

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

at

**FORMER FOOD & FUEL
ROCKINGHAM, VERMONT**

(VTDEC Site 92-1214)

JANUARY 1995



Prepared by:

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Griffin Project #: 11944604

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I. INTRODUCTION

This report summarizes the investigation of subsurface petroleum contamination at the former Food & Fuel gas station on Route 103 in Rockingham, Vermont (see Site Location Map, Appendix A). The investigation has been conducted to determine the source, degree and extent of petroleum contamination, as well as the risks to potential receptors in the area. Included in the report are the findings from the hollow-stem auger drilling along with the results of subsequent groundwater sampling conducted on the property. This work has been completed for the Town of Rockingham by Griffin International, Inc. (Griffin).

II. HISTORICAL BACKGROUND

In October of 1991, toluene was detected at 1 part per billion (ppb) in a water supply sample from the Haynam residence, located approximately 190 yards west of the former Food & Fuel station (see Area Map, Appendix A). The Haynam water supply is a spring, not a drilled well. At that time, the former Food & Fuel USTs were identified as a potential source of the contamination found in the Haynam spring.

On December 4, 1991, the water supply was sampled again by the Vermont Department of Environmental Conservation (VTDEC). Toluene was detected at 1 ppb, again, and xylenes were also detected at 1 ppb in this sample. Since that time, according to VTDEC records, this water supply has been sampled five times. No dissolved petroleum contamination was detected in any of these samples. The Haynam pond was also sampled occasionally. Petroleum contamination was never detected in any of the samples from the pond. The VTDEC had discontinued sampling of the Haynam spring and pond as of April 1993.

The Lafayette and Furgat residences, shown on the Area Map, share a drilled bedrock well located across the street from their houses. This supply well was sampled on July 14, 1992. Dissolved contamination was not detected in this sample.

On April 15, 1994, a representative of the VTDEC sampled the King drinking water supply which is reportedly located downgradient from the Haynam residence. The precise location of the King residence was not identified in the state files. Dissolved contamination was not detected in this sample either.

According to state records, one underground storage tank was removed from the former bus garage property located approximately 50 yards west of the Haynam residence. Three monitoring wells were installed in the vicinity of the UST tank pit. No dissolved petroleum contamination was detected in any of the groundwater samples collected from these wells. Based on the water table elevations in the monitoring wells, the groundwater flow was estimated to be to the north-northwest in the vicinity of the bus garage.

The former Food & Fuel property, now owned by the Town of Rockingham, was abandoned by its former owners in the early 1990s. The gas station utilized three (3) 10,000-gallon underground storage tanks (USTs) to store gasoline. The investigation presented in this report has been conducted in response to the abandonment of the USTs, the detection of toluene and xylenes in the Haynam spring in 1991, and the discovery of petroleum contamination in the soils surrounding the USTs during their removal.

On November 17, 1994, a Griffin representative inspected the closure of the three USTs. The tanks were found to be in fair condition with some superficial rust and pitting on the north end of each tank but no visible holes were observed. It was determined that the contamination detected may have resulted from spillage occurring during the filling process. Significant petroleum contamination was observed in the soils surrounding the USTs. A volatile organic compound (VOC) concentration of 150 parts per million (ppm) was recorded in a soil sample from 12 feet below the south end of tank #3. The average VOC concentration in soil samples collected throughout the excavation was 20 ppm.

Griffin has conducted the subsurface investigation for the Town of Rockingham to try to determine the degree and extent of petroleum contamination at the site and the risks that the contamination poses to potential receptors. The following report describes the findings from this investigation.

III. SITE DESCRIPTION

As stated previously, the former Food & Fuel Station utilized three 10,000-gallon gasoline tanks. According to state records, these USTs were likely installed in 1971. The tanks were situated on the east side of the building (see Site Map, Appendix A). Product from the three USTs was dispensed at the pump islands located south of the building. Product was pumped to the dispensers through steel underground piping.

The Surficial Geologic Map of Vermont maps the surrounding area as littoral sediment, predominantly pebbly sand. Actual subsurface materials consist primarily of medium to coarse sand with little gravel. The depth to bedrock in this area is unknown.

The immediate area surrounding the site consists mostly of rural residences. The nearest business is a gas station located approximately 150 yards east of the former Food & Fuel. The surrounding residences and the gas station are served entirely by private drinking water supplies such as the ones described in Section II of this report.

IV. SUBSURFACE INVESTIGATION

On December 14, 1994, three monitoring wells were installed using a hollow-stem auger drill rig. The monitoring wells, designated MW-1, MW-2 and MW-3, were installed to help define the degree and extent of petroleum contamination in the vicinity of the former tank pit. Soil samples were obtained in each boring at five-foot intervals using a split-spoon. These soil samples were screened for VOCs using an HNU (Model PI-101) photoionization device (PID). The wells were drilled to the south, west and east of the former tank pit. A well could not be installed north of the tank pit due to the nature of the terrain, and the presence of trees and overhead lines in the area. The locations of the new wells are shown on the Site Map in Appendix A.

In the boring for MW-1, medium to coarse sand was predominant from 5 feet below grade to the base of exploration at 22 feet below grade. No petroleum contamination was observed in any of the soils from this boring. The groundwater table was encountered at approximately 13 feet below grade.

In the boring for MW-2, varying proportions of fine to coarse sand were predominant in the split spoon samples. A trace of gravel was also observed in several of the samples. A slight petroleum odor was observed in the 5'-7' sample interval. A PID reading of 40 ppm was recorded for this sample. A strong gasoline odor was observed in the next sample obtained from 10'-12'. This sample had a PID reading of 220 ppm. In the 15'-17' soil sample, only a slight petroleum odor was observed; a PID reading of 4.2 ppm was recorded. Groundwater was encountered in this boring at approximately 13.5 feet below grade.

In the boring for MW-3, brown sand with little gravel was observed from grade to 10 feet below grade. In the 10'-12' split spoon, thin layers of brown silt and dark gray sand and gravel were observed. These soils had a slight odor. From 15'-17', brown coarse sand was observed in the split spoon. PID readings from the 5'-7', 10'-12' and 15'-17' samples were 3.4 ppm, 3.2 ppm and 3.6 ppm, respectively. Groundwater was also encountered in this boring at approximately 13.5 feet below grade.

The monitoring wells were constructed with two-inch diameter, Schedule 40 PVC riser and 0.010" slotted screen. The screened portion of MW-1 is from 10 to 20 feet below grade and the screened portion of MW-2 and MW-3 is from 8.5 to 18.5 feet below grade. A silica sand pack was placed around the screened portion of each well. A bentonite seal was placed in the annulus immediately above the sand pack. Native soil was used as backfill for the remainder of the annular space up to one foot below grade. To complete the construction of each well, a road box was set at grade level. In addition, locking well caps were placed on all monitoring wells. The boring logs and well construction details for these wells are included in Appendix B.

V. WATER LEVELS AND WATER QUALITY

A. Water Table Elevations

Water table elevation measurements were collected from all three monitoring wells prior to sampling on December 22, 1994. In addition, the site was surveyed in azimuth and elevation, including the tops of the monitoring wells. 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 on-site groundwater flow is to the east at a hydraulic gradient of 0.4%.

This calculated flow direction and gradient is contrary to what is expected. The surrounding topography suggests that groundwater flow is likely to the north or northeast toward the Williams River.

B. Water Quality

Griffin collected groundwater samples at the site from MW-1, MW-2 and MW-3. The samples were analyzed for petroleum compounds by EPA Method 602. The analytical results have been plotted to show the distribution of dissolved contamination across the site (see Contaminant Concentration Map, Appendix A).

Dissolved petroleum contamination was not detected in the groundwater sample from MW-1. Low levels of benzene, toluene, ethylbenzene and xylenes (BTEX) were detected in the sample from MW-2. Benzene, detected at 34.1 ppb, was the only compound detected at a concentration greater than the Vermont Groundwater Enforcement Standard. Very low levels of BTEX were detected in the sample from MW-3. The groundwater enforcement standards for BTEX were not exceeded in this sample. MTBE, a gasoline additive, was not detected in any of the samples. A groundwater quality summary for this sampling event is presented in Appendix D.

The trip blank, equipment blank and duplicate sample results indicate that proper quality assurance and quality control were maintained during the sampling and analysis. The laboratory analytical report is also included in Appendix D.

VI. RISK ASSESSMENT

From the subsurface investigation conducted by Griffin, it is apparent that the soils and groundwater in the vicinity of the former UST locations at the former Food & Fuel have been impacted by a release or releases of gasoline. The most likely receptor of the gasoline contamination at this site are soils and groundwater on the subject property and on downgradient properties.

The drinking water supplies of neighboring properties do not appear to be at risk at this time. The Haynam, Furgat and Lafayette residences to the west appear to be located upgradient or cross-gradient from the former Food & Fuel, based on the water table elevation data collected as part of this investigation. On the south side of Route 103, there are at least two residences located within one-quarter mile of the former Food & Fuel station. These residences are located in a likely upgradient direction from the station up on a hill. The water supplies at these residences are also not likely to be at risk.

The on-site building does not have a basement and the nearest buildings to the site are likely too distant to be at risk from the on-site contamination.

The nearest surface water is an intermittent brook located approximately 50 to 70 yards east of the Food & Fuel building. No signs of petroleum contamination were observed near this brook on the day the wells were installed. The risk to this receptor is deemed to be low at this time since the groundwater sample from MW-3, located less than 20 feet east of the former tank pit, contained only trace levels of BTEX.

The nearest major surface water body likely located downgradient from the site is the Williams River. This river is approximately one-quarter of a mile to the north of the former Food & Fuel. This potential receptor does not appear to be at risk.

VII. CONCLUSIONS

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

1. On December 14, 1994, three monitoring wells were installed at the Town of Rockingham property on Route 103 (former Food & Fuel gas station). The most significant soil contamination was observed in the boring for MW-2, located adjacent to the pump islands. This suggests that there may have been a release of gasoline from the underground piping in this area and/or surface releases near the pump islands and USTs.
2. Based on the December monitoring data, groundwater flow on this property is estimated to be to the east at a hydraulic gradient of 0.4%. However, the regional

groundwater flow direction is likely to the north or northeast, toward the Williams River.

3. Very low levels of dissolved groundwater contamination were detected in the samples from MW-2 and MW-3. The estimated groundwater flow direction suggests that MW-3 is located downgradient from the former locations of the USTs. Since contamination was only detected in trace levels in the groundwater from MW-3, it appears that the downgradient extent of contamination has been sufficiently defined. However, the northern (and potentially downgradient) extent of contamination has not been defined. In addition, upgradient well MW-1 was free of contamination, indicating that the upgradient extent of contamination has been defined.
4. The greatest potential risk posed by the on-site contamination appears to be to groundwater beneath adjacent properties. At this time, it appears that the risk to the nearby surface waters and drinking water supplies is relatively low.

VIII. RECOMMENDATIONS

Griffin recommends that two additional monitoring wells be installed to the north of the former tank pit using an all-terrain vehicle drill rig. These wells will help determine the degree and extent of contamination in the possible downgradient direction from the former source area. After the installation of these wells, the azimuth and elevation of the tops-of-casings should be surveyed.

All five monitoring wells should be sampled after the new wells are completed. In addition, Griffin recommends that the Haynam water supply be sampled. All water samples should be analyzed for petroleum compounds by EPA Method 602. Prior to sampling, groundwater levels should be monitored so that a more complete groundwater contour map can be developed. This additional investigation will be very important in determining the risk to the intermittent stream, Williams River and local drinking water supplies.

APPENDIX A

Maps

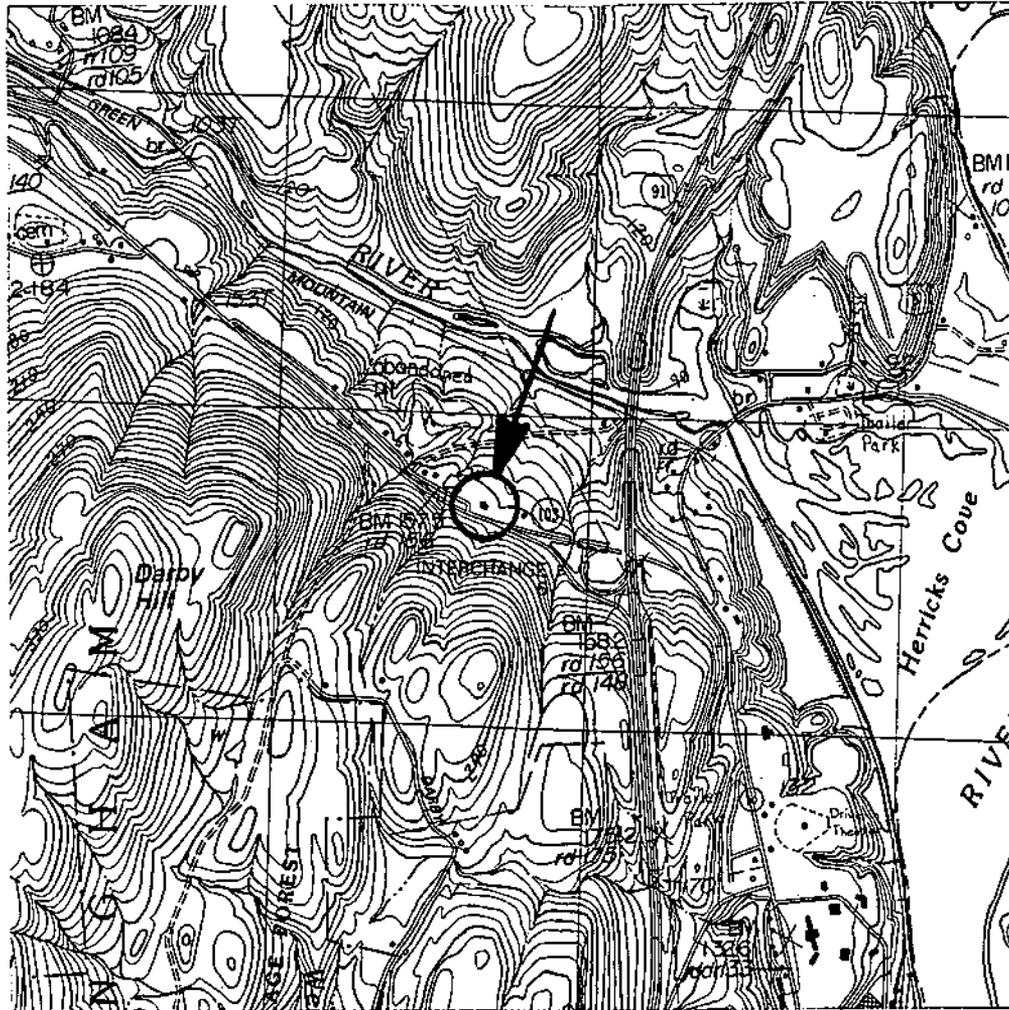
Site Location Map

Area Map

Site Map

Groundwater Contour Map

Contaminant Concentration Map



JOB #: 11944604
 SOURCE: USGS- BELLOWS FALLS, VERMONT/NEW HAMPSHIRE QUADRANGLE



FORMER FOOD AND FUEL

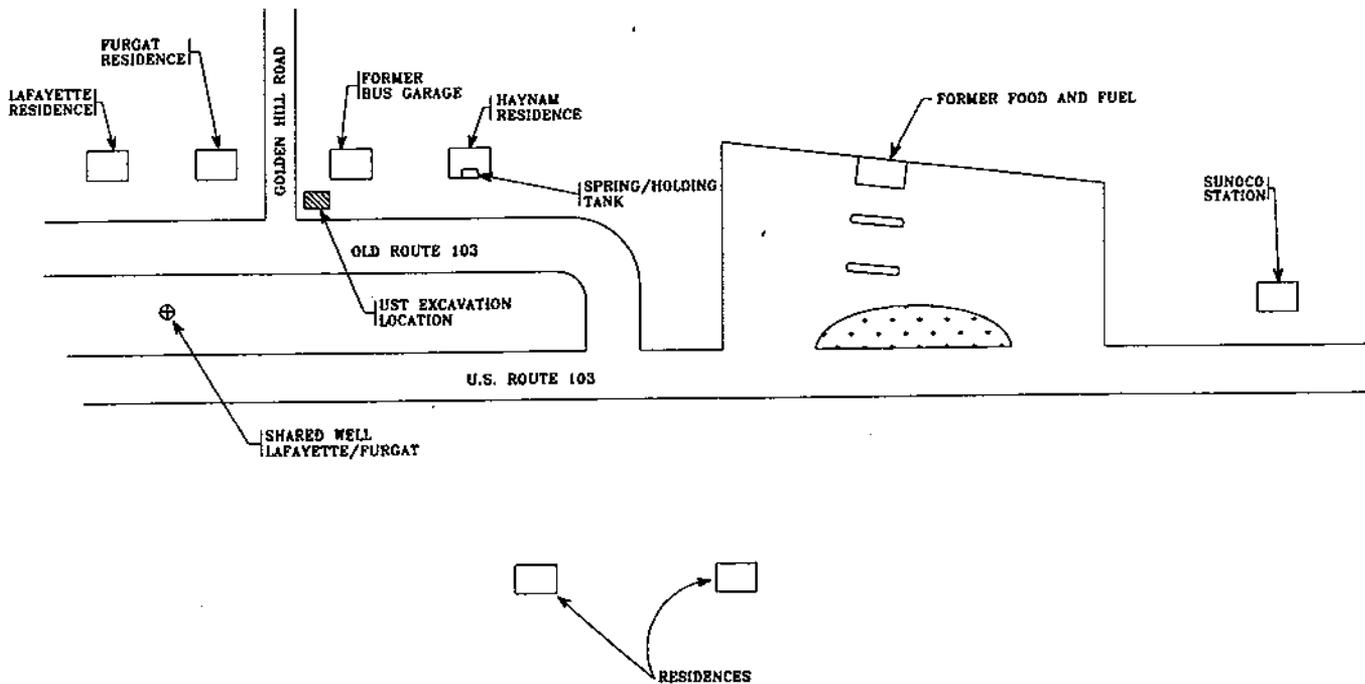
ROCKINGHAM, VERMONT

SITE LOCATION MAP

DATE: 12/23/94 DWG.#:1 SCALE: 1:25000 DRN.:SB APP.:KM



FIELD AREA WITH TREES

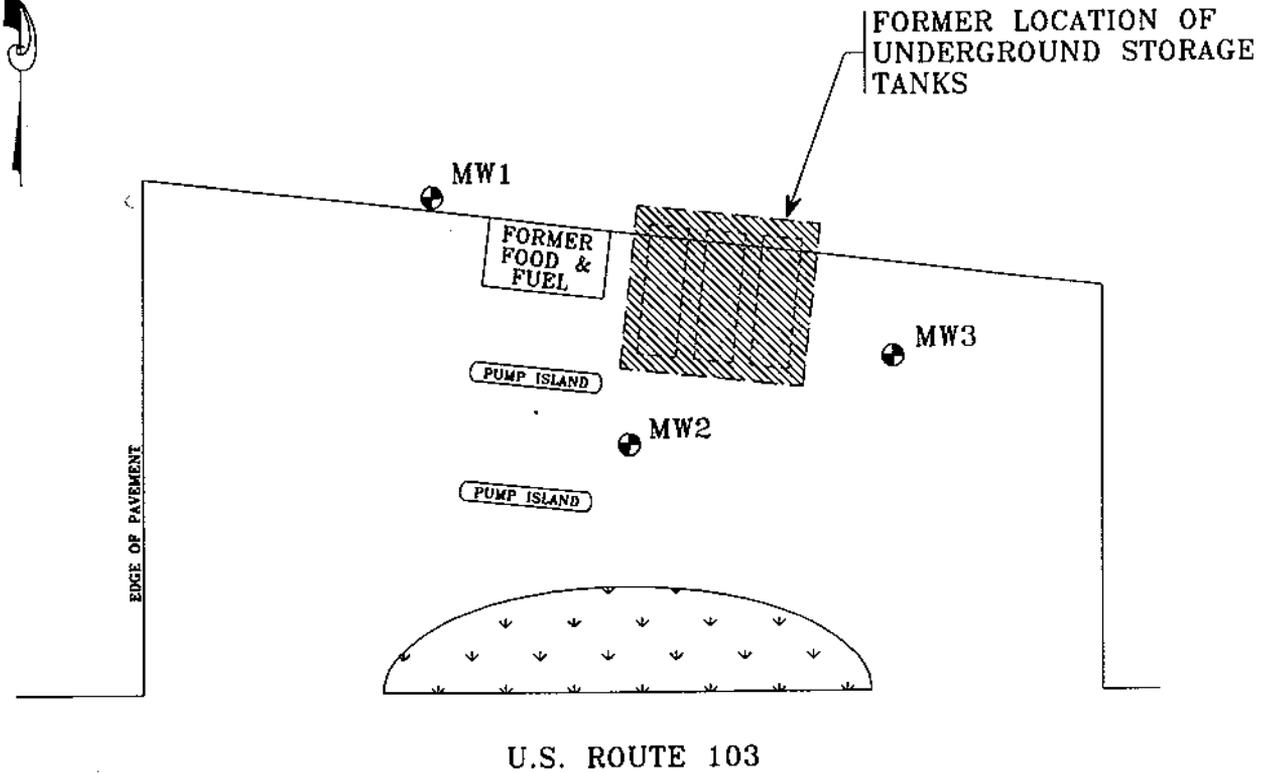


JOB #: 11944604



FORMER FOOD AND FUEL
ROCKINGHAM, VERMONT
AREA MAP

DATE: 12/23/94 DWG.#: 2 NOT TO SCALE DRN.:SB APP.:KM



LEGEND

 MW2 MONITORING WELL

JOB #: 11944604



FORMER FOOD AND FUEL

ROCKINGHAM, VERMONT

SITE MAP

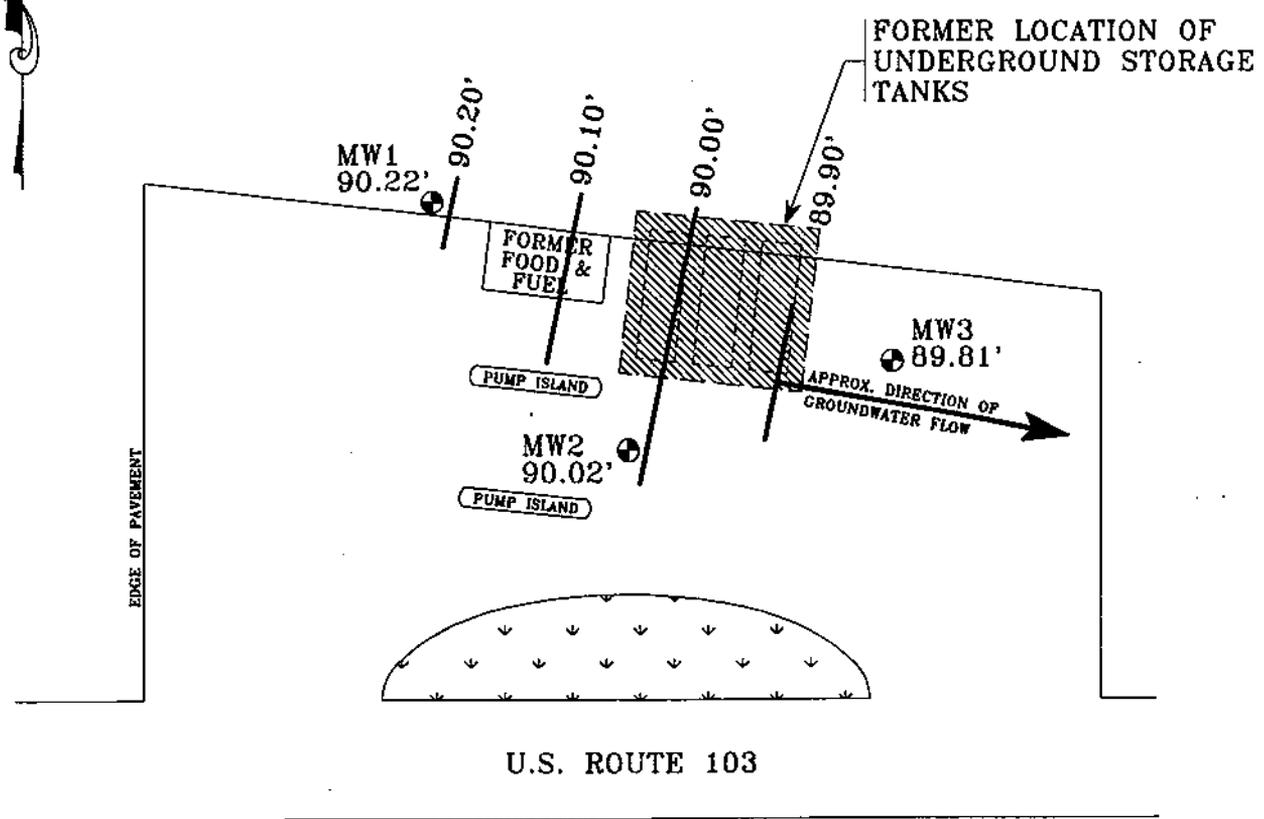
DATE: 12/23/94

DWG.#: 3

SCALE: 1" = 40'

DRN.:SB

APP.:KM



LEGEND

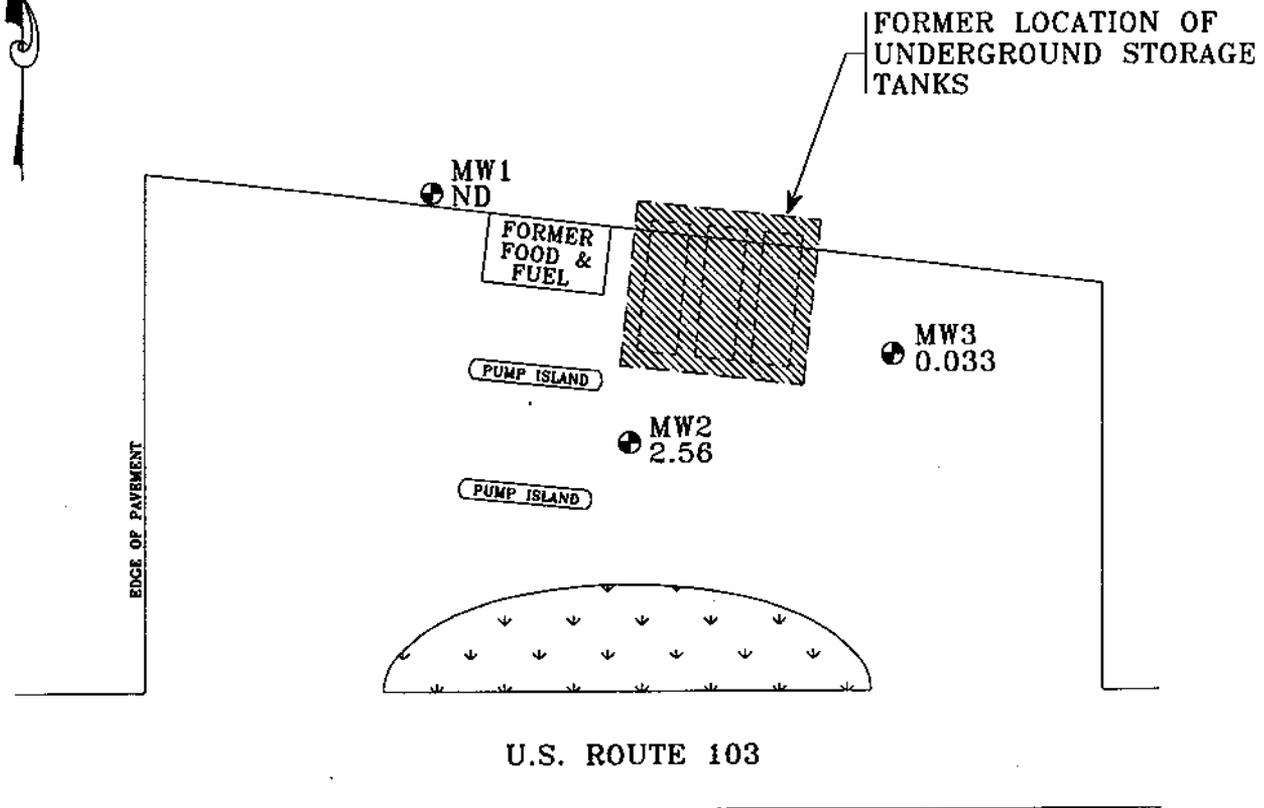
- ⊕ MW2 90.02' MONITORING WELL AND WATER TABLE ELEVATION IN FEET
- 90.10' GROUNDWATER CONTOUR IN FEET (DASHED WHERE INFERRED)

JOB #: 11944604
 DATE MEASURED: 12/22/94



FORMER FOOD AND FUEL
ROCKINGHAM, VERMONT
GROUNDWATER CONTOUR MAP

| | | | | |
|---------------|----------|---------------|---------|---------|
| DATE: 1/23/95 | DWG.#: 4 | SCALE: 1"=40' | DRN.:SB | APP.:KM |
|---------------|----------|---------------|---------|---------|



LEGEND

- 
MW2 2.56 MONITORING WELL AND TOTAL BTEX AND MTBE CONCENTRATION (ppm)
- ND** NONE DETECTED

JOB #: 11944604
 SAMPLE DATE: 12/22/94



FORMER FOOD AND FUEL
ROCKINGHAM, VERMONT
CONTAMINANT CONCENTRATION MAP

| | | | | |
|---------------|----------|---------------|---------|---------|
| DATE: 1/23/95 | DWG.#: 5 | SCALE: 1"=40' | DRN.:SB | APP.:KM |
|---------------|----------|---------------|---------|---------|

APPENDIX B

Well Logs

PROJECT FORMER FOOD AND FUEL

LOCATION ROCKINGHAM, VERMONT

DATE DRILLED 12/14/94 TOTAL DEPTH OF HOLE 22'

DIAMETER _____

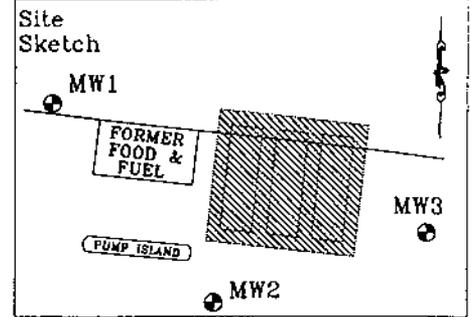
SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 9.5' TYPE sch 40 pvc

DRILLING CO. GMB DRILLING METHOD HSA

DRILLER RON GARNEAU LOG BY K. McGRAW

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 | NATIVE BACKFILL | | 0'-2' .0 ppm | Brown fine to medium SAND, some gravel, dry, no odor. | 1 |
| 2 | | | | | 2 |
| 3 | BENTONITE | | | | 3 |
| 4 | | | | | 4 |
| 5 | WELL RISER | | 5'-7'- 4,4,5,6 0 ppm | Reddish brown medium to coarse SAND, dry, no odor. | 5 |
| 6 | | | | | 6 |
| 7 | | | | | 7 |
| 8 | | | | | 8 |
| 9 | | | | | 9 |
| 10 | | | | | 10 |
| 11 | SAND PACK | | 10'-12'- 12,14,17,17 0 ppm | Reddish brown medium to coarse SAND, little gravel, damp, no odor. | 11 |
| 12 | | | | | 12 |
| 13 | | | | 13.0' WATER TABLE | 13 |
| 14 | | | | | 14 |
| 15 | WELL SCREEN | | 15'-17'- 8,10,11,16 0 ppm | Brown medium to coarse SAND, little gravel, little silt, wet, no odor. | 15 |
| 16 | | | | | 16 |
| 17 | | | | | 17 |
| 18 | | | | | 18 |
| 19 | BOTTOM CAP | | | | 19 |
| 20 | | | | | 20 |
| 21 | | | 20'-22'- 27,37,46 0 ppm | Brown med. to coarse SAND, little gravel, some thin layers of silt, wet, no odor. | 21 |
| 22 | | | | BASE OF WELL AT 20' | 22 |
| 23 | UNDISTURBED NATIVE SOIL | | | END OF EXPLORATION AT 22' | 23 |
| 24 | | | | | 24 |
| 25 | | | | | 25 |

PROJECT FORMER FOOD AND FUEL

LOCATION ROCKINGHAM, VERMONT

DATE DRILLED 12/14/94 TOTAL DEPTH OF HOLE 20'

DIAMETER _____

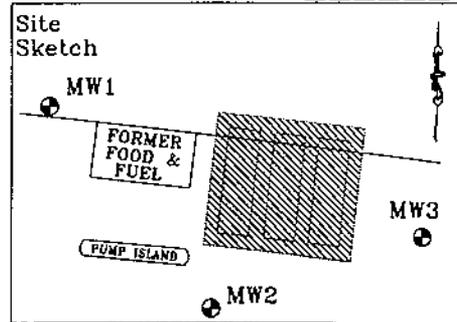
SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 8.0' TYPE sch 40 pvc

DRILLING CO. GMB DRILLING METHOD HSA

DRILLER RON GARNEAU LOG BY K. McGRAW

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 LOCKING WELL CAP | | | | 0 |
| 1 | CONCRETE | | 0'-2' 0 ppm | Brown medium SAND, trace gravel, dry, no odor. | 1 |
| 2 | NATIVE BACKFILL | | | | 2 |
| 3 | WELL RISER | | | | 3 |
| 4 | | | | | 4 |
| 5 | | | | | 5 |
| 6 | BENTONITE | | 5'-7'- 14,16,17,15 40 ppm | Brown fine to medium SAND, trace gravel, dry, slight odor. | 6 |
| 7 | | | | | 7 |
| 8 | | | | | 8 |
| 9 | | | | | 9 |
| 10 | | | | | 10 |
| 11 | SAND PACK | | 10'-12'- 7,8,7,8 220 ppm | Grayish brown fine to coarse SAND, damp, strong gasoline odor. | 11 |
| 12 | | | | | 12 |
| 13 | WELL SCREEN | | | 13.5' WATER TABLE | 13 |
| 14 | | | | | 14 |
| 15 | | | | | 15 |
| 16 | | | 15'-17'- 5,4,7,7 4.2 ppm | Brown coarse SAND, trace gravel, wet, slight odor. | 16 |
| 17 | BOTTOM CAP | | | | 17 |
| 18 | | | | | 18 |
| 19 | | | | no sample | 19 |
| 20 | UNDISTURBED NATIVE SOIL | | | BASE OF WELL AT 18.5' END OF EXPLORATION AT 20' | 20 |
| 21 | | | | | 21 |
| 22 | | | | | 22 |
| 23 | | | | | 23 |
| 24 | | | | | 24 |
| 25 | | | | | 25 |

PROJECT FORMER FOOD AND FUEL

LOCATION ROCKINGHAM, VERMONT

DATE DRILLED 12/14/94 TOTAL DEPTH OF HOLE 18.5'

DIAMETER _____

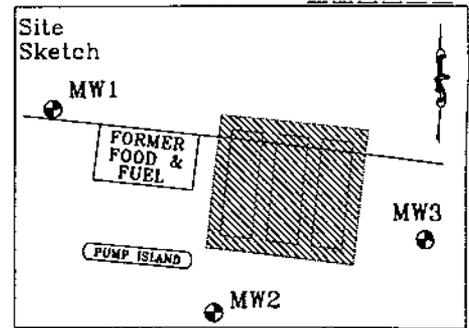
SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 8.0' TYPE sch 40 pvc

DRILLING CO. GMB DRILLING METHOD HSA

DRILLER RON GARNEAU LOG BY K. McGRAW

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 | CONCRETE | | 0'-2' | Brown SAND, little gravel, dry, no odor. | 1 |
| 2 | NATIVE BACKFILL | | 0 ppm | | 2 |
| 3 | BENTONITE | | | | 3 |
| 4 | WELL RISER | | | | 4 |
| 5 | NATIVE BACKFILL | | | | 5 |
| 6 | | | 5'-7'- 9,8,4,4, 3.4 ppm | Brown SAND, little gravel, dry, no odor. | 6 |
| 7 | | | | | 7 |
| 8 | | | | | 8 |
| 9 | | | | | 9 |
| 10 | | | | | 10 |
| 11 | SAND PACK | | 10'-12'- 17,12,13,7 3.2 ppm | Brown silty SAND, moist. Thin layers of brown SILT and dark gray SAND and GRAVEL, moist, slight odor. | 11 |
| 12 | | | | | 12 |
| 13 | WELL SCREEN | | | 13.5' WATER TABLE | 13 |
| 14 | | | | | 14 |
| 15 | | | | | 15 |
| 16 | | | 15'-17'- 27,19,36,31 3.6 ppm | Brown coarse SAND, wet, no odor. | 16 |
| 17 | | | | | 17 |
| 18 | BOTTOM CAP | | | | 18 |
| 19 | UNDISTURBED NATIVE SOIL | | | BASE OF WELL AT 18.5' END OF EXPLORATION AT 18.5' | 19 |
| 20 | | | | | 20 |
| 21 | | | | | 21 |
| 22 | | | | | 22 |
| 23 | | | | | 23 |
| 24 | | | | | 24 |
| 25 | | | | | 25 |

APPENDIX C

Liquid Level Monitoring Data

**Liquid Level Monitoring Data
Former Food & Fuel, Town of Rockingham**

12/22/94

| Well I.D. | Well Depth | Top of Casing Elevation | Depth To Product | Depth To Water | Product Thickness | Specific Gravity Of Product | Water Equivalent | Corrected Depth To Water | Corrected Water Table Elevation |
|-----------|------------|-------------------------|------------------|----------------|-------------------|-----------------------------|------------------|--------------------------|---------------------------------|
| MW-1 | 20 | 100.00 | | 9.78 | | | | | 90.22 |
| MW-2 | 18.5 | 99.56 | | 9.54 | | | | | 90.02 |
| MW-3 | 18.5 | 98.62 | | 8.81 | | | | | 89.81 |

All Values Reported in Feet

Top-of-Casing Elevations Measured in Feet Relative to MW-1 set at 100.00'

APPENDIX D

Groundwater Quality Summary

Laboratory Report

**Groundwater Quality Summary
Former Food & Fuel
Rockingham, Vermont**

12/22/1994

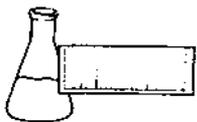
| PARAMETER | Sample | | | | | | Vermont Drinking Water Standards |
|---------------|--------|---------|------|------------|-----------------|-------------------|----------------------------------|
| | MW-1 | MW-2 | MW-3 | Trip Blank | Equipment Blank | Duplicate of MW-2 | |
| Benzene | ND | 34.1 | 2.3 | ND | ND | 24.7 | 5.0* |
| Chlorobenzene | ND | ND | ND | ND | ND | ND | 100* |
| 1,2-DCB | ND | ND | ND | ND | ND | ND | 600* |
| 1,3-DCB | ND | ND | ND | ND | ND | ND | 600** |
| 1,4-DCB | ND | ND | ND | ND | ND | ND | 75* |
| Ethylbenzene | ND | 391. | 5.3 | ND | ND | 334. | 700* |
| Toluene | ND | 554. | 5.6 | ND | ND | 444. | 1,000* |
| Xylenes | ND | 1,580. | 19.5 | ND | ND | 1,320. | 10,000* |
| Total BTEX | ND | 2,559.1 | 32.7 | ND | ND | 2,122.7 | - |
| MTBE | ND | ND | ND | ND | ND | ND | 40** |
| BTEX+MTBE | ND | 2,559.1 | 32.7 | ND | ND | 2,122.7 | - |

All Values Reported in ug/L (ppb)

* - Maximum Contaminant Level (MCL)

** - Vermont Health Advisory Level

ND - None Detected



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: Former Food & Fuel
REPORT DATE: January 3, 1995
DATE SAMPLED: December 22, 1994

PROJECT CODE: GITR1783
REF.#: 69,064 - 69,069

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.

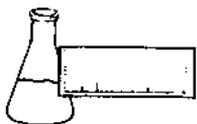
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

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



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: Former Food & Fuel
REPORT DATE: January 3, 1995
DATE SAMPLED: December 22, 1994
DATE RECEIVED: December 22, 1994
DATE ANALYZED: December 28, 1994

PROJECT CODE: GITR1783
REF.#: 69,064
STATION: Trip Blank
TIME SAMPLED: 7:40
SAMPLER: Kevin McGraw

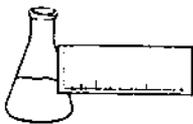
| <u>Parameter</u> | <u>Detection Limit (ug/L)</u> | <u>Concentration (ug/L)</u> |
|---------------------|-------------------------------|-----------------------------|
| Benzene | 1 | ND ¹ |
| Chlorobenzene | 1 | ND |
| 1,2-Dichlorobenzene | 1 | ND |
| 1,3-Dichlorobenzene | 1 | ND |
| 1,4-Dichlorobenzene | 1 | ND |
| Ethylbenzene | 1 | ND |
| Toluene | 1 | ND |
| Xylenes | 1 | ND |
| MTBE | 10 | ND |

Bromobenzene Surrogate Recovery: 99%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



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: Former Food & Fuel
REPORT DATE: January 3, 1995
DATE SAMPLED: December 22, 1994
DATE RECEIVED: December 22, 1994
DATE ANALYZED: December 28, 1994

PROJECT CODE: GITR1783
REF.#: 69,065
STATION: MW-1
TIME SAMPLED: 11:20
SAMPLER: Kevin McGraw

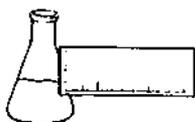
| <u>Parameter</u> | <u>Detection Limit (ug/L)</u> | <u>Concentration (ug/L)</u> |
|---------------------|-------------------------------|-----------------------------|
| Benzene | 1 | ND ¹ |
| Chlorobenzene | 1 | ND |
| 1,2-Dichlorobenzene | 1 | ND |
| 1,3-Dichlorobenzene | 1 | ND |
| 1,4-Dichlorobenzene | 1 | ND |
| Ethylbenzene | 1 | ND |
| Toluene | 1 | ND |
| Xylenes | 1 | ND |
| MTBE | 10 | ND |

Bromobenzene Surrogate Recovery: 105%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



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LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Former Food & Fuel
REPORT DATE: January 3, 1995
DATE SAMPLED: December 22, 1994
DATE RECEIVED: December 22, 1994
DATE ANALYZED: December 28, 1994

PROJECT CODE: GITR1783
REF.#: 69,066
STATION: MW-3
TIME SAMPLED: 11:35
SAMPLER: Kevin McGraw

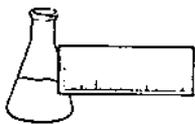
| <u>Parameter</u> | <u>Detection Limit (ug/L)</u> | <u>Concentration (ug/L)</u> |
|---------------------|-------------------------------|-----------------------------|
| Benzene | 1 | 2.3 |
| Chlorobenzene | 1 | ND ¹ |
| 1,2-Dichlorobenzene | 1 | ND |
| 1,3-Dichlorobenzene | 1 | ND |
| 1,4-Dichlorobenzene | 1 | ND |
| Ethylbenzene | 1 | 5.3 |
| Toluene | 1 | 5.6 |
| Xylenes | 1 | 19.5 |
| MTBE | 10 | ND |

Bromobenzene Surrogate Recovery: 95%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 None detected



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LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Former Food & Fuel
REPORT DATE: January 3, 1995
DATE SAMPLED: December 22, 1994
DATE RECEIVED: December 22, 1994
DATE ANALYZED: December 30, 1994

PROJECT CODE: GITR1783
REF.#: 69,067
STATION: MW-2
TIME SAMPLED: 11:55
SAMPLER: Kevin McGraw

| <u>Parameter</u> | <u>Detection Limit (ug/L)¹</u> | <u>Concentration (ug/L)</u> |
|---------------------|---|-----------------------------|
| Benzene | 20 | 34.1 |
| Chlorobenzene | 20 | ND ² |
| 1,2-Dichlorobenzene | 20 | ND |
| 1,3-Dichlorobenzene | 20 | ND |
| 1,4-Dichlorobenzene | 20 | ND |
| Ethylbenzene | 20 | 391. |
| Toluene | 20 | 554. |
| Xylenes | 20 | 1,580. |
| MTBE | 200 | ND |

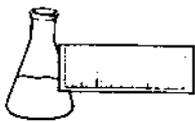
Bromobenzene Surrogate Recovery: 105%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at 5% dilution.

2 None detected



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LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Former Food & Fuel
REPORT DATE: January 3, 1995
DATE SAMPLED: December 22, 1994
DATE RECEIVED: December 22, 1994
DATE ANALYZED: December 30, 1994

PROJECT CODE: GITR1783
REF.#: 69,068
STATION: Duplicate
TIME SAMPLED: 11:55
SAMPLER: Kevin McGraw

| <u>Parameter</u> | <u>Detection Limit (ug/L)¹</u> | <u>Concentration (ug/L)</u> |
|---------------------|---|-----------------------------|
| Benzene | 20 | 24.7 |
| Chlorobenzene | 20 | ND ² |
| 1,2-Dichlorobenzene | 20 | ND |
| 1,3-Dichlorobenzene | 20 | ND |
| 1,4-Dichlorobenzene | 20 | ND |
| Ethylbenzene | 20 | 334. |
| Toluene | 20 | 444. |
| Xylenes | 20 | 1,320. |
| MTBE | 200 | ND |

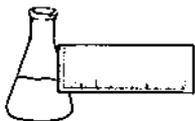
Bromobenzene Surrogate Recovery: 95%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at 5% dilution.

2 None detected



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FAX 879-7103

LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Former Food & Fuel
REPORT DATE: January 3, 1995
DATE SAMPLED: December 22, 1994
DATE RECEIVED: December 22, 1994
DATE ANALYZED: December 30, 1994

PROJECT CODE: GITR1783
REF.#: 69,069
STATION: Equipment Blank
TIME SAMPLED: 12:10
SAMPLER: Kevin McGraw

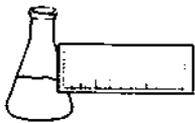
| <u>Parameter</u> | <u>Detection Limit (ug/L)</u> | <u>Concentration (ug/L)</u> |
|---------------------|-------------------------------|-----------------------------|
| Benzene | 1 | ND ¹ |
| Chlorobenzene | 1 | ND |
| 1,2-Dichlorobenzene | 1 | ND |
| 1,3-Dichlorobenzene | 1 | ND |
| 1,4-Dichlorobenzene | 1 | ND |
| Ethylbenzene | 1 | ND |
| Toluene | 1 | ND |
| Xylenes | 1 | ND |
| MTBE | 10 | ND |

Bromobenzene Surrogate Recovery: 97%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



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EPA METHOD 602 LABORATORY REPORT

MATRIX SPIKE AND DUPLICATE LABORATORY CONTROL DATA

CLIENT: Griffin International
PROJECT NAME: Former Food & Fuel
REPORT DATE: January 3, 1995
DATE SAMPLED: December 22, 1994
DATE RECEIVED: December 22, 1994
DATE ANALYZED: December 28, 1994

PROJECT CODE: GITR1783
REF.#: 69,065
STATION: MW-1
TIME SAMPLED: 11:20
SAMPLER: Kevin McGraw

| <u>Parameter</u> | <u>Sample(ug/L)</u> | <u>Spike(ug/L)</u> | <u>Dup1(ug/L)</u> | <u>Dup2(ug/L)</u> | <u>Avg % Rec</u> |
|------------------|---------------------|--------------------|-------------------|-------------------|------------------|
| Benzene | ND ¹ | 10 | 10.0 | 10.7 | 103% |
| Toluene | ND | 10 | 9.8 | 10.6 | 102% |
| Ethylbenzene | ND | 10 | 9.2 | 9.7 | 94% |
| Xylenes | ND | 30 | 27.1 | 28.8 | 93% |

NOTES:

1 None detected



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

CHAIN-OF-CUSTODY RECORD

Job# 11944604

13006

| | | |
|---|--|---|
| Project Name: Former Food & Fuel Site Location: Town of Rockingham | Reporting Address: Griffin International, PO BOX 943, Williston, VT 05493 | Billing Address: Griffin |
| Endyne Project Number: GTR1783 | Company: Griffin International Contact Name/Phone #: K. McGraw/865-4288 | Sampler Name: Kevin McGraw Phone #: (802) 865-4288 |

| 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 | | | | |
| 69064 | Trip Blank | H ₂ O | ✓ | | 12/22/94 7:40 | 2 | 40mL | | 602 | HCl | |
| 69065 | MW-1 | ↓ | ✓ | | 11:20 | ↓ | ↓ | | ↓ | ↓ | |
| 69066 | MW-3 | ↓ | ✓ | | 11:35 | ↓ | ↓ | | ↓ | ↓ | |
| 69067 | MW-2 | ↓ | ✓ | | 11:55 | ↓ | ↓ | | ↓ | ↓ | |
| 69068 | Duplicate | ↓ | ✓ | | 11:55 | ↓ | ↓ | | ↓ | ↓ | |
| 69069 | Equipment Blank | ↓ | ✓ | | 12:10 | ↓ | ↓ | | ↓ | ↓ | |
| | | | | | | | | | | | |
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|--|---|----------------------------|
| Relinquished by: Signature <i>Kevin McGraw</i> | Received by: Signature <i>J M Webster</i> | Date/Time 12/22/94 3:36 PM |
| Relinquished by: Signature | Received by: Signature | Date/Time |

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 | Nitrite N | 9 | BOD ₅ | 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): | | | | | | | | | | |