 14 1994



Laboratory Services

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

LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Morristown Corner Store
REPORT DATE: October 12, 1994
DATE SAMPLED: October 5, 1994
DATE RECEIVED: October 5, 1994
DATE ANALYZED: October 12, 1994

PROJECT CODE: GIMC1762
REF.#: 65,456
STATION: Duplicate (MW-1)
TIME SAMPLED: 11:31
SAMPLER: Jim Valley

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	138.
Chlorobenzene	1	ND ¹
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	19.9
Toluene	1	191.
Xylenes	1	128.
MTBE	10	38.5

Bromobenzene Surrogate Recovery: 99%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 None detected

