



April 18, 2000

Mr. Chuck Schwer
Sites Management Section
VTDEC WMD
103 South Main St./ West Bldg.
Waterbury, VT 05671-0404

RE: Initial Site Investigation at Middlebury Citgo, Middlebury, Vermont
VTDEC Site #98-2471

Dear Mr. Schwer:

Enclosed please find a copy of the initial site investigation conducted at the above referenced site. Mr. Dennis Boise of Champlain Oil Company requested that a copy be forwarded to you for your review.

Based on the results of this investigation, Griffin is recommending a confirmatory round of groundwater sampling, pending VTDEC approval.

Please do not hesitate to call, if you have any questions or comments.

Sincerely,

A handwritten signature in cursive script that reads "Beth Stopford".

Beth Stopford
Environmental Engineer

Enc.

cc: GI #129941654

APR 20 8 05 AM '00
WASTE MANAGEMENT
DIVISION

**INITIAL INVESTIGATION OF
SUSPECTED SUBSURFACE
PETROLEUM CONTAMINATION
AT MIDDLEBURY CITGO**

April 14, 2000

Site Location:

**Middlebury Citgo
84 Court Street
Middlebury, VT**

**VTDEC SITE #98-2471
GI Project #129941654**

Prepared For:

**Champlain Oil Company
P.O. Box 2126
South Burlington, VT 05403**

Prepared By:



P.O. Box 943 / 20 Commerce Street Williston, VT 05495 (802) 865-4288



TABLE OF CONTENTS

I. INTRODUCTION.....	1
II. SITE BACKGROUND	1
A. Site History	1
B. Site Description.....	2
C. Site Geologic Setting	2
III. INVESTIGATIVE PROCEDURES.....	2
A. Monitoring Well Installation.....	2
B. Determination of Groundwater Flow Direction and Gradient.....	4
C. Groundwater Sample Collection and Analysis.....	4
D. Sensitive Receptor Risk Assessment.....	5
IV. CONCLUSIONS	6
V. RECOMMENDATIONS.....	7
VI. REFERENCES.....	8

APPENDICES

A. MAPS

- 1) Site Location Map
- 2) Area Map
- 3) Site Map
- 4) Groundwater Contour Map
- 5) Contaminant Concentration Map

B. BORING LOGS AND MONITORING WELL CONSTRUCTION DIAGRAMS

C. LIQUID LEVEL MONITORING DATA

D. GROUNDWATER QUALITY SUMMARY DATA

E. LABORATORY ANALYSIS REPORTS



I. INTRODUCTION

This report summarizes the initial investigation of suspected subsurface petroleum contamination at the Middlebury Citgo, located at 84 Court Street in Middlebury, VT (see the Site Location Map in Appendix A). This investigation was conducted by Griffin International, Inc. (Griffin) for Champlain Oil Company (COCO) to address petroleum contamination detected during a piping replacement inspection associated with gasoline underground storage tanks (USTs) in July 1998. The Vermont Department of Environmental Conservation (VTDEC) requested that this work be completed in a letter to Mr. Dennis Boise of COCO from Mr. Chuck Schwer of the VTDEC, dated December 17, 1998. The site (VTDEC Site #98-2471) is owned by COCO.

Work conducted at the site included the advancement of three soil borings and installation of three groundwater monitoring wells, the collection and laboratory analysis of groundwater samples from two of the three monitoring wells (the third well was dry), and from an existing on-site monitoring well. In addition, a sensitive receptor risk assessment was conducted to assess the risk that subsurface petroleum contamination at the site may pose to potentially sensitive receptors identified in the site vicinity. Work has been conducted in accordance with Griffin's *Work Plan and Cost Estimate for Subsurface Investigation at Middlebury Citgo* dated January 15, 1999 [1]. The Work Plan was approved by Mr. Tony Cairns of COCO on December 17, 1999, and by Mr. Chuck Schwer of the VTDEC in a letter dated December 30, 1999.

II. SITE BACKGROUND

A. Site History

Subsurface petroleum contamination was detected in soil at the Middlebury Citgo with field measurements made using an HNu™ Model PI-101 photoionization detector (PID) equipped with a 10.2 eV bulb during a piping replacement inspection in July 1998. Soil contamination was associated with the piping for one 8,000-gallon gasoline UST, and two 6,000-gallon gasoline USTs. Piping replacement activities were conducted on July 13, 1998. Details of the closure inspection are outlined in the Underground Storage Tank Permanent Closure Form [2]. Adsorbed petroleum contamination exceeding Soil Guideline Thresholds set by the Waste Management Division of the VTDEC [3] were detected along the south and north end of the dispenser island. Measured VOC concentrations ranged from 0.2 parts per million (ppm) to 42 ppm.

In compliance with a request from the VTDEC that additional work be conducted at this site in order to determine the degree and extent of petroleum contamination, COCO retained the services of Griffin to conduct this initial site investigation.



B. Site Description

Middlebury Citgo is located on the west side of Route 7/Court Street in Middlebury, VT (see Site Location Map in Appendix A). The area is serviced by municipal water and sewer. The area surrounding the site is residential with some commercial properties. The Middlebury Union High School is to the west of the site. An unnamed tributary to the Otter Creek flows along the north and west perimeter of the property. The Otter Creek is located approximately 1,000 feet west of the site.

The on-site building, housing a convenience store and two service bays utilized for automobile service and repair, is constructed on a cement slab foundation. The majority of the site is paved.

C. Site Geologic Setting

According to the Surficial Geologic Map of Vermont [4], the site is underlain as lake bottom sediments, specifically silt, silty clay, and/or clay containing ice rafted boulders. Soils encountered during drilling activities consisted of well-graded sand with fine gravel overlying clay and silt. Bedrock at the site is mapped as gray limestone with thin interbeds of sandy limestone [5]. Bedrock was not encountered during excavation or drilling activities at the site.

Based on visual observation and review of the USGS topographic map [6], groundwater in the vicinity of the Middlebury Citgo would be expected to flow to the west toward the Otter Creek, following topographic contours.

III. INVESTIGATIVE PROCEDURES

A. Monitoring Well Installation

On January 28, 2000, three soil borings were advanced by T&K Drilling of East Swanzey, NH using a hollow stem auger drilling rig and completed as groundwater monitoring wells. Drilling and well construction were directly supervised by a Griffin engineer. Soil samples were collected at five-foot intervals from each boring. Each soil sample was screened for volatile organic compounds (VOCs) using an HNu™ Model HW-101 PID equipped with a 10.2 eV bulb. Soils were screened using the Griffin Jar/Polyethylene Bag Headspace Screening Protocol, which conforms to state and industry standards. Contaminant concentrations and soil characteristics were recorded in detailed boring logs by the supervising Griffin engineer (see the Boring Logs and Well Construction Diagrams in Appendix B).

The soil borings/monitoring wells (MW00-1, MW00-2, MW00-3) were installed to help better define groundwater flow direction and gradient, and the degree and extent of suspected petroleum contamination at the site. MW00-1 was installed west of the presumed source area



(e.g. the former piping for the UST system) in a presumed downgradient direction. MW00-2 was installed northwest of the pump island, in an estimated down to crossgradient direction. MW00-3 was installed south of the pump island in a presumed up to crossgradient direction.

The monitoring wells were constructed of 2-inch diameter Schedule 40 PVC riser and 0.010-inch factory slotted, well screen. The length of the riser and the screened section of pipe varied depending on the depth of the well. The annulus between the well screen and the borehole was filled with a sand pack to just above the well screen. A bentonite seal was placed above the sand pack. The remainder of the boring was filled with native backfill. To complete the construction of each well, a road box was set in concrete at grade level. In addition, locking well caps were placed on the monitoring wells. Specific well construction details are displayed in the detailed Boring Logs and Well Construction Diagrams included in Appendix B.

MW00-1

The boring for MW00-1 was advanced to 17 feet below grade. Soils from the boring consisted of well-graded sand with gravel from 0 to 2 and 5 to 7 feet below grade. Moist fat clay was observed from 10 to 12 feet below grade. Moist to wet silt was observed from 15 to 17 feet below grade. A maximum VOC concentration of 10.6 ppm was measured with a PID in soils collected from between 10 and 12 feet below grade.

Groundwater was encountered at approximately 10 feet below grade. The boring was completed as MW00-1, and the screened section of the well was installed from 17 to 7 feet below the ground surface.

MW00-2

The boring for MW00-2 was advanced to 13.5 feet below grade, at which point auger refusal was met. Soils from the boring for MW00-2 consisted of well-graded, sand from 0 to 2 feet below grade. Dry, well-graded sand with silt was observed between 5 and 7 feet. Soils from 10 to 12 feet below grade consisted of moist fat clay. A maximum VOC concentration of 300 ppm was measured with a PID in soils collected from between 10 and 12 feet below grade.

Groundwater was not encountered at 13 feet below grade, however soils were moist. The boring was completed as MW00-2, and the screened section of the well was installed from 13 to 3 feet below grade.

MW00-3

The boring for MW00-3 was advanced to 11 feet below grade, at which point auger refusal was met. Soils from the boring consisted of well-graded sand from 0 and 2 feet below grade. Well-graded sand with gravel was observed from 5 to 7 feet below grade. Soils from 10 to 12 feet



below grade consisted of moist to wet fat clay. A maximum VOC concentration of 300 ppm was measured with a PID in the sample collected between 10 and 12 feet below grade, coincident with the water table.

The boring was completed as MW00-3, and the screened section of the well was installed from 10.5 to 3.5 feet below grade.

B. Determination of Groundwater Flow Direction and Gradient

Water table elevation measurements were collected from two of the three newly installed monitoring wells (MW00-3 was dry), as well as from an existing on-site monitoring well (MWE-1), on February 4, 2000 using an MMC interface probe. These measurements were subtracted from the top of casing elevations, which were determined relative to an arbitrary datum of 100 feet at the top of the casing for MW00-3, to determine the water table elevation at each of the wells. Groundwater level data are recorded in Appendix C. No free phase petroleum product was observed in any of the monitoring wells gauged on February 4, 2000.

As displayed in the groundwater contour map included in Appendix A, groundwater flow on February 4, 2000 is to the northeast at a hydraulic gradient of approximately 5%. This groundwater flow direction is counter to what would be expected from site topography and the proximity of the tributary to the Otter Creek along the site perimeter. Under the groundwater flow regime estimated for February 4, 2000, none of the on-site monitoring wells are located downgradient of the dispenser island, where elevated VOC concentrations were detected during the piping replacement in 1998.

C. Groundwater Sample Collection and Analysis

Groundwater samples were collected from three of the four monitoring wells immediately following well gauging on February 4, 2000. MW00-3 was dry and could not be sampled. Samples were analyzed for the presence of VOCs per EPA Method 8021B. Results of the laboratory analyses are summarized in Appendix D. Laboratory report forms are presented in Appendix E.

MTBE was detected in the sample collected from MW00-1 at a concentration exceeding Vermont Groundwater Enforcement Standards (VGES). None of the other targeted compounds were detected above method detection limits in the sample collected from this well.

Low concentrations of targeted petroleum constituents were detected in the existing monitoring well, MWE-1. Benzene, 1,3,5-trimethyl benzene, and 1,2,4-trimethylbenzene were detected at concentrations exceeding the VGES.



None of the targeted petroleum constituents were detected in the sample collected from MW00-2 on February 4, 2000.

Samples were collected according to Griffin's groundwater sampling protocol, which complies with industry and state standards. Results from the analyses of the trip blank and duplicate samples indicate that adequate quality assurance and control (QA/QC) were maintained during sample collection and analysis.

D. Sensitive Receptor Risk Assessment

A receptor risk assessment was conducted to identify known and potential receptors of contamination at the Middlebury Citgo facility. A visual survey was conducted during the piping replacement inspection in September 1999 and during monitoring well installation. Based on these observations, a determination of the potential risk to identified receptors was made based on proximity to the expected source area (i.e., the UST system), groundwater flow direction, and contaminant concentration levels in soil and groundwater.

Water Supplies

The Middlebury Citgo and the surrounding residences are served by municipal water supplied from the Town of Middlebury municipal water system. The Village of Middlebury receives its water from several shallow wells located off Route 116 on the east side of Middlebury; more than three miles southeast of the site [7]. Given its distance from the site, this water supply is not considered at risk of petroleum impact from contamination detected at the Middlebury Citgo.

Buildings in the Vicinity

Environmental risk to the on-site building is considered minimal, given that the building does not have a basement, which would allow the potential accumulation of petroleum vapors. Additionally, the depth to groundwater is approximately 10 feet below grade, which minimizes potential risks to the buildings via petroleum vapor migration. The majority of the Middlebury Citgo site, and specifically the source area, is paved, reducing the potential for exposure to the petroleum compounds through dermal contact with soils or inhalation of vapors.

The interior of the Middlebury Citgo garage was screened with a PID on the day of drilling (January 28, 2000). VOC concentrations from 1 and 2 ppm were measured on the interior of the garage, background readings outside the store were between 0 and 1 ppm. Elevated VOC concentrations inside the garage are presumed to be related to the use of the building for auto service and repair.



Other buildings in the area are considered at minimal risk from the on-site petroleum contamination given: 1) they are serviced by municipal water and sewer; 2) depth to groundwater is below the average depth of residential basements (approximately 8 feet below grade); and 3) their distance from the source area.

Surface Water

The nearest surface water is an unnamed tributary to the Otter Creek along the north and west perimeter of the site. The Otter Creek is located approximately 1000 feet west of the source area at the Middlebury Citgo. The Otter Creek is upgradient of the source area, based upon the water table elevations measured on February 4, 2000. The Otter Creek is considered at minimal risk of petroleum impact from the Middlebury Citgo given its distance from the subject site.

The tributary to the Otter Creek along the site perimeter was visually inspected on the day of drilling (January 28, 2000). No petroleum sheens or odors were observed on the water surface or from seeps along the stream banks.

Utility Corridors

The area surrounding Middlebury Citgo is serviced by municipal water and sewer. Storm drains located in the vicinity of the Middlebury Citgo property were screened with a PID on the day of drilling (January 28, 2000), and no elevated VOC concentrations were detected. The depth to groundwater beneath the site is approximately 10 feet below ground level, below the average depth of utility corridors (up to 6 feet). Therefore the potential of contaminant migration via utility corridors is considered minimal.

IV. CONCLUSIONS

Based on this additional site investigation of petroleum contamination at the Middlebury Citgo site, the following conclusions are offered:

1. There has been an apparent release(s) of gasoline in the subsurface at the subject site. The nature and duration of these releases is not known.
2. VOC readings of soils collected during a piping upgrade in July 1998 indicate that adsorbed petroleum compounds exist in the soils in the vicinity of the dispenser island. Measured VOC concentrations ranged from 0.2 to 42 ppm. The petroleum-contaminated soils at the Middlebury Citgo site are paved over, and are not readily accessible, reducing risk to potential receptors.



3. Three groundwater monitoring wells were installed at the Middlebury Citgo facility on January 28, 2000 to evaluate the degree and extent of subsurface petroleum contamination detected during the piping replacement inspection in July 1998. During monitoring well installation a maximum VOC concentration of 300 ppm was measured in a soil sample collected from MW00-3, at a depth of 10 to 12 feet below grade, approximately coincident with the water table. VOC concentrations measured with the PID in all other soil samples collected for screening did not exceed 11 ppm.
4. Water table elevation data collected on February 4, 2000 indicate that groundwater in the overburden aquifer beneath the site is flowing generally to the northeast at a hydraulic gradient of approximately 5%. The direction of groundwater flow is counter to the groundwater flow direction expected based on site topography and the proximity of the tributary to the Otter Creek along the perimeter of the site.
5. No free product was present in the monitoring wells sampled on February 4, 2000.
6. MTBE was detected in MW00-1 at a concentration exceeding the VGES. None of the other targeted petroleum constituents were detected in the sample collected from MW00-1.
7. None of the targeted petroleum constituents were detected in the groundwater sample collected from MW00-2.
8. Groundwater samples collected from the existing monitoring well, MWE-1, had low concentrations of select petroleum constituents. Benzene, 1,3,5-trimethyl benzene, and 1,2,4-trimethyl benzene were detected at concentrations exceeding VGES.
9. No receptors are believed to be at risk from low levels of subsurface petroleum contamination, based on currently available data.

V. RECOMMENDATIONS

Based upon the above conclusions, Griffin recommends that a confirmatory round of groundwater sampling be conducted at the site. The confirmatory sampling event should be scheduled for Spring, 2000 in order to confirm contaminant concentrations measured during the February, 2000 sampling event. The confirmatory round of sampling should also be conducted to confirm groundwater flow direction, which was not consistent with what was expected based on topography and the proximity of an adjacent stream. Following the confirmatory round of groundwater sampling recommendations for future monitoring or investigation at the site should be made.



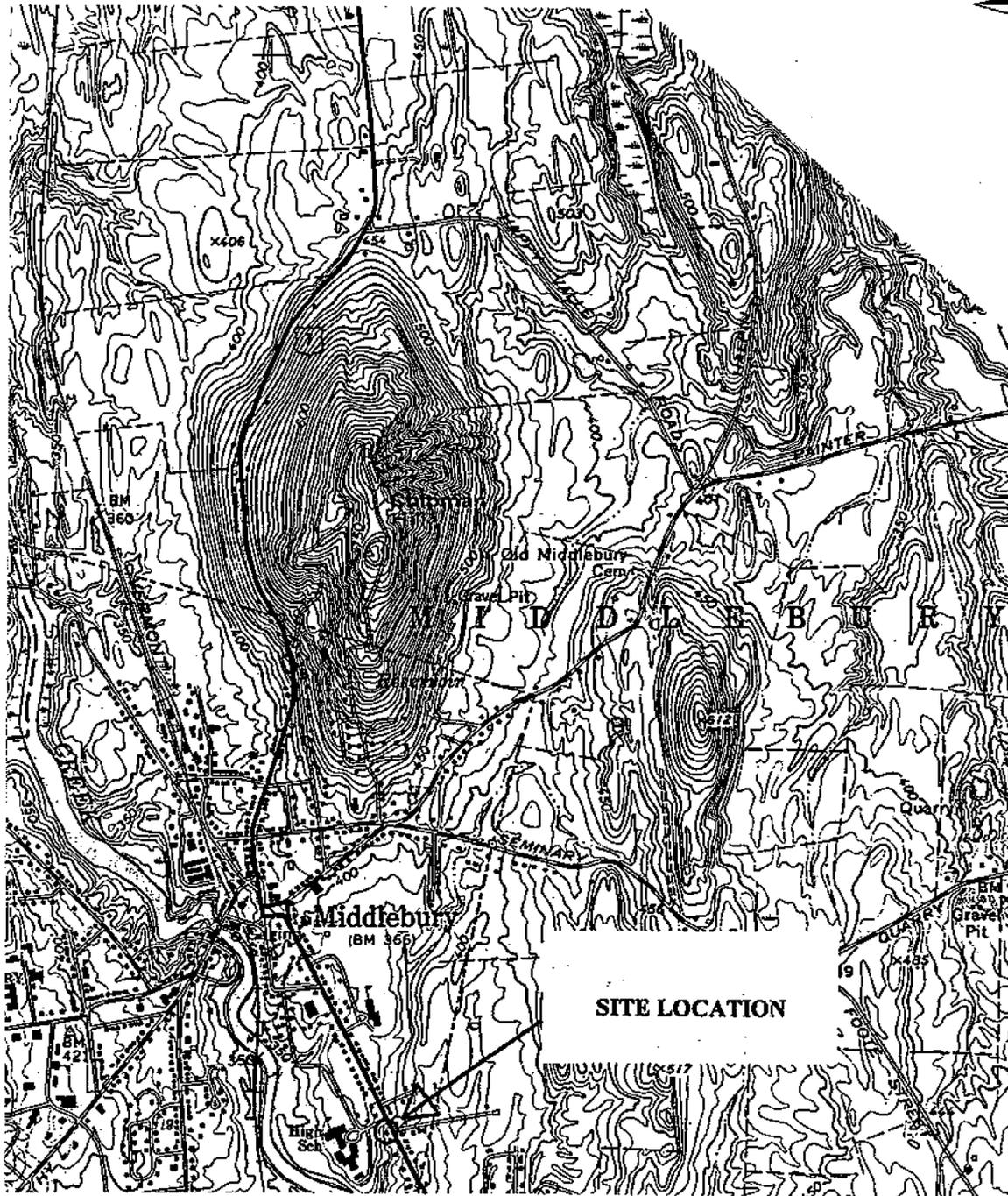
VI. REFERENCES

1. Griffin International, Inc. January 15, 1999. *Work Plan and Cost Estimate for Subsurface Investigation at Middlebury Citgo.*
2. Griffin International Inc., July 20, 1998. UST Closure Letter Report from Don Tourangeau to Susan Thayer (VTDEC) re: Piping Closure Inspection, Middlebury Citgo, UST Facility 1080.
3. Vermont Department of Environmental Conservation. August 1996. *Agency Guidelines for Contaminated Soils and Debris.*
4. Doll, Charles G., ed., 1970, *Surficial Geologic Map of Vermont*, State of Vermont.
5. Doll, Charles G., ed., 1961, *Centennial Geologic Map of Vermont*, State of Vermont.
6. USGS 7.5 Minute Topographic Quadrangle Map. 1963, photo-revised 1972. Middlebury, Vermont.
7. Werner, Dan, Town of Middlebury Public Works, December 16, 1999, telephone interview



APPENDIX A

Maps



Job #: 129941654



Middlebury Citgo

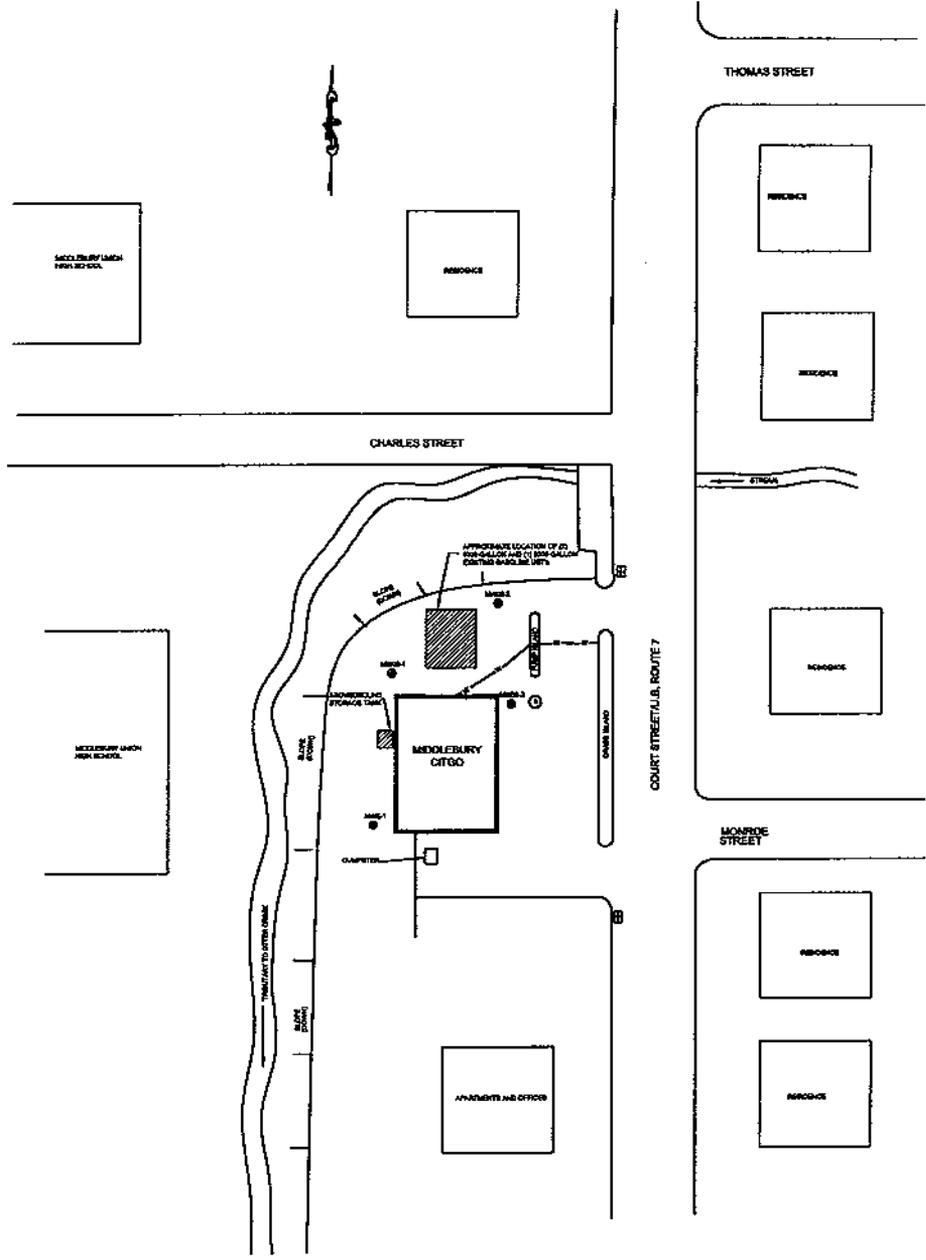
84 Court Street, Middlebury, Vermont

Site Location Map

Date:
4/12/2000

Source: USGS Middlebury, Vermont Quadrangle.
7.5-minute series. 1963, photoinspected 1972.

Scale:
1"=2000'



LEGEND

- MW00-2 MONITORING WELL
- SEWER MANHOLE
- CATCHBASIN
- WATER LINE

SOURCE: GRIFFIN FIELD SURVEY 1/28/00

JOB #: 128941654

VTDEC SITE # 98-2471



MIDDLEBURY CITGO

84 COURT STREET, MIDDLEBURY, VERMONT

AREA MAP

DATE: 4/13/00

DWG.#: 1

SCALE: NTS

DRN.: MP

APP.: BS

CHARLES STREET

STREAM

APPROXIMATE LOCATION OF (2) 8000-GALLON AND (1) 8000-GALLON EXISTING GASOLINE UST's

SLOPE (DOWN)

MW00-2
87.76'

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

COURT STREET/U.S. ROUTE 7

TRIBUTARY TO OTTER CREEK

SLOPE (DOWN)

ABOVEGROUND STORAGE TANK

MW00-1
90.21'

MIDDLEBURY CITGO

MW00-3
DRY

88.0'

88.5'

89.0'

89.5'

MWE-1
90.68'

DUMPSTER

90.0'

90.5'

MONROE STREET

LEGEND

-  MW00-2 MONITORING WELL WITH GROUNDWATER LEVEL ELEVATION (FT)
-  SEWER MANHOLE
-  CATCHBASIN
-  WATER LINE
-  90.0' GROUNDWATER ELEVATION CONTOUR (FT) (DASHED WHERE INFERRED)

SOURCE: GRIFFIN FIELD SURVEY 1/28/00

JOB #: 129941654

VTDEC SITE # 98-2471



MIDDLEBURY CITGO

84 COURT STREET, MIDDLEBURY, VERMONT

GROUNDWATER CONTOUR MAP

MEASURED 2/4/00

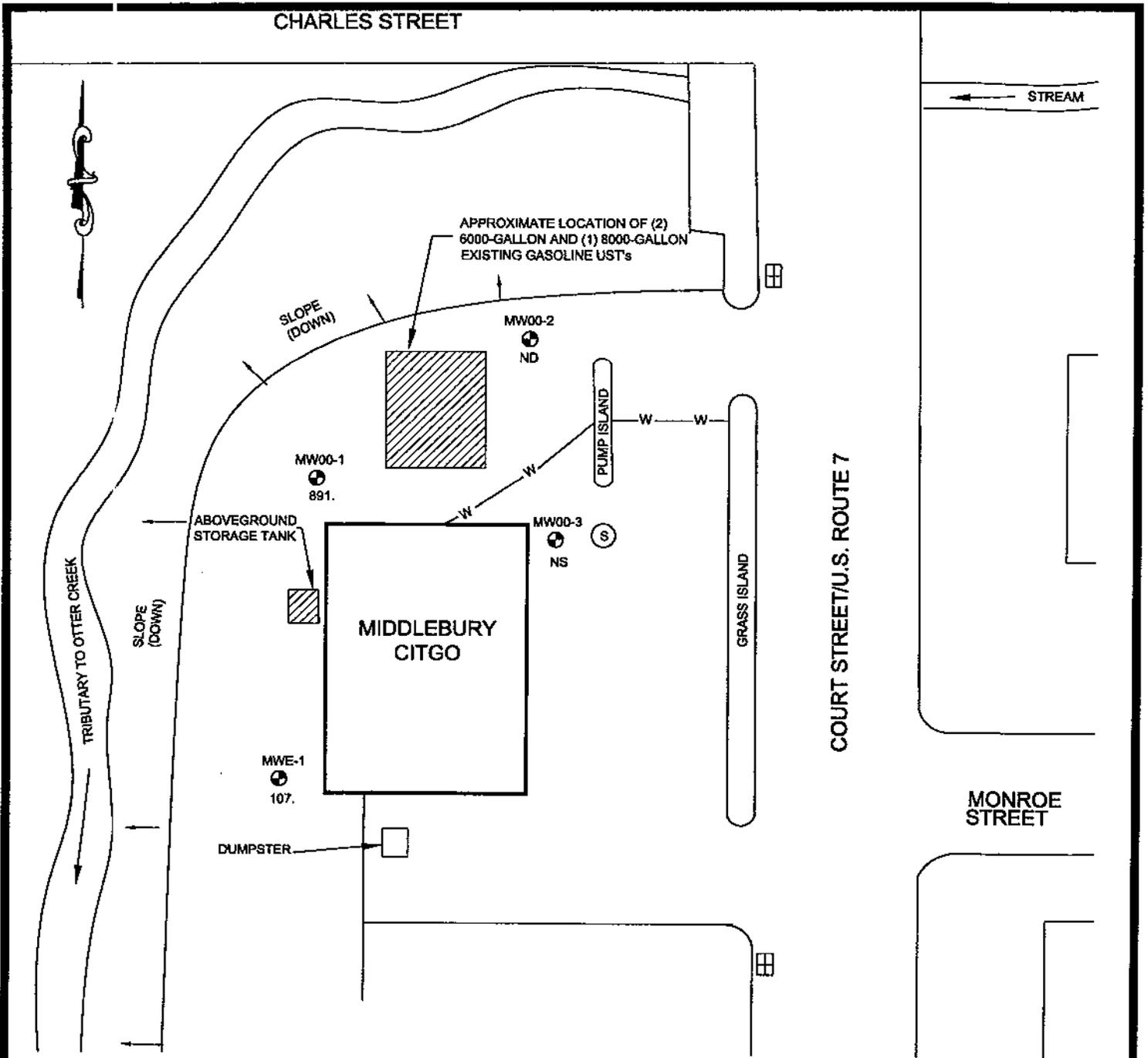
DATE: 4/13/00

DWG.#: 3

SCALE: 1" = 30'

DRN.: MP

APP.: BS



LEGEND

- MW00-2 ND: MONITORING WELL WITH VOC CONCENTRATION (ppb) (METHOD 8021B)
- ⊙: SEWER MANHOLE
- ⊞: CATCHBASIN
- - -: WATER LINE
- ND: NOT DETECTED
- NS: NOT SAMPLED

SOURCE: GRIFFIN FIELD SURVEY 1/28/00
 JOB #: 12E941654 VTDEC SITE # 98-2471



MIDDLEBURY CITGO

84 COURT STREET, MIDDLEBURY, VERMONT

CONTAMINANT CONCENTRATION MAP

SAMPLED 2/4/00

DATE: 4/13/00

DWG.#: 4

SCALE: 1" = 30'

DRN.: MP

APP.: BS



APPENDIX B

Boring Logs and Monitoring Well Construction Diagrams

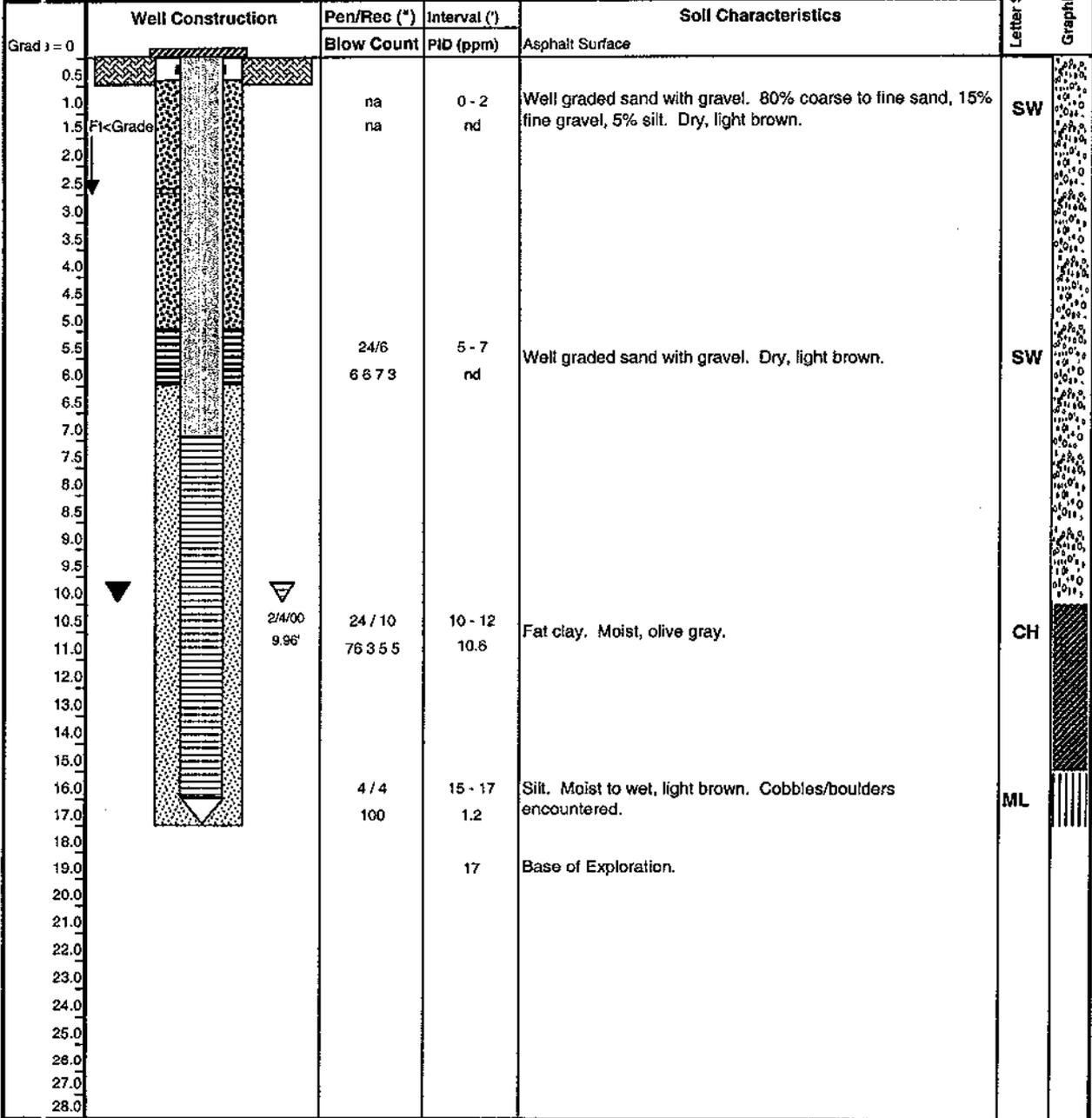
BORING LOG AND WELL CONSTRUCTION DIAGRAM

Well No: MW00-1



Middlebury Citgo
Middlebury, Vermont

Griffin Project #: 129941654	Date Installed: 01/28/2000	
Drilled by: Griffin International	Drilling Method: Hollow-stem auger	
Driller: T&K Drilling	Boring Diameter.: 4.25"	
Supervised by: EES	Development Method: Bailer	
Logged by: EES	Screened Length: 10 ft.	



Legend

<ul style="list-style-type: none"> Road Box with Bolt Down Cover, Set in Cement. Existing Surface. Bentonite Seal Placed in Annulus. Grade #1 Silica Sand Pack Placed in Annulus. Drill Cuttings Placed in Annulus. 	<ul style="list-style-type: none"> Locking Plug. 1.5" ID, Schedule 40 PVC Riser. 1.5" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen Plug Point Approximate Water Level During Drilling Static Water Level
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NA - Not Available

BORING LOG AND WELL CONSTRUCTION DIAGRAM

Well No: MW00-2



Middlebury Citgo
Middlebury, Vermont

Griffin Project #: 129941654	Date Installed: 01/28/2000
Drilled by: Griffin International	Drilling Method: Hollow-stem auger
Driller: T&K Drilling	Boring Diameter.: 4.25"
Supervised by: EES	Development Method: Bailer
Logged by: EES	Screened Length: 10 ft.

Grade = 0	Well Construction	Pen/Rec (")	Interval (')	Soil Characteristics	Letter Symbol	Graphic Symbol	
		Blow Count	PID (ppm)				
	Asphalt Surface						
0.5		na	0 - 2	Well graded sand. 90% coarse to fine sand, 5% coarse gravel, 5% silt. Dry, light brown.	SW		
1.0		na	nd				
1.5							
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5		24 / 11	5 - 7	Well graded sand with gravel. 80% medium to fine sand, 15% fine gravel, 5% silt. Dry, light brown.	SW		
6.0	6 3 4 7	0.1					
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							
10.5		24 / 17	10 - 12	Fat clay. 100% clay. Moist, olive gray and light brown.	CH		
11.0	4 7 7 9	0.1					
11.5							
12.0							
13.0							
14.0							
15.0							
16.0							
17.0							
18.0							
19.0							
20.0							
21.0							
22.0							
23.0							
24.0							
25.0							
26.0							
27.0							
28.0							

Legend

- | | |
|---|---|
| <ul style="list-style-type: none"> Road Box with Bolt Down Cover, Set in Cement. Existing Surface. Bentonite Seal Placed in Annulus. Grade #1 Silica Sand Pack Placed in Annulus. Drill Cuttings Placed in Annulus. <p>NA - Not Available</p> | <ul style="list-style-type: none"> Locking Plug. 1.5" ID, Schedule 40 PVC Riser. 1.5" ID, Schedule 40 PVC, 0.010" Slotted Well Screen Plug Point Approximate Water Level During Drilling Static Water Level |
|---|---|

BORING LOG AND WELL CONSTRUCTION DIAGRAM

Well No: MW00-3



Middlebury Citgo
Middlebury, Vermont

Griffin Project #: 129941654	Date Installed: 01/28/2000	
Drilled by: Griffin International	Drilling Method: Hollow-stem auger	
Driller: T&K Drilling	Boring Diameter: 4.25"	
Supervised by: EES	Development Method: Bailer	
Logged by: EES	Screened Length: 7 ft.	

Gr. de = 0	Well Construction	Pen/Rec (*)	Interval (')	Soil Characteristics	Letter Symbol	Graphic Symbol
		Blow Count	PID (ppm)			
0.5	Asphalt Surface					
1.0		na	0 - 2	Well graded sand. 90% fine to medium sand, 5% fine gravel, 5% silt. Dry, light brown.	SW	
1.5	Ft < Grade	na	0.2			
2.0						
2.5						
3.0						
3.5						
4.0						
4.5						
5.0						
5.5		24 / 18	5 - 7	Well graded sand with gravel. 80% fine to medium sand, 20% fine gravel. Dry, light brown.	SW	
6.0		3 5 8 12	not recorded			
6.5						
7.0						
7.5						
8.0						
8.5						
9.0						
9.5						
10.0						
10.5	▼	12 / 9	10 - 12	Fat clay. 100% clay. Moist to wet, olive gray.	CH	
11.0	▼	4 100	300			
12.0						
13.0						
14.0						
15.0						
16.0						
17.0						
18.0						
19.0						
20.0						
21.0						
22.0						
23.0						
24.0						
25.0						
26.0						
27.0						
28.0						

Legend

<ul style="list-style-type: none"> Road Box with Bolt Down Cover, Set in Cement. Existing Surface. Bentonite Seal Placed in Annulus. Grade #1 Silica Sand Pack Placed in Annulus. Drill Cuttings Placed in Annulus. <p>NA - Not Available</p>	<ul style="list-style-type: none"> Locking Plug. 1.5" ID, Schedule 40 PVC Riser. 1.5" ID, Schedule 40 PVC, 0.010" Slotted Well Screen Plug Point Approximate Water Level During Drilling Static Water Level
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APPENDIX C
Liquid Level Monitoring Data

Summary of Liquid Level Data

Measurement Date: February 4, 2000

Well I.D.	Well Depth btoc	Top of Casing Elevation	Depth To Product btoc	Depth To Water btoc	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-001	16.6	100.17	-	9.96	-	-	-	-	90.21
MW-002	13.3	99.14	-	11.38	-	-	-	-	87.76
MW-003	10.2	100.00	-	dry	-	-	-	-	dry
MWE-1	14.0	102.33	-	11.65	-	-	-	-	90.68

All Values Reported in Feet

btoc - Below Top of Casing

nm - not measured

Monitoring wells surveyed by Griffin International January 28, 2000

Elevations determined relative to top of casing of MW3, which was arbitrarily set at 100'



APPENDIX D

Groundwater Quality Summary Data

Groundwater Quality Summary

Sample Date: February 4, 2000

PARAMETER	MW00-1	MW00-2	MW00-3	MWE-1	VGES
Benzene	ND(20)	ND(1)	Well	16.4	5
Toluene	ND(20)	ND(1)	Dry	3.5	1,000
Ethylbenzene	ND(20)	ND(1)	No Sample	9.4	700
Xylenes	ND(20)	ND(1)	Collected	31.0	10,000
Total BTEX	ND	ND		60.3	-
1,3,5 Trimethyl Benzene	ND(20)	ND(1)		8.5	4
1,2,4 Trimethyl Benzene	ND(20)	ND(1)		16.8	5
Naphthalene	ND(20)	ND(1)		9.5	20
MTBE	891.	ND(10)		12.3	40
Total Targeted VOCs	891.	ND		107.	-

TBQ(): Trace below quantitation limit (quantitation limit)

ND(): Not detected (detection limit)

NT: Not tested

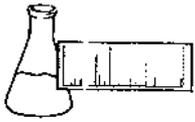
All values in ug/L (ppb) unless noted.

Analysis by EPA Method 8021B

VGES = Vermont Groundwater Enforcement Standards (Vermont Groundwater Protection Rule and Strategy, 1/20/00)



APPENDIX E
Laboratory Analysis Reports



ENDYNE, INC.

Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Middlebury Citgo
REPORT DATE: February 14, 2000
DATE SAMPLED: February 4, 2000

ORDER ID: 5884
REF.#: 150,307 - 150,311

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

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

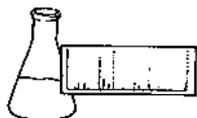
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

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

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures



ENDYNE, INC.

Laboratory Services

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

EPA METHOD 8021B--PURGEABLE AROMATICS

CLIENT: Griffin International

DATE RECEIVED: February 7, 2000

PROJECT NAME: Middlebury Citgo

REPORT DATE: February 14, 2000

CLIENT PROJ. #: 129941654

ORDER ID: 5884

Ref. #:	150,307	150,308	150,309	150,310	150,311
Site:	Trip Blank	MWE 1	MW00 1	Duplicate	MW00 2
Date Sampled:	2/4/00	2/4/00	2/4/00	2/4/00	2/4/00
Time Sampled:	7:08	13:00	13:05	13:05	13:10
Sampler:	DT/JR	DT/JR	DT/JR	DT/JR	DT/JR
Date Analyzed:	2/12/00	2/14/00	2/12/00	2/14/00	2/12/00
UIP Count:	0	>10	0	0	0
Dil. Factor (%):	100	100	5	5	100
Surr % Rec. (%):	101	108	106	122	0
Parameter	Conc. (ug/L)				
MTBE	<10	12.3	891.	912.	<10
Benzene	<1	16.4	<20	<20	<1
Toluene	<1	3.5	<20	<20	<1
Ethylbenzene	<1	9.4	<20	<20	<1
Xylenes	<1	31.0	<20	<20	<1
1,3,5 Trimethyl Benzene	<1	8.5	<20	<20	<1
1,2,4 Trimethyl Benzene	<1	16.8	<20	<20	<1
Naphthalene	<1	9.5	<20	<20	<1

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



ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

34817

179911654

Project Name: <i>10/10/07 10/10/07</i>		Reporting Address: <i>600 10/10/07</i>		Billing Address: <i>600 10/10/07</i>	
Endyne Order ID:	-O	Company:		Sampler Name: <i>Tom S. [unclear]</i>	
(Lab Use Only)	-I	Contact Name/Phone #: <i>Bob [unclear]</i>		Phone #: <i>802 879 4333</i>	
	-S				

Ref # (Lab Use Only)	Sample Identification	Matrix	GRA	COM	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
	<i>7/1/07 BLANK</i>	<i>H₂O</i>	<i>X</i>		<i>07:03</i>	<i>2</i>	<i>40mL</i>		<i>17</i>	<i>11°C</i>	
	<i>11/1/07-1</i>	<i>↓</i>	<i>↓</i>		<i>17:00</i>	<i>↓</i>	<i>↓</i>		<i>↓</i>	<i>↓</i>	
	<i>11/1/07-1</i>	<i>↓</i>	<i>↓</i>		<i>18:05</i>	<i>↓</i>	<i>↓</i>		<i>↓</i>	<i>↓</i>	
	<i>11/1/07-2</i>	<i>↓</i>	<i>↓</i>		<i>18:05</i>	<i>↓</i>	<i>↓</i>		<i>↓</i>	<i>↓</i>	
	<i>11/1/07-2</i>	<i>↓</i>	<i>↓</i>		<i>18:10</i>	<i>↓</i>	<i>↓</i>		<i>↓</i>	<i>↓</i>	

Relinquished by: <i>[Signature]</i>	Date/Time: <i>2/10/08 12:00</i>	Received by: <i>[Signature]</i>	Date/Time: <i>2-7-08 10:30 AM</i>	Received by: <i>[Signature]</i>	Date/Time: <i>[Blank]</i>
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New York State Project: Yes No Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	PP13 Metals
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	RCRAS Metals
4	Nitrite N	9	BOD	14	Turbidity	19	8021B	24	8260/8260B	29	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	8010/8020	25	8270 B/N or Acid	30	
31	Metals (As Is, Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Si, Sr, Ti, Tl, V, Zn										
32	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)					33					
34	Other										