

MAR 18 1993



March 17, 1993

Ms. Lynda Wedderspoon
Sites Management Section
VT DEC
103 South Main Street
Waterbury, VT 05671-0404

Re: Gulf Station, Route 7A, Manchester, Vermont

Dear Ms. Wedderspoon:

Enclosed is our report on the investigation of petroleum contamination at Midway Oil's Gulf Station in Manchester, Vermont. Please feel free to contact me if you have any questions or comments on the report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Michael Cassara', with a long horizontal flourish extending to the right.

Michael Cassara, P.E.

Encl.

cc: Mr. Frank Trombetta, Midway Oil

**REPORT
ON THE INVESTIGATION
OF PETROLEUM
CONTAMINATION AND
PRELIMINARY SITE ASSESSMENT**

**MIDWAY OIL GULF STATION
MANCHESTER, VERMONT**

**VTDEC SITE # 92-1320
GRIFFIN PROJECT #11924315**

MARCH 1993

Prepared For:

**Midway Oil Corp.
217 North Main Street
Rutland, VT
(802) 775-5534**

Prepared By:

GRIFFIN INTERNATIONAL, INC.
**2B Dorset Lane
Williston, Vermont 05495**

(802) 879-7708

EXECUTIVE SUMMARY

The Midway Oil Gulf Station in Manchester, Vermont presently serves as a filling station, however it was at one time a service station as well.

In November of 1992 free phase gasoline was discovered in an existing monitoring well being used for leak detection around the Gulf Station's underground storage tank (UST) pit. An attempt was made to learn the source of the leak by performing tightness tests on the USTs. These tests indicated that the tanks were not leaking, but one of the tanks only passed marginally. This tank was very suspect as the source of the leak.

Subsequently, excavations were performed to ascertain the leak's source. The excavating was done in the presence of a representative of the Vermont Department of Environmental Conservation (VTDEC). Subsurface petroleum contamination was reported during the excavation. However, the excavating was halted before the source of the leak was discovered because of the risk of disturbing the USTs and causing additional releases.

As a precaution, the UST that had marginally passed the tightness test was emptied and put out of service. Tentative plans call for Midway Oil, the tank's owner, to remove the tanks in late 1993. The VTDEC requested the installation of additional monitoring wells and the collection of groundwater samples from all new and existing monitoring wells to determine the extent of the contamination. Griffin International, Inc. accomplished this work during January and February of 1993. The results of this work indicate the presence of dissolved phase petroleum contamination on the site.

Potential receptors of the contamination include a small unnamed stream which flows through a culvert below the Gulf Station. This stream flows above ground to the southwest of the site and into a culvert that conveys it under Route 7A and the Gulf Station. The stream reemerges from the culvert to the northeast of the Gulf Station, flows open for approximately eight feet and then enters another culvert which conveys it below the adjoining property to the north. This stream eventually empties into the Batten Kill River approximately one half mile to the southeast of the site.

Laboratory analysis of samples collected from the wells indicate a small amount of petroleum contamination of the groundwater at the site. Analysis of a sample from the stream did not indicate that it was being impacted by petroleum contamination at this time.

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	
I. INTRODUCTION	1
II. SITE BACKGROUND	1
III. INVESTIGATIVE PROCEDURES	
A.) Monitoring Well Installation	1
B.) Groundwater Sampling and Analysis	2
C.) Determination of Groundwater Flow Direction and Gradient	3
D.) Receptor Survey	3
3	
IV. PRODUCT BAILING	3
V. RISK ASSESSMENT	4
VI. CONCLUSIONS	4
VII. RECOMMENDATIONS	5
VIII. APPENDIX	
A1.) Site Location Map	1
A2.) Site Map	2
A3.) Groundwater Contour Map	3
A4.) Liquid Level Monitoring Data	4
A5.) Water Quality Sampling Results	5
A6.) Well Logs	6
A7.) Bailing Logs	8
A8.) Laboratory Reports	11

I. INTRODUCTION

This report details the results of the investigation of subsurface petroleum contamination at the Midway Oil Gulf Station in Manchester, Vermont. This work has been completed by Griffin International, Inc. (Griffin) for Midway Oil Corp. of Rutland, Vermont. The investigation was requested by the VTDEC to define the degree and extent of contamination and to assess the risks that it poses to potential receptors.

II. SITE BACKGROUND

Site Description

Midway Oil's Gulf Station in Manchester, Vermont is located on the east side of US Route 7A immediately north of Mountain View Terrace (see Site Location and Site Maps, pages 1 and 2 in the Appendix). The site is approximately 1000 feet south of the intersection of US Route 7A and VT Route 30 and approximately one half mile west of the Batten Kill River, which flows southerly in this area. The topography in the vicinity of the site slopes rather steeply to the west and very gently to the east. The soils at the site are mapped as glacial outwash overlaying Winooski Dolomite bedrock. The soil observed at the site during the drilling of monitoring wells #4 and #5 fit the description of outwash.

Gasoline at the station is stored in two UST's. A third UST, which only marginally passed a recent leak test, was taken out of service. The fuel is dispensed at a pump island on the west side of the Station. Gasoline is conveyed from the USTs to the pumps via underground piping.

The station, and surrounding homes and businesses, are served by the Town of Manchester municipal water and sewer system. The water supply system is fed by two gravel packed wells located about nine tenths of a mile to the southeast of the Gulf Station.

III. INVESTIGATIVE PROCEDURES

In order to define the extent of petroleum contamination at the site, Griffin installed two additional monitoring wells (MW4 and MW5) at the Gulf Station. These wells are situated to the north of the Gulf Station building and to the west of the underground stream. The locations of these and the existing monitoring wells are indicated on the Site Map in the Appendix. After installation, groundwater samples were collected from both new and existing monitoring wells.

The soil from the borings were visually inspected and screened with a photo-ionization device (PID) during the operation. The PID indicated the presence of petroleum contamination in the soil at these locations. Details and results of the work completed are presented below.

A.) Monitoring Well Installation

On January 28, 1993, two wells were installed by Frost Well Drilling of East Dorset, Vermont, under the direct supervision of a Griffin engineer. The wells were installed using air

rotary drilling equipment. Soil samples were collected, from each borehole, at approximately five foot intervals as the drill cuttings were expelled. The soil samples were screened for volatile organic compounds (VOCs) using a Photovac Micro TIP Model HL2000 PID and logged by the engineer. Soils encountered in the boreholes consisted of deposits of sand and gravel to their maximum depths. No bedrock was encountered in either boring.

Monitoring well locations are indicated on the Site Map on page 2 in the Appendix. MW5 is located to the north of the Gulf station building and slightly west of the underground stream. MW4 is located to the northwest of the building and north of the pump island. Both wells are north of the USTs on the site. These are located to the south of the Gulf Station building.

No PID readings were detected in the upper levels of the soil in either borehole. At depths of ten feet, a reading of 2 ppm was detected in the borehole for MW4 and a reading of 25 ppm was detected in the borehole for MW5. A petroleum odor was associated with the soils of both boreholes at the lower depths.

The monitoring wells are 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 a silica gravel pack to filter fine sediments from groundwater entering the well. At the top of the wells the annulus is filled with a bentonite clay seal to prevent surface water from infiltrating into the borehole. Each well is protected at the surface by locking well caps, flush mounted steel well head protection casings, and bolt down covers. The well protection casings are set in cement. Well construction details are listed on the well logs in the Appendix, pages 6 and 7.

B.) Groundwater Sampling and Analysis

On February 4, 1993, Griffin collected groundwater samples from monitoring wells MW2, MW3, MW4, MW5, and from the underground stream at the site. All samples collected were analyzed according to EPA Method 602 which tests for benzene, toluene, ethylbenzene, xylenes (the BTEX compounds), and MTBE (methyl tertiary butyl ether, an anti-knock gasoline additive). All samples were collected according to Griffin's groundwater sampling protocol which includes well development prior to sample collection.

The analysis of groundwater samples collected from wells MW3, MW4, and MW5, all hydraulically downgradient of the USTs, indicated elevated concentrations of BTEX and MTBE compounds. The sample from MW2 showed slight concentrations of several BTEX compounds but no MTBE. The sample taken from the stream showed no evidence of contamination from the constituents tested for. The water quality results from the analyses of the groundwater and stream samples are tabulated on page 5 of the Appendix, along with the Vermont Drinking Water Standards.

A slight petroleum odor was detected in monitoring well MW2 and a strong petroleum odor was detected in MW3 during sample collection. A 0.01 foot layer of free phase product was detected in MW1 during sample collection.

Duplicate, trip blank, and equipment blank samples taken during the sampling indicate that adequate quality assurance/quality control was maintained during sample collection and analysis. The QA/QC results are tabulated on page 5 of the Appendix.

C.) Determination of Groundwater Flow Direction and Gradient

Prior to groundwater sampling, Griffin measured the relative water table elevations in the five monitoring wells. Measurements were made relative to a benchmark (the top of casing of MW2), which was given an arbitrary elevation of 100 feet. Water level data is presented on page 4 of the Appendix.

The water table elevation of each monitoring well was calculated by subtracting the depth to water measurement (made from the top of the casings) from the assigned top of casing elevations. These water table elevations were used to produce the groundwater contour map shown on page 3 in the Appendix. Groundwater was encountered at depths ranging from approximately 8 to 9½ feet below grade. Groundwater was determined to be flowing northwesterly at a gradient of about 1 percent. The water table elevation was about one foot lower than the underground stream at the time the samples were taken.

D.) Receptor Survey

From visual surveys of the area conducted on November 29, 1992 and January 28, 1993, the potential receptors of subsurface contamination at the site include the underground stream that passes under the Gulf Station building, other nearby buildings and properties, and the Station building.

The stream was visually observed on January 28 and no sheen or other evidence of petroleum contamination was evident. In addition, the water sample taken from this source showed no detectable levels of contamination. This would indicate that the groundwater table was below the stream throughout its length through this reach, and/or that the culvert through which the stream passes under the site is sound throughout its length and no groundwater can pass into it. However, the latter hypothesis cannot be tested unless the water table rises above the level of the culvert.

IV. PRODUCT BAILING

A system of bailing of free product from monitoring wells was established in October of 1992. At that time daily bailing of MW1 was initiated along with weekly bailing of MW1, MW2, and MW3. Beginning in February 1993, monitoring wells MW4 and MW5 were also bailed on a weekly basis. Free product has only been found in MW1, and the amount recovered has been decreasing (see bailing logs on pages 16 to 18 of the Appendix). The total amount of product recovered to date is approximately 12 gallons. The bailing is being done by the Gulf Station manager and the recovered product is being stored on site.

V. RISK ASSESSMENT

During Griffin's inspection of the site, no water supply wells were identified in the vicinity of the site. As mentioned earlier, the homes and businesses in this area are served by Manchester municipal water and sewer service. Manchester's water supply system is served by two gravel packed wells adjacent to the Batten Kill River. The wells are located next to the water treatment plant which is approximately nine tenths of a mile to the southeast of the site. Therefore, there appears to be little or no risk to the water supply which serves the surrounding buildings. The potential for nearby buildings to be impacted by vapors also appears to be minimal due to the relatively low concentrations in the source area and the considerable distance between the source and these buildings.

The main potential receptor appears to be the underground stream that passes below the Gulf Station building. While there was no contamination detected during this phase of testing, the potential exists for contamination when the groundwater table is normally higher (in the spring and late fall). The existing contamination plume and groundwater flow gradient cross the stream.

VI. CONCLUSIONS

Based on the information gathered during this phase of work, Griffin has reached the following conclusions:

- 1) There was a release of gasoline to the subsurface in the vicinity of USTs at the Manchester Gulf Station. The amount and duration of the release is unknown. The likely source, one of the USTs, was taken out of service in November of 1992.
- 2) The release has resulted in residual, dissolved phase, petroleum contamination in the groundwater at the site as indicated by elevated contaminant concentrations in some of the on-site monitoring wells.
- 3) A thin layer of free phase product has been detected in MW1, which is immediately adjacent to the suspect UST. Approximately 12 gallons of free product has been recovered from MW1 since a bailing program was begun in October 1992. The amount of free product appearing in the well has been declining.
- 4) The contaminant concentrations in monitoring wells MW3, MW4, and MW5 indicate that the contaminant plume has migrated across the property in a northwesterly direction from the UST pit.
- 5) Subsurface materials appear to consist of glacial outwash. Sand and gravel to depths of approximately 13 feet below grade were observed during monitoring well installation. Bedrock was not encountered during the installation. The direction of flow of groundwater at the site is northwesterly, at a gradient of approximately 1%.

6) The groundwater table elevation, as measured during Griffin's survey, was below the underground stream at the time the survey was done. Analysis of a water sample from the underground stream indicated that contamination was not reaching this receptor at detectable concentrations at the time the samples were taken.

7) The homes and businesses in the vicinity of the site are served by a municipal water supply system which is fed by water from two gravel wells nearly a mile from the site. The risk posed to the municipal water supply appears minimal. The risk to nearby buildings also appears to be minimal.

8) Assuming there is no continued source of contamination, the natural processes of dilution, dispersion, and biodegradation should result in reduction of contamination concentrations to below detectable levels.

VII. RECOMMENDATIONS

Based on the results discussed above, Griffin makes the following recommendations:

1) To adequately document the expected reduction in contamination concentrations across the site, we recommend annual sampling/analysis of all the monitoring wells on the site. In addition, the stream should be sampled/analyzed during the annual sampling round. We recommend this should be initiated May 1993 to determine if the stream is impacted by the high water table.

2) To accelerate the reduction in contamination concentrations across the site, we recommend that the most highly contaminated soils be removed from the tank pit during scheduled removal of the suspect UST. These soils can be stockpiled on site, or off site, at a VTDEC approved location. The soils can be polyencapsulated to prevent the leaching of contaminants into clean soils and to enhance photodegradation of the contamination.

3) We recommend that the monitoring well bailing program be continued as follows:

- a) bail MW1 weekly
- b) bail all five wells monthly.

Bailing can continue to be done by the station manager.

APPENDIX

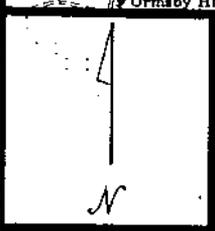


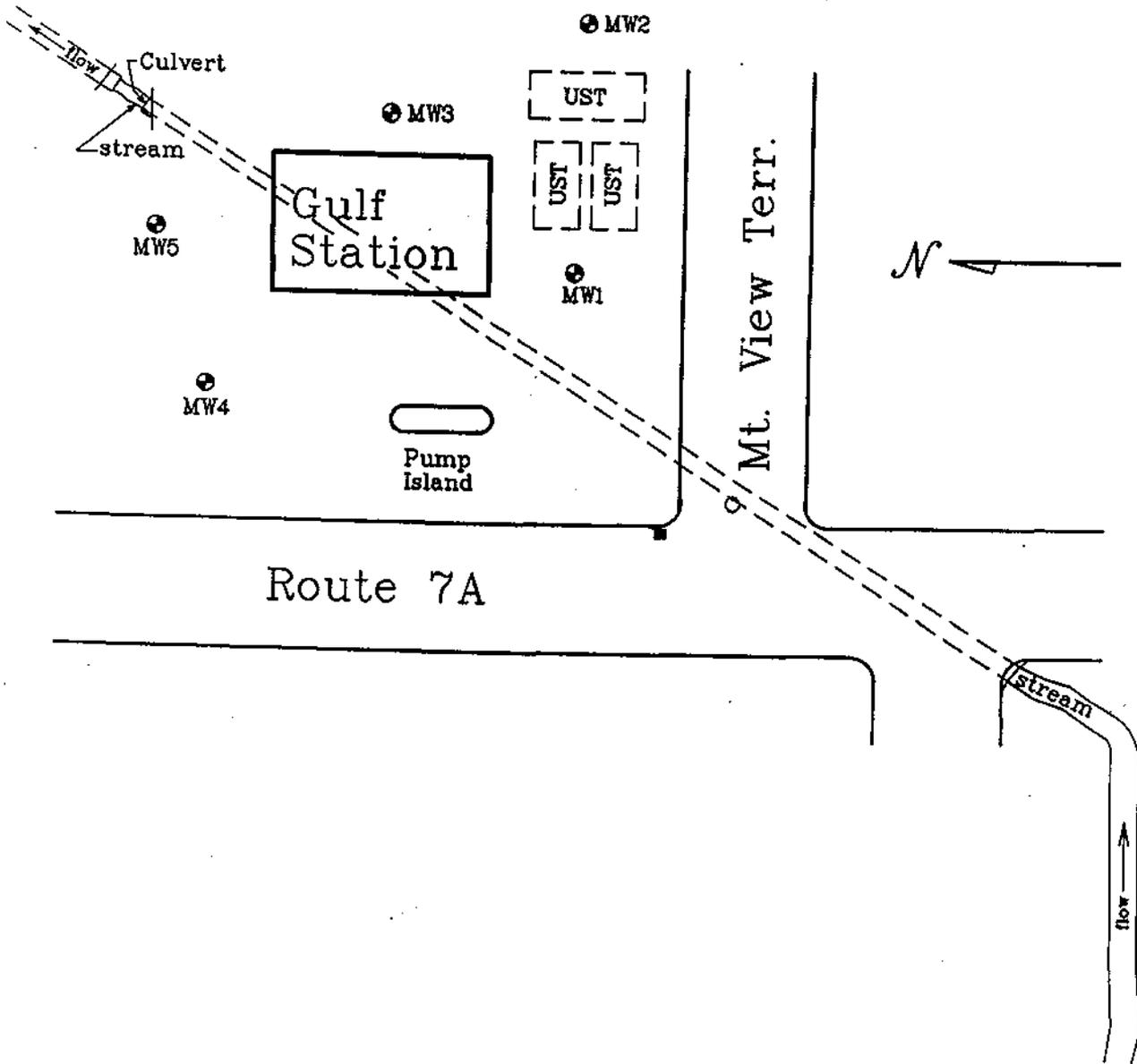
SITE LOCATION MAP

**MANCHESTER GULF
MANCHESTER, VERMONT**

GRIFFIN PROJECT #11924315
 SOURCE: USGS 7.5 MIN QUAD MANCHESTER, VT
 SCALE: 1:24,000
 CONTOUR INTERVAL 20 FEET
 1968 EDITION

GRIFFIN INTERNATIONAL, INC.





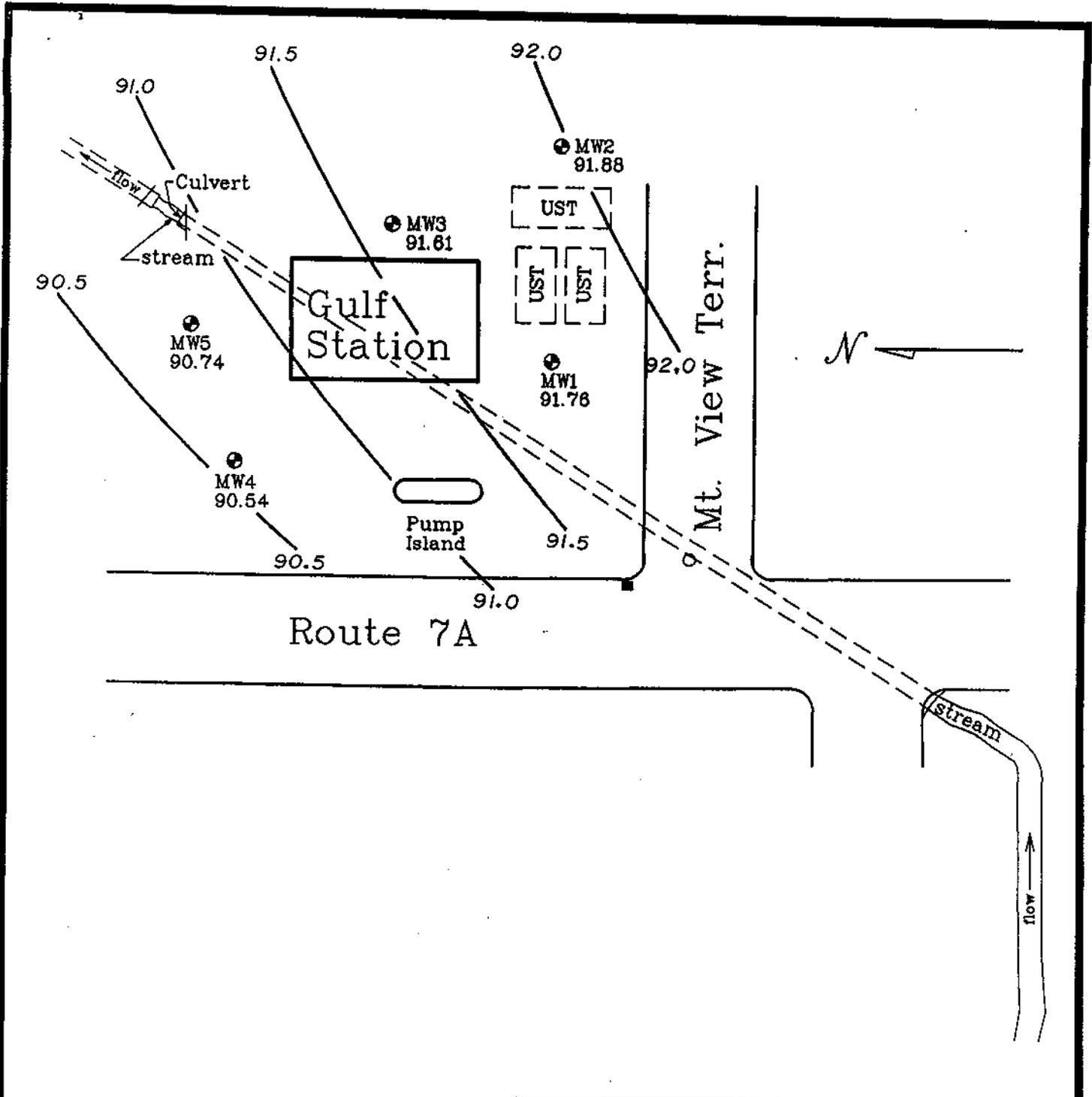
SITE MAP
MANCHESTER GULF STATION
MANCHESTER, VERMONT

● MW3 } MONITORING WELL WITH I.D.

DRAWN: 3/2/93
GRIFFIN PROJECT #: 11924315
REF: MANGULF

0 30 60 90

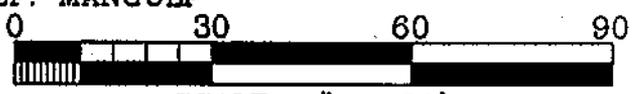
SCALE: 1" = 30'



**GROUNDWATER CONTOUR MAP
MANCHESTER GULF STATION
MANCHESTER, VERMONT**

● MW3 } MONITORING WELL WITH I.D. AND
92.35' } WATER TABLE ELVATION IN FEET

MONITORING DATE: 2/4/93
GRIFFIN PROJECT #: 11924315
REF: MANGULF



SCALE: 1" = 30'

**Liquid Level Monitoring Data
Manchester Gulf
Manchester, Vermont**

Monitoring Date: 2 / 4 / 93

Well I.D.	Well Depth	Top of Casing Elevation	Depth To Product	Depth To Water	Product Thickness	Specific Gravity Of Product	Hydro Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	n/a	98.69	6.93	6.94	0.01	0.88	0.01	6.93	91.76
MW-2	n/a	100.00	-	8.12	-	-	-	-	91.88
MW-3	n/a	98.22	-	6.61	-	-	-	-	91.61
MW-4	13.	98.10	-	7.56	-	-	-	-	90.54
MW-5	13.	98.12	-	7.38	-	-	-	-	90.74

All Values Reported in Feet
n/a = notavailable

**Water Quality Sampling Results
Midway Oil Gulf Station
Manchester, Vermont**

Sampling Date: February 4, 1993

PARAMETER	Location								Vt. Drinking Water Standards
	MW-2	MW-3	MW-4	MW-5	Stream	Duplicate	Trip Blank	Equip. Bl.	
Benzene	TBQ	83.1	17.1	29	ND	11.1	ND	ND	5.0*
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	100**
1,2-DCB	ND	ND	ND	ND	ND	ND	ND	ND	-
1,3-DCB	ND	ND	ND	ND	ND	ND	ND	ND	-
1,4-DCB	ND	ND	ND	ND	ND	ND	ND	ND	-
Ethylbenzene	1.2	271	88.7	149	ND	69.3	ND	ND	680**
Toluene	ND	78.2	13.7	35.1	ND	8.8	ND	ND	2,420**
Xylenes	2.8	1170	129	519	ND	105	ND	ND	400**
Total BTEX	4	1802.3	248.5	732.1	ND	194.2	ND	ND	-
MTBE	ND	246	38.9	172	ND	32	ND	ND	40**
BTEX+MTBE	4	1848.3	287.4	904.1	ND	226.2	ND	ND	-

All Values Reported in ug/L (ppb)

* - Maximum Contaminant Level

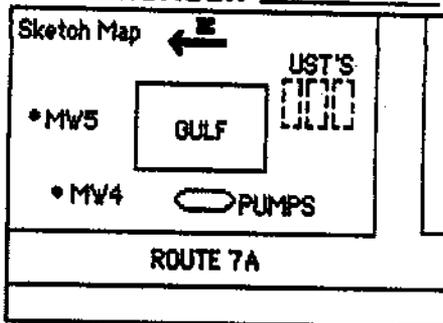
** - Health Advisory Level

ND - None Detected

TBQ - Trace Below Quantitation Limit

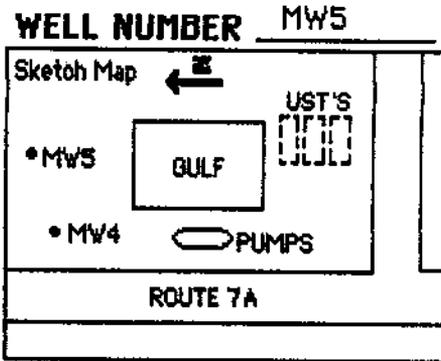
PROJECT MANCHESTER GULF
 LOCATION MANCHESTER, VT
 DATE DRILLED 1/28/93 TOTAL DEPTH OF HOLE 13'
 DIAMETER 6"
 SCREEN DIA. 2" LENGTH 10' SLOT SIZE .010"
 CASING DIA. 2" LENGTH 2.5' TYPE PVC
 DRILLING CO. FROST DRILLING METHOD AIR ROTARY
 DRILLER JODY LOG BY M. CASSARA

WELL NUMBER MW4



DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		ROAD BOX		GRADE
1		WELL CAP		Light brown, medium to coarse SAND, some fine Gravel, little Silt. 0 ppm.
2		CONCRETE		
2		NATIVE BACKFILL		Dark brown, medium to coarse SAND, some medium and fine Gravel, little Silt. 2 ppm.
3		BENTONITE		
3		WELL RISER		WATER TABLE ▼
4		WELL SCREEN		
6		GRAVEL PACK		
13		BOTTOM CAP		
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

PROJECT MANCHESTER GULF
 LOCATION MANCHESTER, VT
 DATE DRILLED 1/28/93 TOTAL DEPTH OF HOLE 13'
 DIAMETER 6"
 SCREEN DIA. 2" LENGTH 10' SLOT SIZE .010"
 CASING DIA. 2" LENGTH 2.5' TYPE PVC
 DRILLING CO. FROST DRILLING METHOD AIR ROTARY
 DRILLER JODY LOG BY M. CASSARA



DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0		ROAD BOX		GRADE
1		WELL CAP		Light brown, medium to coarse SAND, little fine Gravel, little Silt. 0 ppm.
2		CONCRETE		
2		NATIVE BACKFILL		
2		BENTONITE		
3		WELL RISER		
4		WELL SCREEN		
5				
6		GRAVEL PACK		Dark brown, medium to coarse SAND, some fine Gravel, little Silt. OILY, 25 ppm.
7				
8				WATER TABLE ▼
9				
10				
11				
12				
13		BOTTOM CAP		
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

October 92

1 2 3

RECEIVED

1 2 3

10/31/92	ok	ok	ok	NOV 4	Y2"		
10/10/92	ok	ok	ok	NOV 5	Y4"		
10/17/92	2"	ok	ok	NOV 6	Y2"		
10/21/92	1/4"			NOV 7	Y4"		
10/22/92	Y2"			NOV 8	Y4"		
10/23/92	1/2"			NOV 9	Y4"		
10/24/92	1/4"			NOV 10	Y4"	OK	OK
10/25/92	0			NOV 11	Y4"		
10/26/92	3/4"			NOV 12	Y4"		
10/27/92	3"	OK		NOV 13	Y4"		
10/31/92				NOV 14	Y4"		
10/28/92	3/4"	OK	OK	NOV 15	0		
10/29/92	1/2"			NOV 16	0		
10/31/92	1/4"			NOV 23	Y4"	OK	OK
NOV				NOV 24	Y4"		
11/1/92				NOV 25	Y4"		
11/2/92	5"			NOV 26	Y4"		
				NOV 27	Y4"		
				NOV 28	Y4"		
				NOV 29	Y4"		
				NOV 30	Y4"		
				DEC 1	0		
				DEC 2	Y4"		
				DEC 3	Y4"		
				DEC 4	OK		
				DEC 5	OK		

1492

1993

RECORDS

	1	2	3
DEC 6			
DEC 7	OK	OK	OK
DEC 8	OK		
DEC 9	OK		
DEC 10	OK		
DEC 11	OK		
DEC 12	OK		
DEC 14	OK		
DEC 15	OK		
DEC 16	OK		
DEC 17	OK		
DEC 18	OK		
DEC 19	OK		
DEC 21	OK	OK	OK
DEC 22	OK		
DEC 23	OK		
DEC 24	OK		
DEC 26	OK	OK	OK
DEC 28	1/4"		
DEC 29	OK		
DEC 30	OK		
DEC 31	OK		
JAN 2	1/4"		
JAN 4	OK	OK	OK

	1	2	3
JAN 5	OK		
JAN 6	OK		
JAN 7	OK	OK	OK
JAN 8	OK		
JAN 9	OK		
JAN 11	1/4"		
JAN 12	OK		
JAN 13	OK		
JAN 14	OK		
JAN 15	1/4"		
JAN 16	1/4"		
JAN 18	OK	OK	OK
JAN 19	OK		
JAN 20	OK		
JAN 21	1/4"		
JAN 22	1/4"		
JAN 23	OK		
JAN 25	OK		
JAN 26	1/4"	OK	OK
JAN 27	1/4"		
JAN 28	1/4"		
JAN 29	1/4"		
JAN 30	OK		
FEB 1	OK		

1993

	1	2	3	4	5
FEB 2					
FEB 3	Y ¹¹				
FEB 4	OK	OK	OK	OK	OK
FEB 5	OK				
FEB 6	OK				
FEB 8	OK				
FEB 9	OK				
FEB 10	OK	OK	OK	OK	OK
FEB 11	OK				
FEB 12	OK				
FEB 13	OK				
FEB 15	OK				
FEB 16	OK				
FEB 17	OK				
FEB 18	OK	OK	OK	OK	OK
FEB 19	OK				
FEB 20	Y ¹¹				
FEB 22	Y ⁴				
FEB 23	OK				
FEB 24	Y ¹¹				
FEB 25	OK	OK	OK	OK	OK
FEB 26	OK				

	1	2	3	4	5
FEB 27	OK				
MARCH 1	OK				
MARCH 2	OK				
MARCH 3	OK	OK	OK	OK	OK
MARCH 4	OK				
MARCH 5	OK				
MARCH 6	OK				
MARCH 8	OK				
MARCH 9	OK				
MARCH 10	OK				


ENDYNE, INC.

RECEIVED FEB 26 1993

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: Manchester Gulf
 REPORT DATE: February 19, 1993
 DATE SAMPLED: February 4, 1993
 DATE RECEIVED: February 5, 1993
 ANALYSIS DATE: February 18, 1993

 PROJECT CODE: GIMA1986
 REF.#: 42,066
 STATION: MW #2
 TIME SAMPLED: 14:15
 SAMPLER: D. Tourangeau

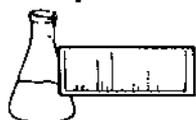
<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	TBQ ¹
Chlorobenzene	1	ND ²
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	1.2
Toluene	1	ND
Xylenes	1	2.8
MTBE	5	ND

Bromobenzene Surrogate Recovery: 86%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >25

NOTES:

- 1 Trace below quantitation limit
- 2 None detected


ENDYNE, INC.

 RECEIVED FEB 25 1993
 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: Manchester Gulf
 REPORT DATE: February 19, 1993
 DATE SAMPLED: February 4, 1993
 DATE RECEIVED: February 5, 1993
 ANALYSIS DATE: February 18, 1993

 PROJECT CODE: GIMA1986
 REF.#: 42,063
 STATION: MW #3
 TIME SAMPLED: 13:43
 SAMPLER: D. Tourangeau

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	10	83.1
Chlorobenzene	10	ND ²
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
Ethylbenzene	10	271.
Toluene	10	78.2
Xylenes	10	1,170.
MTBE	50	246.

 Bromobenzene Surrogate Recovery: CI³

NUMBER OF UNIDENTIFIED PEAKS FOUND: >25

NOTES:

- 1 Detection limit raised due to high levels of contaminants. Sample run at 10% dilution.
- 2 None detected
- 3 Coelution Interference



ENDYNE, INC.

RECEIVED FEB 26 1993

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: Manchester Gulf
REPORT DATE: February 19, 1993
DATE SAMPLED: February 4, 1993
DATE RECEIVED: February 5, 1993
ANALYSIS DATE: February 18, 1993

PROJECT CODE: GIMA1986
REF.#: 42,062
STATION: MW #4
TIME SAMPLED: 13:20
SAMPLER: D. Tourangeau

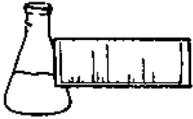
<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	17.1
Chlorobenzene	1	ND ¹
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	88.7
Toluene	1	13.7
Xylenes	1	129.
MTBE	5	38.9

Bromobenzene Surrogate Recovery: CI²

NUMBER OF UNIDENTIFIED PEAKS FOUND: >25

NOTES:

- 1 None detected
- 2 Coelution Interference


ENDYNE, INC.
RECEIVED FEB 26 1993
 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: Manchester Gulf
 REPORT DATE: February 19, 1993
 DATE SAMPLED: February 4, 1993
 DATE RECEIVED: February 5, 1993
 ANALYSIS DATE: February 18, 1993

 PROJECT CODE: GIMA1986
 REF.#: 42,064
 STATION: MW #5
 TIME SAMPLED: 13:55
 SAMPLER: D. Tourangeau

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	10	29.0
Chlorobenzene	10	ND ²
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
Ethylbenzene	10	149.
Toluene	10	35.1
Xylenes	10	519.
MTBE	50	172.

 Bromobenzene Surrogate Recovery: CI³

NUMBER OF UNIDENTIFIED PEAKS FOUND: >25

NOTES:

- 1 Detection limit raised due to high levels of contaminants. Sample run at 10% dilution.
- 2 None detected
- 3 Coelution Interference


ENDYNE, INC.

RECEIVED FEB 26 1993
 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: Manchester Gulf
 REPORT DATE: February 19, 1993
 DATE SAMPLED: February 4, 1993
 DATE RECEIVED: February 5, 1993
 ANALYSIS DATE: February 18, 1993

PROJECT CODE: GIMA1986
 REF.#: 42,065
 STATION: Stream
 TIME SAMPLED: 14:08
 SAMPLER: D. Tourangeau

<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	5	ND

Bromobenzene Surrogate Recovery: 97%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected


ENDYNE, INC.

 RECEIVED FEB 26 1993
 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: Manchester Gulf
 REPORT DATE: February 19, 1993
 DATE SAMPLED: February 4, 1993
 DATE RECEIVED: February 5, 1993
 ANALYSIS DATE: February 18, 1993

 PROJECT CODE: GIMA1986
 REF.#: 42,067
 STATION: Duplicate
 TIME SAMPLED: 13:20
 SAMPLER: D. Tourangeau

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	11.1
Chlorobenzene	1	ND ¹
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	69.3
Toluene	1	8.8
Xylenes	1	105.
MTBE	5	32.0

 Bromobenzene Surrogate Recovery: CI²

NUMBER OF UNIDENTIFIED PEAKS FOUND: >25

NOTES:

- 1 None detected
- 2 Coelution Interference



ENDYNE, INC.

RECEIVED FEB 26 1993

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: Manchester Gulf
REPORT DATE: February 19, 1993
DATE SAMPLED: February 4, 1993
DATE RECEIVED: February 5, 1993
ANALYSIS DATE: February 18, 1993

PROJECT CODE: GIMA1986
REF.#: 42,061
STATION: Trip Blank
TIME SAMPLED: 7:40
SAMPLER: D. Tourangeau

<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	5	ND

Bromobenzene Surrogate Recovery: 92%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected

RECEIVED FEB 26 1993


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: Manchester Gulf
 REPORT DATE: February 19, 1993
 DATE SAMPLED: February 4, 1993
 DATE RECEIVED: February 5, 1993
 ANALYSIS DATE: February 18, 1993

 PROJECT CODE: GIMA1986
 REF.#: 42,068
 STATION: Equipment Blank
 TIME SAMPLED: 14:20
 SAMPLER: D. Tourangeau

<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	5	ND

Bromobenzene Surrogate Recovery: 96%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected