

MAY 18 1992

# 900643



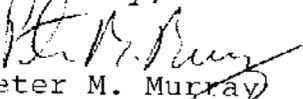
May 14, 1992

Linda Guere  
State of Vermont  
Dept. of Environmental Conservation  
Hazardous Materials Management Div.  
103 South Main St.  
Waterbury, VT 05671-0404

Dear Linda,

Enclosed is the report on the investigation of subsurface petroleum contamination at the Jiffy Mart in Rutland. Please call me with any questions which you may have.

Sincerely,

  
Peter M. Murray  
Project Hydrogeologist

cc: Barry Dixon

MAY 18 1992

REPORT ON ADDITIONAL INVESTIGATION  
OF SUBSURFACE PETROLEUM CONTAMINATION  
JIFFY MART  
RUTLAND, VERMONT

April, 1992

Prepared for:

Mr. J. Barry Dixon  
Jiffy Mart  
Claremont, New Hampshire

Prepared by:

Griffin International, Inc.  
2B Dorset Lane  
Williston, Vermont  
(802) 879-7708

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## I. INTRODUCTION

This report details the investigation of subsurface petroleum contamination at the Jiffy Mart, located on the corner of State and Pine Streets, in Rutland, Vermont. The investigation has been conducted by Griffin International, Inc. (Griffin) for Mr. J. Barry Dixon, owner of the Jiffy Mart.

Subsurface petroleum contamination was first discovered at this site in December, 1990 during the removal of an underground storage tank (UST). This investigation has been conducted to determine the degree and extent of the contamination and, to determine if nearby potential receptors are at risk of being impacted by the contamination. Data collected during this investigation indicates that, while residual contamination remains in the vicinity of the former UST, it has not migrated off site in significant concentrations and does not pose a threat to potential receptors.

## II. SITE HISTORY

In June, 1988, The State of Vermont Agency of Transportation (VTAOT) detected petroleum vapors in soil borings which it drilled in the intersection of Pine and State Streets. The borings were drilled to obtain subsurface information for the reconstruction of local streets and sidewalks.

In December, 1990, a 4,000 gallon UST was excavated and removed from the Jiffy Mart. The tank had not been in use for over one year. An inspector from the State of Vermont Department of Environmental Conservation (VTDEC) noticed several large holes in the tank, through which product had likely leaked. In addition, the inspector detected petroleum contamination in soils in the tank pit.

The VTDEC responded by requesting that an investigation of the contamination be conducted. Griffin completed the investigation for Mr. Dixon in February, 1991. The report on the investigation concluded that petroleum contamination existed in the vicinity of the former UST in the adsorbed phase, dissolved phase and free floating phase. In addition, the report concluded that the contamination could potentially impact nearby sensitive receptors which include several homes.

Reconstruction of the streets and sidewalks by the VTAOT was conducted during the Summer of 1991. Petroleum vapors were detected in excavations related to the reconstruction in the vicinity of the Jiffy Mart. Vapors were detected at a depth of six to seven feet below grade; the maximum depth of the excavations. Vapors were concentrated on the southeast corner of Pine and State Streets. This is the corner on which the Jiffy Mart is located. Vapors were not detected in excavations across Pine and State Streets.

Based on the conclusions in the February, 1991 report, the VTDEC requested that additional investigation of the subsurface petroleum contamination be conducted. The additional investigation has included the installation of two additional monitoring wells and the analysis of water samples from the six on-site wells.

### III. INVESTIGATIVE PROCEDURES

#### A. Monitoring Well Installation/Soil Sampling

On March 19, 1992, Griffin installed a total of two additional monitoring wells, in the vicinity of the Jiffy Mart, to obtain data to determine if the subsurface petroleum contamination had migrated off-site. The two wells were installed by Green Mountain Boring, of Barre, Vermont, under the direct supervision of the Griffin Hydrogeologist.

Drilling was conducted using a hollow stem auger drill rig. The boreholes for each well extend to a depth of approximately 17 feet below grade. Undisturbed soil samples were collected from the boreholes at five foot intervals using a split spoon sampler. The hydrogeologist logged and screened each split spoon sample and the drill cuttings for volatile organic compounds (VOCs) using a portable photo-ionization device.

Both wells are constructed of two inch diameter, PVC well screen and casing. The screen extends 10 feet from the bottom of the well. The annular space, between the well screen and the borehole wall, is packed with silica gravel for filtration. Each borehole is sealed with bentonite to prevent infiltration of surface runoff. The wells are completed with locking well caps and eight inch diameter, bolt down manhole covers.

Soil characteristics and well construction details for these two wells, MW-5 and MW-6, are included on the well logs in Appendix B. Including these two wells, there is currently a total of six monitoring wells at this site. The locations of all six wells are shown on the Site Map, in Appendix A.

MW-5 is located in a paved parking lot on the north side of State Street, across the street from the Jiffy Mart. The lot is owned by George Looker, of Rutland, and is used for parking for Mr. Looker's store which is adjacent to the lot. MW-5 is located in an area which was assumed to be down gradient of the former UST at Jiffy Mart. This well was installed to determine if contamination has migrated in that direction and to determine if the contamination poses a risk to homes located north of the parking lot. Soils encountered in the borehole for this well consisted of silt and sand, with a trace of clay beginning at a depth of approximately 10 feet below grade. No petroleum odors were detected in these soils; however, the PID detected VOC concentrations of 0.2 parts per million (ppm) in the split spoon sample collected from a depth of 5 to 7 feet below grade.

MW-6 is located in the front yard of a residence located directly across Pine Street from the Jiffy Mart. This well was installed to determine if the contamination has migrated onto the property which is owned by Mary Segale of 23 Pine Street. Soils encountered in the borehole for this well consisted of silt and sand. No petroleum odors were detected in these soils and no VOCs were detected by PID.

#### B. Determination of Groundwater Gradient and Flow Direction

At the completion of monitoring well installation, Griffin surveyed the relative locations of each on-site monitoring well and the relative elevations of the top of casing of each well. The top of casing elevations were then determined relative to the top of casing of MW-3, which has been assigned an arbitrary elevation of 100 feet

On March 26, 1992, depths to water in each well were measured using an interface probe. In the well that contained free floating product, MW-3, both the depth to water and depth to product were measured. The water table elevation in each well was then

calculated by subtracting the depth to water from the top of casing elevation. In the case of MW-3, the corrected depth to water was used in the calculation. The liquid level data in Appendix C lists water table elevations in each wells.

The Groundwater Contour Map, in Appendix A, shows water table elevation contours across the site on March 26, 1992. The map indicates that the water table was sloping toward the northwest, at a 1.5% gradient. Groundwater typically flows in the direction that the water table is sloping.

### C. Groundwater Sampling and Analysis

On March 26, 1992, Griffin collected groundwater samples from each on-site monitoring well, except for MW-3. In addition, a trip blank, a site blank and a duplicate were collected for analysis as per VTDEC QA/QC requirements. The samples were analyzed, by Endyne, for BTEX and MTBE, using EPA Method 602. A sample was not collected from MW-3, due to the presence of free floating product.

The laboratory results in Appendix D indicate that groundwater in the vicinity of the former UST at Jiffy Mart contains varying concentrations of BTEX and MTBE. Please note that the sample listed as MW-7 is a QA/QC duplicate of MW-2.

Figure 1 lists contaminant concentrations in each well and the Vermont Health Advisory Levels (HAL) for each compound.

Figure 1.

Summary of Analytical Results  
 Jiffy Mart, Rutland  
 March 26, 1992

CONTAMINANT	MW-1	MW-2	MW-4	MW-5	MW-6	HAL
Benzene	ND <sup>1</sup>	19,600 <sup>2</sup>	13,700	ND	TBQ <sup>3</sup>	5
Ethylbenzene	ND	3,740	2,110	ND	ND	680
Toluene	ND	49,100	15,900	TBQ	TBQ	2,420
Xylenes	2	17,400	10,700	ND	ND	400
MTBE	ND	79,000	112,000	ND	TBQ	40

<sup>1</sup> None Detected

<sup>2</sup> Concentrations listed in parts per billion (ppb)

<sup>3</sup> Trace below quantifiable concentrations

The analytical results indicate that the highest concentrations of dissolved BTEX and MTBE occur near the former UST, which is the suspected source of the contamination. MW-1 contains a small amount of xylenes, which are not likely related to the former UST. MW-5 and MW-6 contained no quantifiable contamination on the sampling date. This indicates that the contamination has not migrated off-site in significant concentrations.

Overall contamination concentrations in MW-2 and MW-4 have decreased since they were last sampled in February, 1991. This decrease indicates that, with the removal of the likely source, concentrations of dissolved BTEX and MTBE contamination in the vicinity of the suspect UST are slowly decreasing due to natural processes.

#### D. Free Product Bailing

As was previously mentioned, free floating product was discovered in MW-3 on March 26, 1992. Free product was also detected in this well in February, 1991. To determine the amount of free product in the vicinity of MW-3, Griffin bailed product from the well on April 4, 1992. Approximately one gallon of product was removed on that date. The product was then poured back into the well for lack of an appropriate place to store it.

On April 29, Griffin returned to the site to bail product from MW-3. Approximately 150 mL of product was bailed from the well and placed in a 55 gallon drum which is currently stored on-site. The drum is locked in a wooden shed located at the back of the Jiffy Mart building. The small amount recovered on this date indicates that the amount of residual free product in the vicinity of the suspect UST is relatively insignificant and is not extensive. The absence of free product in the other monitoring wells supports this assumption.

Griffin will continue to bail free product from MW-3 on a weekly basis until a formal monitoring/remediation plan is enacted.

#### IV. CONCLUSIONS

Based on the findings of this investigation, Griffin has reached the following conclusions regarding subsurface petroleum contamination at the Jiffy Mart in Rutland:

1. Residual subsurface petroleum contamination remains in the vicinity of the former, suspect UST. The contamination was found in both the dissolved and free floating phases. It is also likely that adsorbed contamination remains in the immediate vicinity of the tank.
2. Contaminated groundwater is flowing toward the northwest, at a 1.5% gradient. Due to the relatively slight gradient and the high silt and clay content in the saturated soils, it is likely that groundwater and contaminant migration rates across the site are relatively low.
3. The amount of free floating contamination in the vicinity of MW-3 appears to be minimal.

4. Detectable concentrations of subsurface petroleum contamination have not migrated to properties across both Pine and State Streets. This indicates that contamination has not migrated off-site and will likely not impact potential receptors.
5. Concentrations of BTEX and MTBE in the vicinity of the suspect UST have decreased since February, 1991.
6. In time, the natural processes of dilution, dispersion and biodegradation will result in significant reductions in contamination concentrations at this site.

## V CONCLUSIONS

Based on the above conclusions, we present the following recommendations:

1. To more adequately determine the extent of free floating product at this site, product from MW-3 should be bailed on a weekly basis and stored in the on-site 55 gallon drum. Bailing should continue until the product thickness in MW-3 is less than 1/8".
2. To monitor the continued reduction of concentrations of dissolved BTEX and MTBE across the site, samples of groundwater from each on-site monitoring well should be collected annually and analyzed by EPA Method 602.

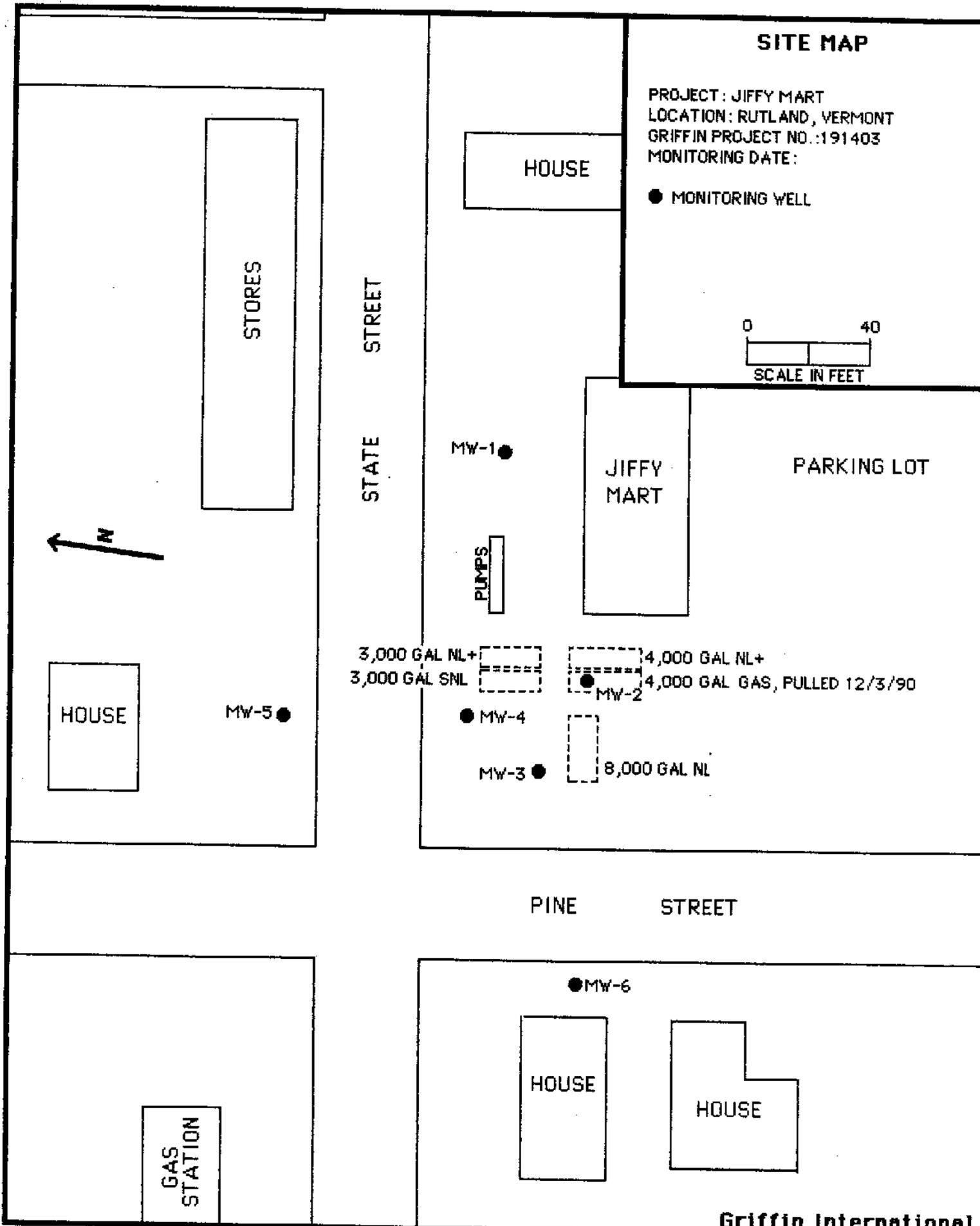
APPENDIX A

Site Maps

# SITE MAP

PROJECT: JIFFY MART  
LOCATION: RUTLAND, VERMONT  
GRIFFIN PROJECT NO.: 191403  
MONITORING DATE:

● MONITORING WELL

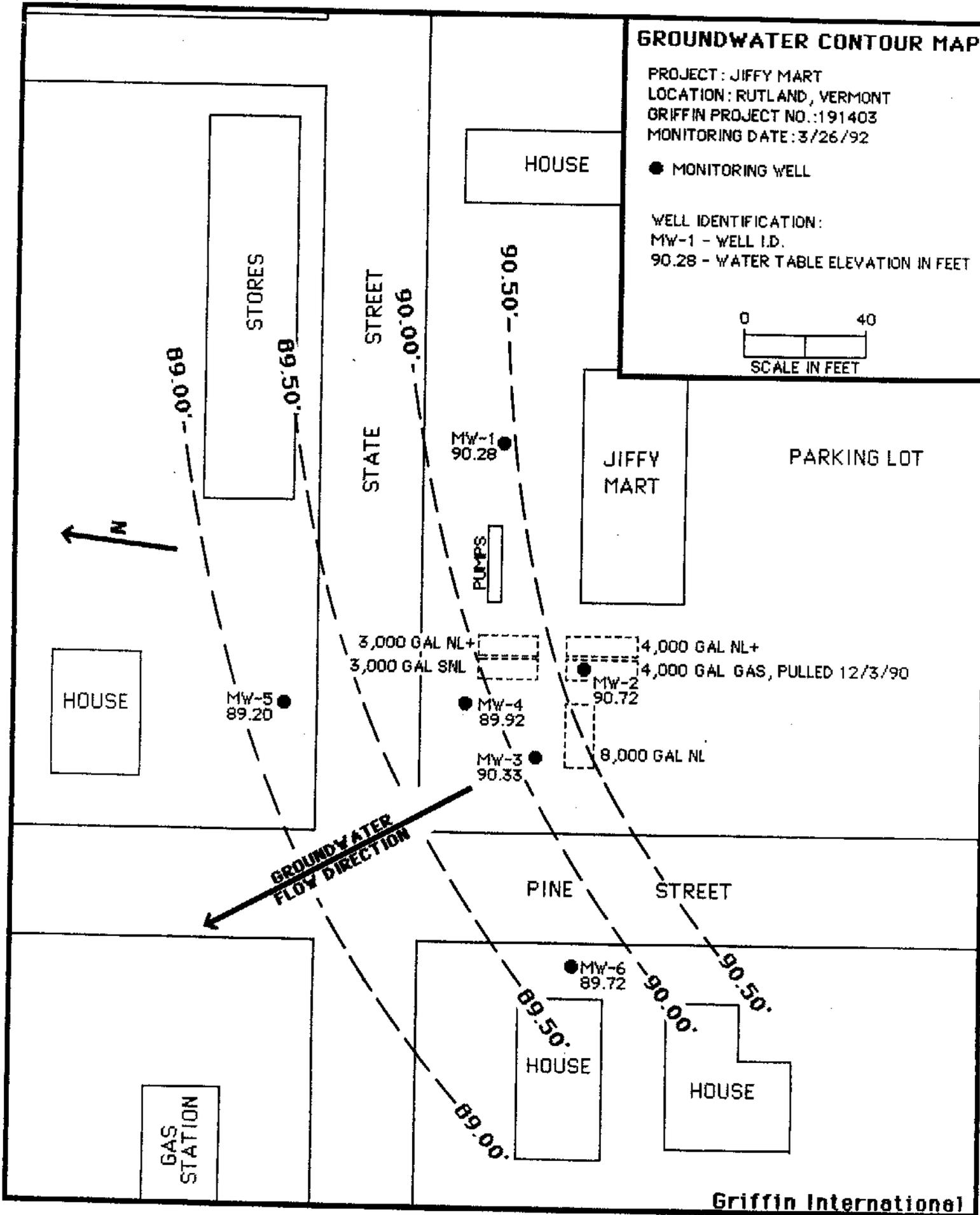


# GROUNDWATER CONTOUR MAP

PROJECT: JIFFY MART  
LOCATION: RUTLAND, VERMONT  
GRIFFIN PROJECT NO.: 191403  
MONITORING DATE: 3/26/92

● MONITORING WELL

WELL IDENTIFICATION:  
MW-1 - WELL I.D.  
90.28 - WATER TABLE ELEVATION IN FEET

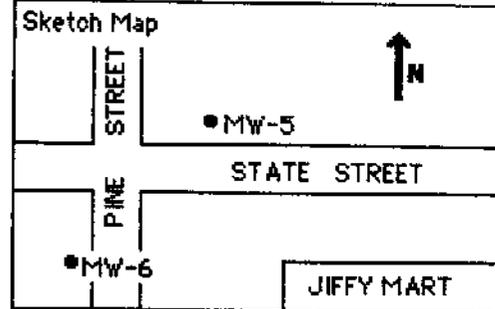


APPENDIX B

Well Logs

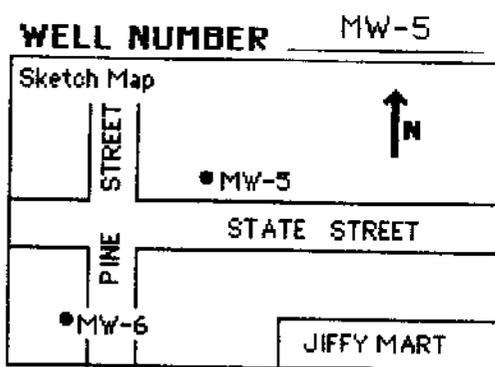
PROJECT  JIFFY MART   
 LOCATION  RUTLAND, VERMONT   
 DATE DRILLED  3/19/92  TOTAL DEPTH OF HOLE  17'   
 DIAMETER  6"   
 SCREEN DIA.  2"  LENGTH  10'  SLOT SIZE  .010"   
 CASING DIA.  2"  LENGTH  6.5'  TYPE  PVC   
 DRILLING CO.  GREEN MT. BORING  DRILLING METHOD  HOLLOW STEM AUGER   
 DRILLER  STEVE LAWRENCE  LOG BY  P. MURRAY

WELL NUMBER  MW-6



DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		ROAD BOX		
1		WELL CAP		
2		CONCRETE		Black SILT and SAND
2		BENTONITE		
3		WELL RISER		Brown, silty, fine to medium SAND
4		NATIVE BACKFILL		Dry, light brown, fine SAND, trace silt
5			5'-7': 8,7,7,7	
6				Dry, fine, light brown SAND NO PETROLEUM ODOR: 0 PPM
7				
8		GRAVEL PACK		
9		WELL SCREEN		
10			10'-12': 2,2,2,2	
11				WATER TABLE ▼
12				Wet, very fine, brown SAND and SILT NO PETROLEUM ODOR: 0 PPM
13				
14				
15				
16				
17		BOTTOM PLUG		
18				BASE OF EXPLORATION AT 17'
19				
20				
21				
22				
23				
24				
25				
26				

PROJECT   JIFFY MART    
 LOCATION   RUTLAND, VERMONT    
 DATE DRILLED   3/19/92   TOTAL DEPTH OF HOLE   17'    
 DIAMETER   6"    
 SCREEN DIA.   2"   LENGTH   10'   SLOT SIZE   .010"    
 CASING DIA.   2"   LENGTH   6.5'   TYPE   PVC    
 DRILLING CO.   GREEN MT. BORING   DRILLING METHOD   HOLLOW STEM AUGER    
 DRILLER   STEVE LAWRENCE   LOG BY   P. MURRAY  



DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 5" OF SPOON	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		ROAD BOX		
1		WELL CAP		
2		CONCRETE		Dark brown SILT, little fine SAND
3		BENTONITE		
4		WELL RISER		Dry, light brown, fine SAND, trace silt NO PETROLEUM ODOR: 0 PPM
5		NATIVE BACKFILL	5'-7': 7,6,4,5	
6				Dry, light brown, fine SAND, trace silt 5'-6.75' Wet, very fine SAND, some silt 6.75'-78' NO PETROLEUM ODOR: 0.2 PPM
7				
8		GRAVEL PACK		
9		WELL SCREEN		
10			10'-12': 2,1,3,4	----- WATER TABLE ▼
11				Wet, gray/brown SILT, some clay, trace very fine sand NO PETROLEUM ODOR: 0 PPM
12				
13				
14				
15			15'-17': 2,3,4	Wet, gray/brown SILT, some clay, little very fine sand NO PETROLEUM ODOR: 0 PPM
16				
17		BOTTOM PLUG		BASE OF EXPLORATION AT 17'
18				
19				
20				
21				
22				
23				
24				
25				
26				

APPENDIX C

Liquid Level Data



APPENDIX D  
Laboratory Results



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: Jiffy Mart  
REPORT DATE: April 8, 1992  
DATE SAMPLED: March 26, 1992  
DATE RECEIVED: March 27, 1992  
ANALYSIS DATE: April 8, 1992

PROJECT CODE: GIJM7142  
REF.#: 29,210  
STATION: MW #1  
TIME SAMPLED: 15:00  
SAMPLER: Don Tourangeau

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	2.0
MTBE	1	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 3

NOTES:

- 1 None detected
- 2 Trace below quantitation limit

Reviewed by \_\_\_\_\_



Laboratory Services

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Williston, Vermont 05495  
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FAX 879-7103

LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International  
PROJECT NAME: Jiffy Mart  
REPORT DATE: April 8, 1992  
DATE SAMPLED: March 26, 1992  
DATE RECEIVED: March 27, 1992  
ANALYSIS DATE: April 8, 1992

PROJECT CODE: GIJM7142  
REF.#: 29,214  
STATION: MW #2  
TIME SAMPLED: 16:45  
SAMPLER: Don Tourangeau

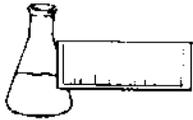
<u>Parameter</u>	<u>Detection Limit (ug/L)<sup>1</sup></u>	<u>Concentration (ug/L)</u>
Benzene	1000	19,600.
Chlorobenzene	2000	ND <sup>2</sup>
1,2-Dichlorobenzene	2000	ND
1,3-Dichlorobenzene	2000	ND
1,4-Dichlorobenzene	2000	ND
Ethylbenzene	1000	3,740.
Toluene	1000	49,100.
Xylenes	1000	17,400.
MTBE	1000	79,000.

NUMBER OF UNIDENTIFIED PEAKS FOUND: 7

NOTES:

- 1 Detection limit raised due to high levels of contaminants. Sample run at 0.1% dilution.
- 2 None detected

Reviewed by \_\_\_\_\_



**ENDYNE, INC.**

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: Jiffy Mart  
REPORT DATE: April 8, 1992  
DATE SAMPLED: March 26, 1992  
DATE RECEIVED: March 27, 1992  
ANALYSIS DATE: April 7, 1992

PROJECT CODE: GIJM7142  
REF.#: 29,213  
STATION: MW #4  
TIME SAMPLED: 16:00  
SAMPLER: Don Tourangeau

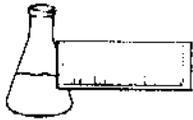
<u>Parameter</u>	<u>Detection Limit (ug/L)<sup>1</sup></u>	<u>Concentration (ug/L.)</u>
Benzene	1000	13,700.
Chlorobenzene	2000	ND <sup>2</sup>
1,2-Dichlorobenzene	2000	ND
1,3-Dichlorobenzene	2000	ND
1,4-Dichlorobenzene	2000	ND
Ethylbenzene	1000	2,110.
Toluene	1000	15,900.
Xylenes	1000	10,700.
MTBE	1000	112,000.

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

- 1 Detection limit raised due to high levels of contaminants. Sample run at 0.1% dilution.
- 2 None detected

Reviewed by \_\_\_\_\_



**ENDYNE, INC.**

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: Jiffy Mart  
REPORT DATE: April 8, 1992  
DATE SAMPLED: March 26, 1992  
DATE RECEIVED: March 27, 1992  
ANALYSIS DATE: April 7, 1992

PROJECT CODE: GIJM7142  
REF.#: 29,212  
STATION: MW #5  
TIME SAMPLED: 15:40  
SAMPLER: Don Tourangeau

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L.)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	TBQ <sup>2</sup>
Xylenes	1	ND
MTBE	1	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

- 1 None detected
- 2 Trace below quantitation limit

Reviewed by 



**ENDYNE, INC.**

Laboratory Services

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Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International  
PROJECT NAME: Jiffy Mart  
REPORT DATE: April 8, 1992  
DATE SAMPLED: March 26, 1992  
DATE RECEIVED: March 27, 1992  
ANALYSIS DATE: March 30, 1992

PROJECT CODE: GIJM7142  
REF.#: 29,209  
STATION: Trip Blank  
TIME SAMPLED: 7:30  
SAMPLER: Don Tourangeau

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	1	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected

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Reviewed by \_\_\_\_\_



**ENDYNE, INC.**

Laboratory Services

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Williston, Vermont 05495  
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FAX 879-7103

LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International  
PROJECT NAME: Jiffy Mart  
REPORT DATE: April 8, 1992  
DATE SAMPLED: March 26, 1992  
DATE RECEIVED: March 27, 1992  
ANALYSIS DATE: March 30, 1992

PROJECT CODE: GIJM7142  
REF.#: 29,216  
STATION: Site Blank  
TIME SAMPLED: 16:55  
SAMPLER: Don Tourangeau

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	1	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected

Reviewed by \_\_\_\_\_