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July 31, 1997

Mr. John Schmeltzer  
Vermont ANR/DEC  
Waste Management Division  
103 South Main St. /West Building  
Waterbury, VT 05671-0404

RE: Initial Investigation of Subsurface Petroleum Contamination at Johnson's Fuel Service  
Bennington, Vermont (VTDEC Site #97-2152)

Dear Mr. Schmeltzer:

Enclosed please find the summary report for the site investigation conducted at Johnson's Fuel Service in Bennington.

We have been informed by Johnson's Fuels that all future correspondence regarding this site should be directed to:

Mr. Walt Freed  
Apollo Fuels, Inc.  
RR2 Box 278A  
North Clarendon, VT 05759

Please contact me if you have any questions or comments.

Sincerely,

Christine Ward  
Hydrogeologist

Enclosure

c.: Mr. Walt Freed  
Mr. Clifford Salsburg, w/o enc.  
GI#4974992

**INITIAL INVESTIGATION OF  
SUBSURFACE PETROLEUM  
CONTAMINATION REPORT**

**JOHNSON'S FUEL SERVICE  
99 NORTHSIDE DRIVE  
BENNINGTON, VERMONT**

(VT DEC SITE #97-2152)  
GI #4974992

July 1997

*Prepared for*

JOHNSON'S FUEL SERVICE  
268 BENMONT AVENUE  
BENNINGTON, VT 05201

*Prepared by*



P.O. Box 943  
Williston, Vermont 05495  
(802) 865-4288

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## I. INTRODUCTION

This report summarizes the investigation of subsurface petroleum contamination at the Johnson's Fuel Service on Northside Drive in Bennington, Vermont. This work was requested by Mr. Chuck Schwer of the Vermont Department of Environmental Conservation (VTDEC) in a letter to Mr. Clifford Salsburg of Johnson's Fuels dated March 27, 1997. This work was performed in accordance with the April 14, 1997, *Work Plan and Cost Estimate for Site Investigation of Suspected Petroleum Contamination* for the site prepared by Griffin. The work plan was approved by the VTDEC in a letter from Mr. John Schmeltzer to Mr. Clifford Salsburg dated April 28, 1997.

## II. SITE BACKGROUND

### A. Site Description

The Johnson's Fuel site is approximately 1.58 acres, and is located on the eastern side of Northside Drive (old Route 7) in Bennington, Vermont.

The attendant booth is approximately 15 feet by 20 feet in size, and is constructed on a concrete slab on grade foundation. There are three gasoline dispensing islands south of the attendant booth, one gasoline dispensing island to west of the booth, and one diesel dispensing island north of the booth. There is a kerosene dispenser pump immediately south of the booth. There are five underground storage tanks (USTs) directly behind the attendant booth; three 8,000-gallon gasoline, one 3,000-gallon kerosene, and one 4,000-gallon diesel. The USTs are constructed of double wall steel with cathodic protection and painted coating. There are three above ground bulk storage tanks, two for No. 2 fuel oil and one for kerosene, located on the northern side of the property surrounded by an earthen berm. There is a propane above ground bulk storage tank near the southeast corner of the property.

The subject property is bounded to the north by Roaring Branch. The property is bounded to the east by railroad tracks, and approximately 150 feet east of the railroad tracks is Route 7. The area between the railroad tracks and the highway is vegetated with shrubby trees. The property is bounded to the south by an unused section of the old Route 7, and a Mobil station on the other side of the road. The property is bounded to the west by Northside Drive. Budget Auto Sales is located on the west side of Northside Drive. Both the Budget Auto Sales building and the Mobil station are slab on grade construction. West of Budget Auto Sales is the Walloomsac River. The entire area is served by municipal water and sewer, however the Johnson's Fuels Service attendant booth is on a private septic system.

## **B. Site History**

The five on-site USTs were installed in 1990. In November 1996, excavations were conducted around the three gasoline USTs to install leak detection and spill containment systems. Approximately 100 cubic yards of contaminated soil from this excavation were stockpiled on-site near the northeast corner of the property (MSK, 1996). This polyencapsulated soil stockpile has been covered with additional clean soil and seeded, and is now an extension of the earthen berm which surrounds the fuel oil and kerosene bulk storage tanks (Salsburg, personal communication).

In March 1997, the piping to the western gasoline dispenser island was excavated. Soil samples collected from the west side of the dispenser were screened for volatile organic compounds (VOCs) using a photo ionizing detector (PID). VOC concentrations ranged from 200 to 300 ppm. VOC concentrations from the soils in the piping trenches ranged from 0 to 15 ppm. Contaminated soil near the pump island was excavated to a depth of four feet (General Estimate, 1997). Approximately 25 cubic yards of contaminated soil from this excavation were stockpiled on-site southeast of the station.

As a result of the petroleum contamination detected in the subsurface, the VTDEC requested that additional work be conducted at the site in order to determine the extent and degree of petroleum contamination to the soil.

## **C. Site Geology**

According to the Surficial Geologic Map of Vermont (Doll, 1970), the site is underlain by glaciofluvial outwash gravel. Bedrock below the site is mapped as Monkton quartzite (Doll, 1961).

# **III. INVESTIGATIVE PROCEDURES**

To further define the extent of subsurface petroleum at Johnson's Fuel Service, the following investigative tasks were undertaken: soil borings; monitoring well installations; and groundwater sample collection and analyses for petroleum related constituents.

## **A. Monitoring Well Installation**

Four monitoring wells were installed on May 28, 1997, by Tri State Drilling and Boring of West Burke, Vermont, under the direct supervision of a Griffin hydrogeologist. The wells were installed using a truck mounted drill rig equipped with 4 inch ODEX. The

soil boring logs and monitoring well as-built specifications are presented in Appendix B. The monitoring well locations are indicated on the Site Sketch (Appendix A).

Monitoring wells MW-1, MW-2, and MW-3 were installed north of the USTs and the fuel dispenser island. Monitoring well MW-4 was installed west of the western gasoline dispenser island. The original work plan had proposed four monitoring well locations: one presumed upgradient monitoring well location southeast of the USTs and dispenser islands, two presumed downgradient well locations north of the USTs and dispenser islands, and one presumed downgradient well location immediately west of the western dispenser island. To better characterize groundwater flow directions and potential contaminant plume flow, the proposed upgradient monitoring well location was moved to a downgradient location. This move was discussed in the work plan approval letter from Mr. John Schmeltzer (VTDEC) to Mr. Clifford Salsburg (Johnson's Fuels Service) dated April 28, 1997.

The location for monitoring well MW-4 was in the Town of Bennington right of way for the old Route 7. A representative from the Bennington Public Works department, present at the site on May 28, 1997, granted permission to install the monitoring well in the right of way.

Underground utilities run along the eastern edge of Northside Drive. Additionally, it appears that the stormwater sewer runs near the eastern edge of Northside Drive and discharges to Roaring Branch near the east side of the bridge.

Soil samples, collected from the drill cuttings, were logged by the supervising hydrogeologist and screened for the presence of VOCs using an HNu™ systems Model PI-101 photo ionizing detector (PID). Prior to screening, the PID was calibrated with isobutylene with reference made to benzene. Soils were screened using the Griffin Jar/Polyethylene Bag Headspace Screening Protocol, which conforms to state and industry standards.

Soils encountered during drilling were predominantly gravel and sand. Silt and fine sand was encountered in the boring for MW-2 from 5 to 10 feet below grade. Moderate levels of VOCs, 20 to 50 parts per million (ppm), were detected in the groundwater saturated zone in the borings for MW-1 and MW-3. Lower levels of VOCs, 0.2 to 5 ppm, were detected in the soils from the borings for MW-2 and MW-4. During drilling, the water table was encountered at approximately 8 feet below grade.

The monitoring wells were constructed of two inch diameter, 0.010" slot, PVC well screen and attached solid PVC riser. The annulus between the borehole wall and the screened section of each well was filled with sand pack to filter fine sediments in groundwater from entering the well. Approximately one foot above the screened section of each well, the annulus between the borehole wall and the riser was filled with a one foot bentonite clay seal to prevent surface water from entering the borehole. The wells

were protected at the surface by a flush mounted steel well head protective casing and a bolt down cover. The well head protection casings were set in bentonite so that they could be raised to slightly below grade during the scheduled repaving. Well construction details are listed on the well logs in Appendix B. The monitoring wells were developed immediately following installation by bailing.

## **B. Groundwater Flow Direction and Gradient**

Water table elevation measurements were collected from all four monitoring wells prior to sampling on June 4, 1997. The top of casing elevations were determined relative to MW-2, which was arbitrarily set at 100 feet. The depth to water in each well was subtracted from the top of casing elevation to obtain the relative water table elevation in each well. Water level data are presented in Appendix C.

Water table elevations have been plotted and contoured to illustrate the estimated gradient and direction of groundwater flow beneath the site (see Groundwater Contour Map, Appendix A). According to these data, it appears that the on-site groundwater flow is generally to the north at a shallow hydraulic gradient of 1.4%. This flow direction is toward the Roaring Branch of the Walloomsac River.

## **C. Groundwater Sampling and Analyses**

Griffin collected groundwater samples at the site from MW1, MW2, MW3, and MW4 during the site visit on June 4, 1997. Groundwater samples were analyzed by Endyne, Inc. of Williston, Vermont, by EPA Method 602 for the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl tertiary butyl ether (MTBE). Results of the laboratory analyses for the monitoring wells are summarized in Appendix D. The laboratory analysis report is also in Appendix D. Analytical results of the trip blank and duplicate samples indicate that adequate quality assurance and control were maintained during sample collection and analysis.

Analysis of the groundwater sample collected from MW-1 indicates a concentration of benzene exceeding the groundwater standard for this compound. A low concentration of xylenes, below the groundwater standard for this group compounds, was also detected in the groundwater sample from MW-1.

A very low concentration of xylenes and a trace concentration of MTBE, below their respective groundwater standards, were detected in the groundwater sample collected from MW-2.

Analysis of the groundwater sample collected from MW-3 indicates concentrations of benzene, and MTBE exceeding their respective groundwater standards. Concentrations

of ethylbenzene, toluene, and xylenes, below the groundwater standards for these compounds, were also detected in the groundwater sample from MW-3.

Analysis of the groundwater sample collected from MW-4 indicates concentrations of benzene, xylenes, and MTBE exceeding their respective groundwater standards. Concentrations of ethylbenzene and toluene, below the groundwater standards for these compounds, were also detected in the groundwater sample from MW-4.

The Total BTEX Distribution Map (Appendix A) shows relatively low levels of contamination in the vicinity of the USTs and the dispenser island, with the higher concentrations in close proximity to the western gasoline dispenser island.

The MTBE Distribution Map (Appendix A) shows a plume in close proximity to the western fuel dispenser island extending northward, with very little lateral migration eastward.

#### **D. Sensitive Receptor Survey**

A receptor risk assessment was conducted to identify known and potential receptors of the contamination detected at Johnson's Fuel Service. A visual survey was conducted on May 28, 1997. Based on these observations, a determination of the potential risk to identified receptors was conducted.

The entire area is served by municipal water. No public or private water supply wells were observed in the vicinity of the Johnson's Fuel Service site.

The nearest surface water is the Roaring Branch located approximately 100 feet north of the site. The Walloomsac River is approximately 300 feet west-northwest of the site. During the site inspection on May 28, 1997, no evidence of petroleum stains or sheens were observed along the southern bank of Roaring Branch or along the eastern bank of the Walloomsac River.

The only building located in close proximity to the on-site USTs systems is the Johnson's Fuels Service attendant booth. The attendant booth is slab on grade construction with no basement and the surrounding area is paved parking. Thus the potential impact to this building from petroleum vapors is considered minimal.

#### **IV. SOIL STOCKPILE SCREENING**

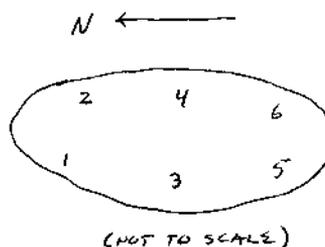
Approximately 25 cubic yards of petroleum contaminated soils resulting from the excavation around the western gasoline dispenser island in March 1997, have been

polyencapsulated and stockpiled on site. It is presently planned to maintain the soils on site until they naturally attenuate to acceptable levels of contamination which will allow their return to unrestricted on-site use.

The soil stockpile is located southeast of the attendant booth. The routine screening of these soils for VOCs is being conducted by Griffin on an annual basis. These soils were screened by Griffin for the first time on June 4, 1997.

A total of six discrete soil samples were collected with a hand auger from the stockpile. Each sample was screened for VOCs using a PID in accordance with Griffin's Jar/Polyethylene Bag Headspace Analysis Protocol, which conforms to state and industry standards. Soil screening results are summarized in the table below, with the approximate locations of the samples shown on the sketch.

Sample #	PID Reading (ppm)
1	>220
2	180
3	>220
4	140
5	>220
6	>220



These PID readings indicate that elevated VOC concentrations are still present within the stockpiled soils.

The 100 cubic yard soil stockpile, resulting from the excavation around the gasoline USTs in November 1996, is inaccessible for sampling due to the clean soil and grass on top of the plastic sheeting.

## V. CONCLUSIONS

Based on the results of this initial site investigation, Griffin presents the following conclusions:

1. There was a release(s) of petroleum to the subsurface from the UST systems. The nature of the release and the total volume of the release(s) are unknown.
2. The groundwater flow beneath the site is estimated to be to the north at a shallow hydraulic gradient of 1.4%. On June 4, 1997, the depth to groundwater at the site was approximately 9 feet below grade.
3. Adsorbed petroleum contamination is present in site soils above the water table.

4. Dissolved petroleum contamination was detected in groundwater at the site. It is expected that the level of contamination in the groundwater will decrease over time due to natural mitigative processes in the absence of future releases from the UST systems.
5. Free product was not detected in any of the monitoring wells.
6. A leak detection and spill containment system have recently been added to the USTs. The piping and the western gasoline dispenser island have recently been replaced.
7. Contaminated soils from around the USTs and the western dispenser island have been removed from the subsurface and stockpiled on site.
8. Based on a survey of known potential sensitive receptors in the vicinity of the site and given the estimated shallow groundwater flow direction, the Roaring Branch is potentially at risk from the petroleum contamination detected at Johnson's Fuel Service. Relatively low levels of petroleum contamination were detected in downgradient monitoring wells located approximately 120 feet distant from Roaring Branch. However no evidence of petroleum contamination was observed along the southern bank of Roaring Branch.

## VI. RECOMMENDATIONS

Since petroleum compounds were detected in the groundwater at levels above the applicable groundwater standards, Griffin recommends that a confirmatory round of sampling be conducted. The four on-site monitoring wells should be sampled and analyzed for petroleum related compounds via EPA Method 602. The next sampling event should be scheduled for early September 1997, when groundwater levels are expected to be lower. This sampling will help identify any seasonal trends in groundwater quality. Recommendations regarding future sampling will be made based on the results of the September sampling event.

The soil stockpile should continue to be screened on an annual basis. The next sampling event should be scheduled for June of 1998. Annual stockpile soil screening will continue until contaminant levels decrease to nondetectable levels (<1 ppm) and there is no remaining evidence (olfactory or visual) of petroleum contamination. At that time, in accordance with VTDEC guidelines (August 1996), the soils can then be thin spread on-site, with VTDEC approval.

The roadboxes for the on-site wells should be asphalted in place once they have been raised during the site repaving. This work is scheduled to be done by Johnson's Fuels personnel.

## REFERENCES

Doll, Charles G., ed. 1961. *Centennial Geologic Map of Vermont*, State of Vermont.

Doll, Charles G., ed. 1970. *Surficial Geologic Map of Vermont*, State of Vermont.

General Estimate. March 21, 1997. *Preliminary Site Assessment*. Hoosick Falls, NY.

MSK Engineering and Design, Inc. December 23, 1996. *Preliminary Site Investigation for Johnson's Fuel Service, Northside Drive, Bennington, VT*. Bennington, VT.

**APPENDIX A**

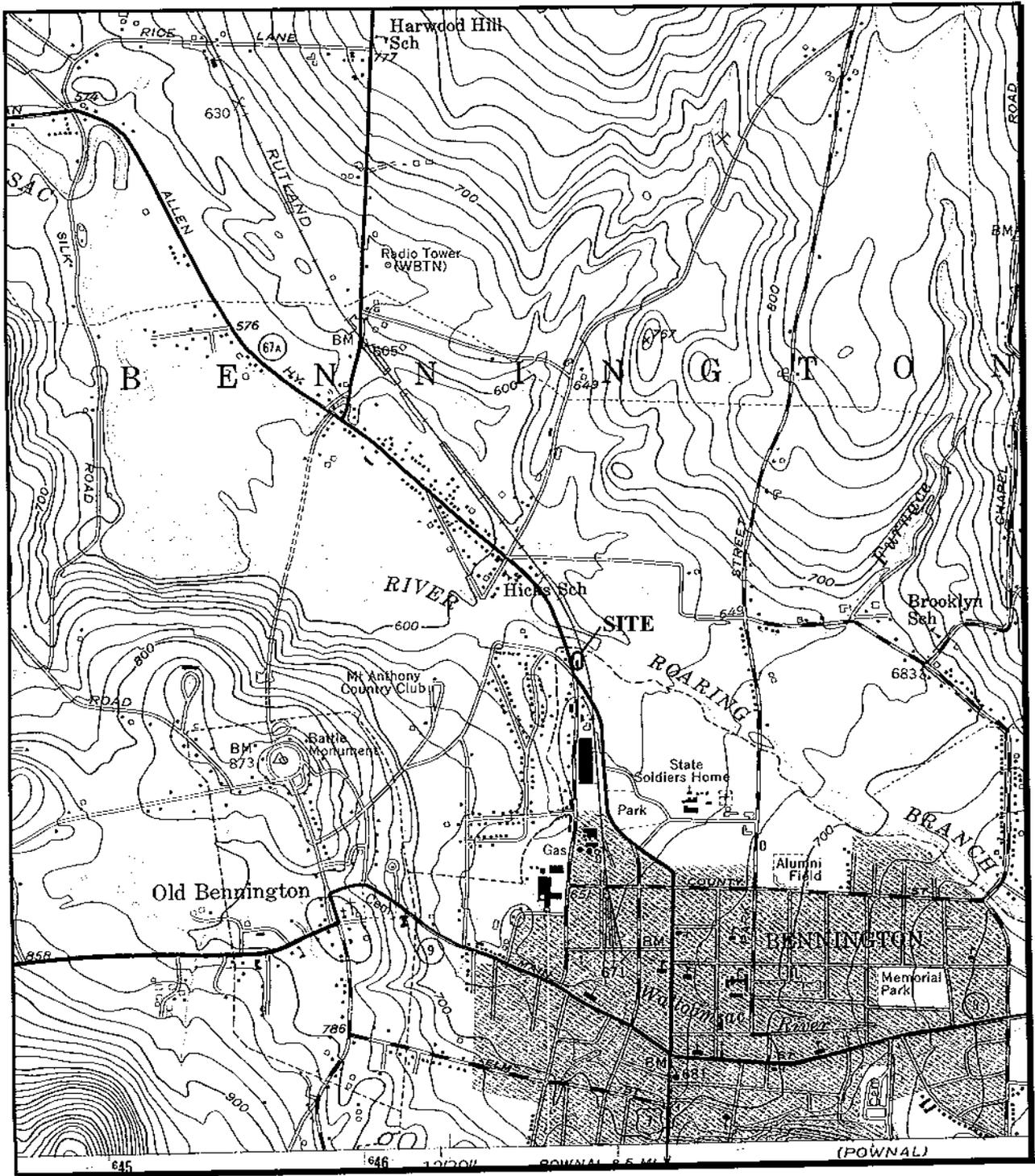
**Site Location Map**

**Site Sketch**

**Groundwater Contour Map**

**Total BTEX Distribution Map**

**MTBE Distribution Map**



**SITE LOCATION MAP**

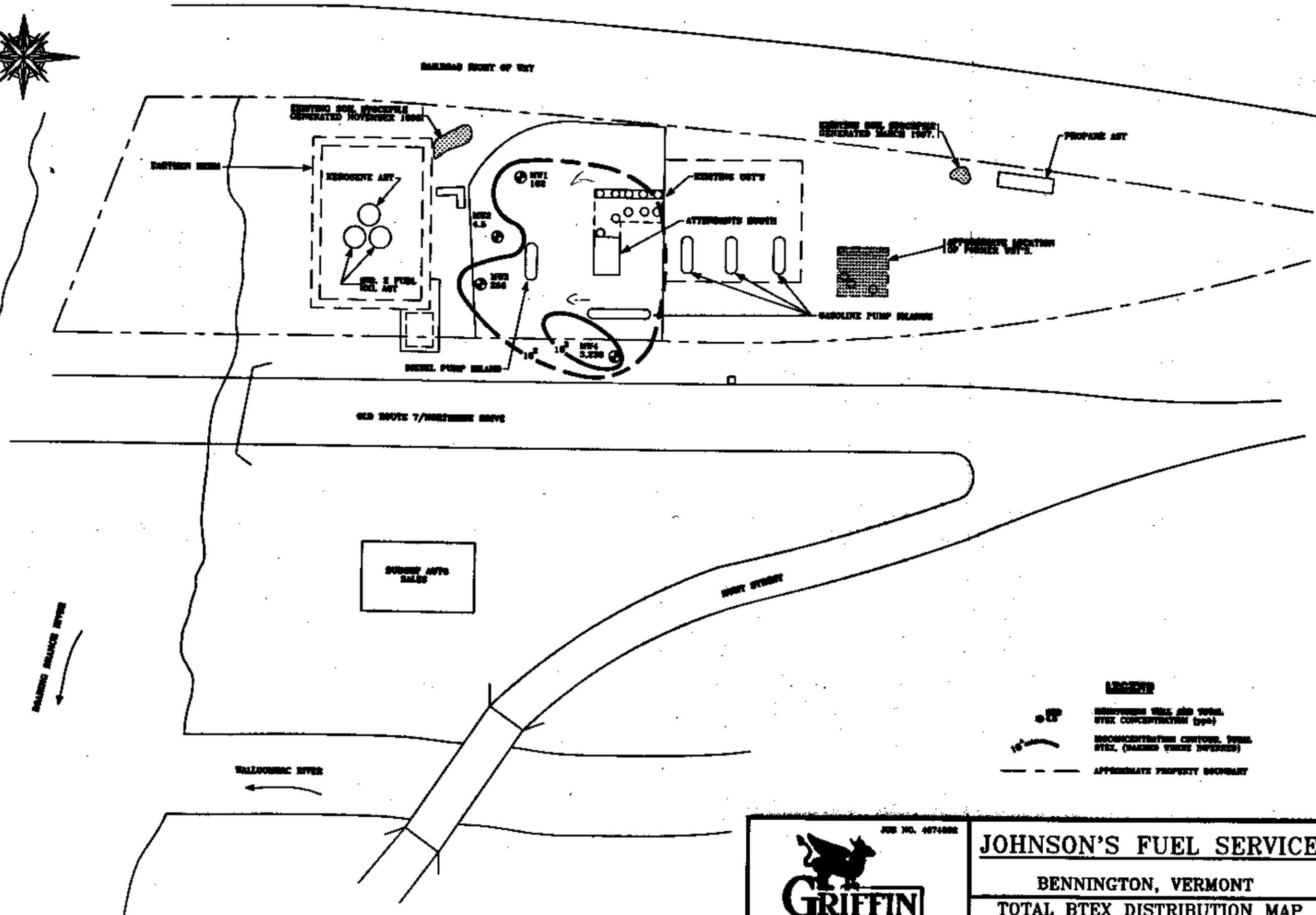
**JOHNSON'S FUEL SERVICE  
BENNINGTON, VERMONT**

Base Map: USGS 7.5 minute Bennington, VT quadrangle, 1954

Scale: 1:24000







**LEGEND**

- MONITORING WELL AND TOTAL BTEX CONCENTRATION (ppb)
- ISOCENTRATION CONTOUR, FUEL SPILL, (SHADED WHERE INFERRRED)
- APPROXIMATE PROPERTY BOUNDARY

NOTE: SITE SKETCH DRAWN FROM EXISTING SITE MAP BY MAURICE WINN DATED FEBRUARY 1988, AND SURVEY DATA, AND OBSERVATIONS BY GRIFFIN INTERNATIONAL, INC.



<b>JOHNSON'S FUEL SERVICE</b>			
BENNINGTON, VERMONT			
TOTAL BTEX DISTRIBUTION MAP			
SAMPLE DATE: 6/4/97			
DATE: 6/27/97	DWG. #: 2	SCALE: 1"=50'	DEN.: SJB APP.: CW



**APPENDIX B**

**Soil Logs and Monitoring Well Specifications**

PROJECT JOHNSON'S FUEL SERVICE

LOCATION BENNINGTON, VERMONT

DATE DRILLED 5/28/97 TOTAL DEPTH OF HOLE 17.0'

DIAMETER \_\_\_\_\_

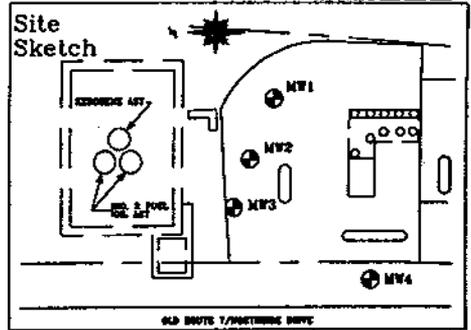
SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 5.5' TYPE sch 40 pvc

DRILLING CO. TRI-STATE DRILLING METHOD ODEX

DRILLER T. FAULKNER LOG BY C. WARD

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 LOCKING WELL CAP			0
1		BENTONITE			1
2		NATIVE BACKFILL			2
3		WELL RISER			3
4		BENTONITE	4'-5' 0.4 ppm	Brown SAND, some fine gravel, little silt, dry to damp.	4
5					5
6				Brown/gray, SAND and fine GRAVEL, little silt, damp to moist, petroleum odor.	6
7			5'-10' 30 ppm		7
8				8.0' WATER TABLE	8
9		SAND PACK			9
10					10
11		WELL SCREEN	10'-15' 20 ppm	Brown/gray, fine to medium GRAVEL, some sand, trace silt, wet, gravel subrounded to angular.	11
12					12
13					13
14					14
15		BOTTOM CAP			15
16			16'-17' 30 ppm		16
17		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 16' END OF EXPLORATION AT 17'	17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT JOHNSON'S FUEL SERVICE

LOCATION BENNINGTON, VERMONT

DATE DRILLED 5/28/97 TOTAL DEPTH OF HOLE 15.0'

DIAMETER \_\_\_\_\_

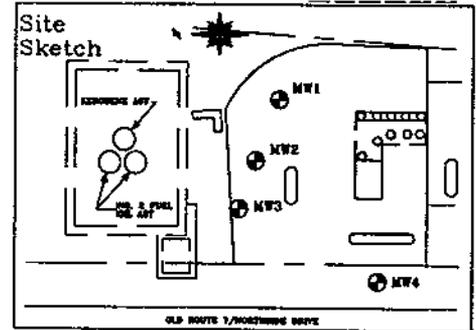
SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 4.5' TYPE sch 40 pvc

DRILLING CO. TRI-STATE DRILLING METHOD ODEX

DRILLER T. FAULKNER LOG BY C. WARD

WELL NUMBER MW2



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
1		BENTONITE			1
2		NATIVE BACKFILL			2
3		WELL RISER	0'-5'	Brown SAND, some gravel, some silt, damp.	3
4		BENTONITE	0.2 ppm		4
5					5
6				Brown, fine SAND, and SILT, trace gravel, wet.	6
7			5'-10'		7
8			5 ppm	8.0' WATER TABLE	8
9		SAND PACK			9
10					10
11		WELL SCREEN			11
12			10'-15'	Brown SAND and GRAVEL, angular, wet.	12
13			5 ppm		13
14		BOTTOM CAP			14
15		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 15'	15
16				END OF EXPLORATION AT 15'	16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT JOHNSON'S FUEL SERVICE

LOCATION BENNINGTON, VERMONT

DATE DRILLED 5/28/97 TOTAL DEPTH OF HOLE 14.0'

DIAMETER \_\_\_\_\_

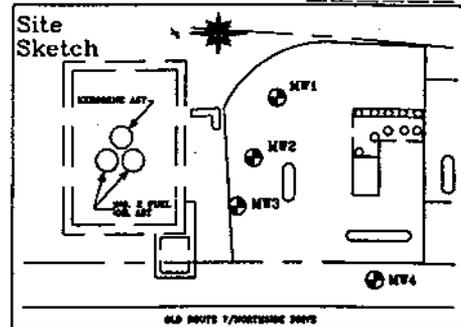
SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 2.5' TYPE sch 40 pvc

DRILLING CO. TRI-STATE DRILLING METHOD ODEX

DRILLER T. FAULKNER LOG BY C. WARD

WELL NUMBER MW3



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	LOCKING WELL CAP			0
1	BENTONITE	NATIVE BACKFILL			1
2	BENTONITE				2
3	WELL RISER				3
4				Brown SAND and fine GRAVEL, dry.	4
5					5
6	SAND PACK				6
7					7
8					8
9	WELL SCREEN		9.0' 50 ppm	9.5' WATER TABLE	9
10					10
11				Brown/gray GRAVEL and SAND, some silt, wet.	11
12	BOTTOM CAP				12
13				Orange/brown GRAVEL and SAND, wet.	13
14	UNDISTURBED NATIVE SOIL		14.0' 40 ppm	BASE OF WELL AT 13' END OF EXPLORATION AT 14'	14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT JOHNSON'S FUEL SERVICE

LOCATION BENNINGTON, VERMONT

DATE DRILLED 5/28/97 TOTAL DEPTH OF HOLE 15.0'

DIAMETER \_\_\_\_\_

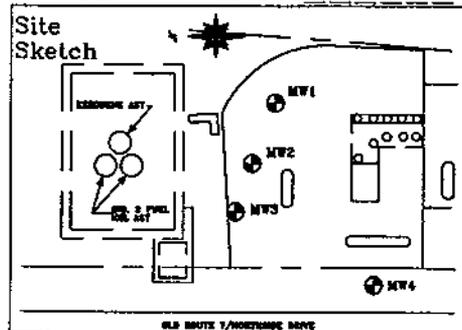
SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 3.0' TYPE sch 40 pvc

DRILLING CO. TRI-STATE DRILLING METHOD ODEX

DRILLER T. FAULKNER LOG BY C. WARD

WELL NUMBER MW4



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	LOCKING WELL CAP			0
1	BENTONITE				1
2	NATIVE BACKFILL				2
3	BENTONITE		0'-5' 0.2 ppm	Brown SAND and GRAVEL, dry to damp.	3
4	WELL RISER				4
5					5
6				Brown SAND and GRAVEL, dry to damp. slight petroleum odor from borehole.	6
7	SAND PACK		10.0' 3 ppm		7
8	WELL SCREEN				8
9					9
10				10.0' WATER TABLE	10
11				Brown GRAVEL and SAND, moist.	11
12					12
13	BOTTOM CAP		15.0' 3 ppm	GRAVEL	13
14					14
15	BEDROCK			BASE OF WELL AT 13.5' REFUSAL AT 15.0'	15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

**APPENDIX C**

**Liquid Level Monitoring Data**

LIQUID LEVEL MONITORING DATA

JOHNSON'S FUELS  
BENNINGTON, VT

6/4/97

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-1	16.0	100.23	-	8.46	-	-	-	-	91.77
MW-2	15.0	100.00	-	8.81	-	-	-	-	91.19
MW-3	13.0	100.44	-	9.25	-	-	-	-	91.19
MW-4	13.5	101.43	-	9.56	-	-	-	-	91.87

All Values Reported in Feet

btoc - Below Top of Casing

Elevations relative to top of casing for MW-2 which was arbitrarily set to 100'

**APPENDIX D**

**Water Quality Data**

# GROUNDWATER QUALITY SUMMARY

## JOHNSON'S FUELS BENNINGTON, VT

### MW-1

PARAMETER	Date of Sample Collection				Applicable Standard (ppb)
	6/4/97				
Benzene	11.4				5. a
Chlorobenzene	ND > 5				100. a
1,2-DCB	ND > 5				600. b
1,3-DCB	ND > 5				600. c
1,4-DCB	ND > 5				75. a
Ethylbenzene	ND > 5				680. d
Toluene	ND > 5				1,000. b
Xylenes	151.				400. d
Total BTEX	162.				-
MTBE	ND > 50				40. c
BTEX+MTBE	162.				-

### MW-2

PARAMETER	Date of Sample Collection				Applicable Standard (ppb)
	6/4/97				
Benzene	ND > 1				5. a
Chlorobenzene	ND > 1				100. a
1,2-DCB	ND > 1				600. b
1,3-DCB	ND > 1				600. c
1,4-DCB	ND > 1				75. a
Ethylbenzene	ND > 1				680. d
Toluene	ND > 1				1,000. b
Xylenes	4.5				400. d
Total BTEX	4.5				-
MTBE	TBQ < 10				40. c
BTEX+MTBE	4.5				-

Analysis by EPA Method 602

All Values Reported in ug/L (ppb)

ND > 1 - None Detected above Detection Limit

TBQ - Trace Below Quantitation

MCL - E.P.A. Maximum Contaminant Level

HAL - Health Advisory Level

VGES - Vermont Groundwater Enforcement Standard

a - MCL and VGES

b - MCL

c - HAL

d - VGES

# GROUNDWATER QUALITY SUMMARY

## JOHNSON'S FUELS BENNINGTON, VT

### MW-3

PARAMETER	Date of Sample Collection				Applicable Standard (ppb)
	6/4/97				
Benzene	25.9				5. a
Chlorobenzene	ND > 5				100. a
1,2-DCB	ND > 5				600. b
1,3-DCB	ND > 5				600. c
1,4-DCB	ND > 5				75. a
Ethylbenzene	8.4				680. d
Toluene	9.6				1,000. b
Xylenes	222.				400. d
Total BTEX	266.				-
MTBE	242.				40. c
BTEX+MTBE	508.				-

### MW-4

PARAMETER	Date of Sample Collection				Applicable Standard (ppb)
	6/4/97				
Benzene	71.0				5. a
Chlorobenzene	ND > 10				100. a
1,2-DCB	ND > 10				600. b
1,3-DCB	ND > 10				600. c
1,4-DCB	ND > 10				75. a
Ethylbenzene	87.9				680. d
Toluene	461.				1,000. b
Xylenes	2,610.				400. d
Total BTEX	3,230.				-
MTBE	1,110.				40. c
BTEX+MTBE	4,340.				-

Analysis by EPA Method 602

All Values Reported in ug/L (ppb)

ND > 1 - None Detected above Detection Limit

TBQ - Trace Below Quantitation

MCL - E.P.A. Maximum Contaminant Level

HAL - Health Advisory Level

VGES - Vermont Groundwater Enforcement Standard

a - MCL and VGES

b - MCL

c - HAL

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**GROUNDWATER QUALITY SUMMARY  
QA/QC SAMPLES**

**JOHNSON'S FUELS  
BENNINGTON, VT**

6/4/97

PARAMETER	Trip Blank	Equipment Blank	Duplicate of MW-2	Applicable Standard (ppb)
Benzene	ND > 1	No	ND > 1	5. a
Chlorobenzene	ND > 1	Sample	ND > 1	100. a
1,2-DCB	ND > 1		ND > 1	600. b
1,3-DCB	ND > 1	Disposable	ND > 1	600. c
1,4-DCB	ND > 1	Bailers	ND > 1	75. a
Ethylbenzene	ND > 1	Used	TBQ < 1	680. d
Toluene	ND > 1		ND > 1	1,000. b
Xylenes	ND > 1		5.8	400. d
Total BTEX	ND		5.8	-
MTBE	ND > 10		TBQ < 10	40. c
BTEX+MTBE	ND		5.8	-

All Values Reported in ug/L (ppb)

ND>1 - None Detected above Detection Limit

TBQ - Trace Below Quantitation

MCL - E.P.A. Maximum Contaminant Level

HAL - Health Advisory Level

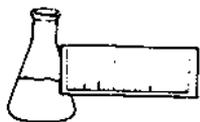
VGES - Vermont Groundwater Enforcement Standard

a - MCL and VGES

b - MCL

c - HAL

d - VGES



**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: Johnson's Fuel Service  
REPORT DATE: June 11, 1997  
DATE SAMPLED: June 4, 1997

PROJECT CODE: GIJF1521  
REF.#: 104,913 - 104,918

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.

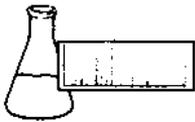
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

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.**

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**EPA METHOD 602--PURGEABLE AROMATICS**

CLIENT: Griffin International

DATE RECEIVED: June 5, 1997

PROJECT NAME: Johnson's Fuel Service

REPORT DATE: June 11, 1997

CLIENT PROJ. #: 4974992

PROJECT CODE: GJF1521

Ref. #:	104,913	104,914	104,915	104,916	104,917
Site:	Trip Blank	MW #3	MW #4	MW #2	Duplicate
Date Sampled:	6/4/97	6/4/97	6/4/97	6/4/97	6/4/97
Time Sampled:	7:35	11:22	11:30	11:42	11:42
Sampler:	D. Tourangeau				
Date Analyzed:	6/7/97	6/9/97	6/7/97	6/9/97	6/10/97
UIP Count:	0	>10	>10	>10	>10
Dil. Factor (%):	100	20	10	100	100
Surr % Rec. (%):	93	100	105	106	97
Parameter	Conc. (ug/L)				
Benzene	<1	25.9	71.0	<1	<1
Chlorobenzene	<1	<5	<10	<1	<1
1,2-Dichlorobenzene	<1	<5	<10	<1	<1
1,3-Dichlorobenzene	<1	<5	<10	<1	<1
1,4-Dichlorobenzene	<1	<5	<10	<1	<1
Ethylbenzene	<1	8.4	87.9	<1	TBQ <1
Toluene	<1	9.6	461.	<1	<1
Xylenes	<1	222	2,610.	4.5	5.8
MTBE	<10	242.	1,110.	TBQ <10	TBQ <10

Ref. #:	104,918				
Site:	MW #1				
Date Sampled:	6/4/97				
Time Sampled:	11:52				
Sampler:	D. Tourangeau				
Date Analyzed:	6/9/97				
UIP Count:	>10				
Dil. Factor (%):	20				
Surr % Rec. (%):	100				
Parameter	Conc. (ug/L)				
Benzene	11.4				
Chlorobenzene	<5				
1,2-Dichlorobenzene	<5				
1,3-Dichlorobenzene	<5				
1,4-Dichlorobenzene	<5				
Ethylbenzene	<5				
Toluene	<5				
Xylenes	151.				
MTBE	<50				

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

4974992

**CHAIN-OF-CUSTODY RECORD**

22252

Project Name: JOHNSON'S FUEL SERVICE Site Location: BRANNINGTON	Reporting Address: GRIFFIN	Billing Address: GRIFFIN
Endyne Project Number: GIFF/521	Company: Contact Name/Phone #: CHRIS LEARD	Sampler Name: DONTOURAIN Phone #:

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
104,913	TRIP BLANK	H <sub>2</sub> O	✓		6/4/97 07:35	2	40ml		20	4cc	
104,914	MW#3	↓	↓		11:22	↓	↓		↓	↓	
104,915	MW#4	↓	↓		11:30	↓	↓		↓	↓	
104,916	MW#2	↓	↓		11:42	↓	↓		↓	↓	
104,917	DUPLICATE	↓	↓		11:42	↓	↓		↓	↓	
104,918	MW#1	↓	↓		11:52	↓	↓		↓	↓	

Relinquished by: Signature <i>[Signature]</i>	Received by: Signature <i>Angela Lopez</i>	Date/Time 6/5 9:45
Relinquished by: Signature <i>Angela Lopez</i>	Received by: Signature <i>Tonia M. Chamber</i>	Date/Time 6-5-97 10:10

New York State Project: Yes    No X Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitric N	9	BOD <sub>5</sub>	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601 602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										