



August 5, 1994

Mr. Charles B. Schwer
Vermont ANR/DEC
Hazardous Materials Management Division
103 South Main Street/West Building
Waterbury, Vermont 05671-0404

RE: Site Assessment at Engineer's Construction, Inc., Williston Road, Williston, Vermont
(VT DEC Site #89-0331)

Dear Mr. Schwer:

Please find enclosed the *Report on the Investigation of Subsurface Petroleum Contamination* for the above referenced site. Please call me if you have any questions regarding this report or the site in general.

Sincerely,

Erik C. Sandblom
Engineer

Enclosure

cc: Alan Pidgeon, Engineers Construction, Inc. (No enclosure)

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I. INTRODUCTION

The following report details the investigation of subsurface petroleum contamination at Engineer's Construction, Inc. located on Williston Road in Williston, Vermont. This investigation has been conducted by Griffin International, Inc. (Griffin) for Engineer's Construction, Inc. in response to a request from the Vermont Department of Environmental Conservation (DEC) that work be completed to further define the degree and extent of petroleum contamination at the site. This request came in a letter from Mr. Charles Schwer of the DEC to Mr. Alan Pigeon of Engineer's Construction, Inc. dated April 14, 1994. The work presented here has been conducted in accordance with the Griffin Work Plan dated April 26, 1994 for this site. This work plan was approved by the DEC on May 6, 1994 with the understanding that one of the water sample analyses would be analyzed per EPA Method 8240 instead of EPA Method 602.

The investigation involved the installation of three monitoring wells in the vicinity of three former underground storage tanks (USTs) at the site and the subsequent sample collection and analysis of groundwater from all monitoring wells associated with the site. In addition, petroleum contaminated soils removed from the ground during the UST removals were screened for volatile organic compounds (VOCs) with a photo ionization detector (PID).

II. SITE BACKGROUND

A. Site Description

Engineer's Construction, Inc. is a construction company located in a business / light industrial district on the west side of Williston, Vermont. The site consists of several buildings and a storage yard for soil, materials, and equipment. The building uses are primarily office and storage and repair of construction equipment. The entire site is bordered to the north by Williston Road, to the east and south by woods and swamp, and to the west by a ravine to the Muddy Brook. This site investigation was focused on the localized area of the three former USTs and directly to the south, near a former diesel UST and an aboveground storage tank (AST).

All buildings at Engineer's Construction and other neighboring buildings are supplied water from Champlain Water District, and are served by the local sewage treatment plant. No private water supplies or septic systems were identified in the area.

Based on The State of Vermont Surficial Geologic Map, the soils in the vicinity of Engineers Construction, Inc. consist primarily of pebbly marine sands and lake bottom sediments (i.e. silt and silty clay). The soils encountered during the monitoring well installation portion of this investigation were primarily saturated silt and clay overlain by gravel fill material.

B. Site History

Two USTs used to contain diesel fuel were removed from the ground at the site in May of 1989. These tanks were located across the street (Engineer's Drive) from the current All-Cycle building. Some petroleum contamination was detected in the soils with a photoionization detector (PID) at the time of tank removal, and 75 cubic yards of petroleum contaminated soil were removed from the ground and stockpiled on polyethylene. The Vermont DEC conducted the inspection of this tank removal.

A 10,000 gallon capacity diesel UST was also removed from the ground at the site in January, 1993. This tank was located immediately to the south of the fence surrounding the All-Cycle building. This tank was removed because free diesel product was discovered in a leak detection monitoring well. All contaminated soils in the vicinity of the tank were removed and treated by land farming. Griffin International conducted an inspection of the tank and tank pit area in March of 1993. Only very small levels of contamination were detected (less than 1.0 part per million (ppm) of volatile organic compounds (VOCs) as measured with a photoionization detector (PID)). No visual contamination was observed in the monitoring wells during this inspection. It was later determined that the detection of product in the monitoring well was most likely the result of an overfill that occurred when the pump was operated unattended. Currently, five monitoring wells are located in the vicinity of this former UST and an existing gasoline UST for the purpose of providing leak detection per Vermont UST Regulations.

In January of 1994, three abandoned USTs were removed from the east side of the All-Cycle building at the site. One of the tanks had been used to store waste oil and the other two were used to store gasoline. All tanks had a capacity of 2,000 gallons and were 20 years old at the time of removal. During the removal of these tanks, petroleum contamination was detected in the soils surrounding the tanks. Most contaminated soils (approximately 28 cubic yards) were removed from the ground and stockpiled at the site on and completely covered with a polyethylene liner. Only very low levels of petroleum contamination (less than 1.0 ppm of VOCs) were detected in the soils that remained.

As a result of the contamination detected and the generation of stockpiled contaminated soils during this tank removal, the Vermont DEC requested that a site assessment be conducted to further determine the degree and extent of petroleum contamination at the site and to develop a plan for the remediation of the petroleum contaminated soils stockpiled on-site.

III. INVESTIGATIVE PROCEDURES

A. Monitoring Well Installation

On May 27, 1994, three groundwater monitoring wells (MW-4, MW-5, and MW-6) were installed to further determine the extent and degree of subsurface contamination in the vicinity of the All-Cycle building at Engineer's Construction, Inc. and the USTs system. The locations of the wells are displayed on the site map in Appendix B. Also shown are the leak detection monitoring wells for a gasoline UST and the diesel UST that was removed in January, 1993.

The new wells were installed by Engineers Construction, Inc. with the use of an 18 inch diameter post hole auger under the direct supervision of a Griffin engineer. Soil samples were collected from the auger at three to five foot intervals. Soil types from each boring were noted and logged in detail. Each soil sample was screened for VOCs with a HNu Systems PI-101 PID.

Each well was constructed with ten feet of factory slotted, two inch diameter PVC pipe with a slot size of 0.010 inch, positioned approximately five feet above the water table to five feet below the water table. The wells were completed with a two inch Schedule 40 PVC riser to just below the ground surface. The annulus between the well screen and the borehole was filled in with sand to approximately two feet above the well screen where it was sealed with a two foot thick bentonite clay plug. The remainder of the annulus was filled in with native material from the boring. A water-tight cap was placed at the top of each well and a flush-mounted manhole cover installed for protection. All wells were installed in accordance with Griffin protocols which comply with State and industry standards. Detailed well logs are included in Appendix C at the end of this report.

Monitoring well 4 (MW-4) was installed at a depth of 11 feet below the ground surface in the former waste oil tank location. Soils from this boring were primarily three feet of brown and red fine sand with gravel over two feet of brown and red saturated sand and silt over gray saturated soupy silt. The water table was encountered at approximately 3.5 feet below the surface. Screening the head space of the samples collected in clean plastic bags indicated a VOC concentration of 0.1 ppm in soils within three feet of the surface to 0.2 ppm at 3 to 5 feet, and 0.2 ppm between 9 and 10 feet below grade.

Monitoring well 5 (MW-5) was positioned at the east edge of the former gasoline tank pit, directly off the northeast corner of the All-Cycle building. The soil boring extended to 12 feet below grade and the base of the well was positioned at 11 feet below the ground surface. Groundwater was encountered at approximately 3.5 feet. VOC concentrations in the soils ranged from 0.4 ppm at the surface to 0.3 ppm at 3 to 5 feet and 0.0 ppm from 9 to 10 feet below grade.

The location of monitoring well 6 (MW-6) is on the north side of the All-Cycle building in the assumed hydraulically downgradient direction of the USTs. The soil samples collected from the soil boring for MW-6 were two feet of brown fine sand fill over two feet of brown clumpy silty clay, over one foot of wet gray clay with some sand, over gray dense clay with black and white coarse sand. The water table was encountered at approximately 4 feet below grade. The base of the well was placed at 11.5 feet below grade. PID screening results indicated that the soils contained 0.0 ppm VOCs from zero to 2 feet below the surface, 0.2 ppm between 2 and 5 feet, and 0.1 ppm at 9 to 10 feet below grade.

B. Determination of Groundwater Flow

Once the monitoring wells were installed, they were allowed to stabilize for a period of approximately one week. After this period, depth to water measurements were taken with the use of a Keck interface probe for four site related wells (MW-3 through MW-6). These

measurements were subtracted from the top of casing elevations, which were determined relative to an arbitrary datum of 100 feet at top of the casing for MW-4, to determine the water table elevation at each of the wells. From this data, the groundwater contours were interpolated onto the site map and the groundwater direction and gradient determined. The groundwater contour map was only generated based on data collected from the three wells in the vicinity of the All-Cycle building (MW-4, MW-5, MW-6) since casing elevation data was determined only for these three wells. The depth to groundwater is available for MW-3, however, the relative water table elevation is unknown.

From the water level measurements summarized in Appendix E and the groundwater contour map displayed in Appendix B, the calculated groundwater flow for June 10, 1994 was generally to the southwest at a gradient of 2.5%. This flow pattern is very likely given the local soil types and surface water drainage patterns to the Muddy Brook on the west side of the site.

C. Groundwater Sampling and Analysis

On June 10, 1994, samples of the groundwater were collected from the three monitoring wells in the vicinity of the All-Cycle building (MW-4, MW-5, MW-6), and one well from the former diesel UST vicinity (MW-3). No free floating petroleum product was observed in any of the monitoring wells. All samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), common constituents found in petroleum products, and MTBE, a common gasoline additive, per EPA Method 602, except for the well closest to the former location of the waste oil tank (MW-4) which was analyzed per EPA Method 8240. Results of the laboratory analysis for those wells sampled on this date are summarized in Appendix D.

According to the results of the analyses, none of the samples collected from the wells contained petroleum contamination in excess of Vermont Drinking Water Standards. The water samples collected from MW-3, MW-5, and MW-6 contained no detectable concentrations of any of the compounds tested for. The sample collected from MW-4 contained 7.0 parts per billion (ppb) chlorobenzene, and trace below the quantitation limits for total xylenes, 1,4-dichlorobenzene, and 1,2-dichlorobenzene with detection limits of 3.0 ppb, 2.0 ppb, and 2.0 ppb, respectively.

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

D. Stockpiled Soil Screening

A total of approximately 28 cubic yards of petroleum contaminated soils remain at the site fully encapsulated in a polyethylene liner. These soils were screened with a properly calibrated HNu PI-101 PID at the time of water sample collection on June 10, 1994 in order to monitor the

gradual decline of detectable contamination in the soils. Twelve soil samples were collected from two soil piles at varying depths and placed in clean plastic bags and closed. The samples were lightly crushed and agitated, then the headspace of the bag was screened with the PID. Results of the screening indicated a VOC concentration in the soil samples ranging from 0.7 ppm to 50 ppm with an average of 8.8 ppm.

E. Sensitive Receptor Risk Assessment

Because only very low levels of petroleum contamination were detected in the soils and groundwater at this site, it is not likely that there are any potential receptors at risk of petroleum contamination impact. However, a visual survey was conducted while Griffin was on-site for the installation of the monitoring wells, and this is described below.

All-Cycle Building

The nearest building to the area of suspected contamination is the All Cycle Building. It is a steel building built on concrete slab. As a result of its construction it is not at risk of being impacted by petroleum contamination if present in soils surrounding the building. The building was not entered while Griffin was on-site, however, conversations with personnel indicated that no petroleum odors have ever been detected in the building.

Low Lying Wet Areas

Low lying wet areas are located approximately 120 feet to the east of the areas of suspected contamination. The elevation of the ground and water in this area is approximately five feet below the elevation of the All-Cycle building and yard. If contamination was present in the former tank pit areas surrounding the All-Cycle building, the likelihood of contaminant transport to these wet areas is very minute due to the direction of groundwater flow, which was to the southwest on the date of sample collection. The groundwater flow most likely flows in this general direction throughout the entire year, based on local topography and surface drainage patterns.

The wet areas to the east of the All-Cycle building were visually inspected for signs of petroleum contamination during monitoring well installation. No sheens were observed on standing water or on water slowly flowing to the south along the base of the bank up to the yard. No staining was observed on the soils along the bank or exposed in the woods, nor was any stressed vegetation observed. Water from the swamp flows to the south to a culvert located near the southeast corner of the fenced in area around the building. This culvert appears to lead across the entire site to a drainage ditch that leads to the Muddy Brook.

The Muddy Brook

The Muddy Brook flows to the north through the bottom of a ravine, along the west edge of the Engineers Construction property. It flows into the Winooski River. Its distance to the All Cycle

building is approximately 800 feet with a sudden elevation drop of 20 to 30 feet at the west edge of the property. Although the groundwater flows in the direction of the river, this separation distance significantly reduces the likelihood of petroleum contamination impact to the brook from contamination at the All-Cycle building. Griffin Inspected the Muddy Brook and the drainage ditch leading from underneath the site to the Muddy Brook while on-site. No evidence of petroleum contamination impact was observed.

IV. CONCLUSIONS

Based on the data collected from the Engineer's Construction, Inc. and vicinity in Williston, Vermont, from May through July 1994, the following conclusions can be made.

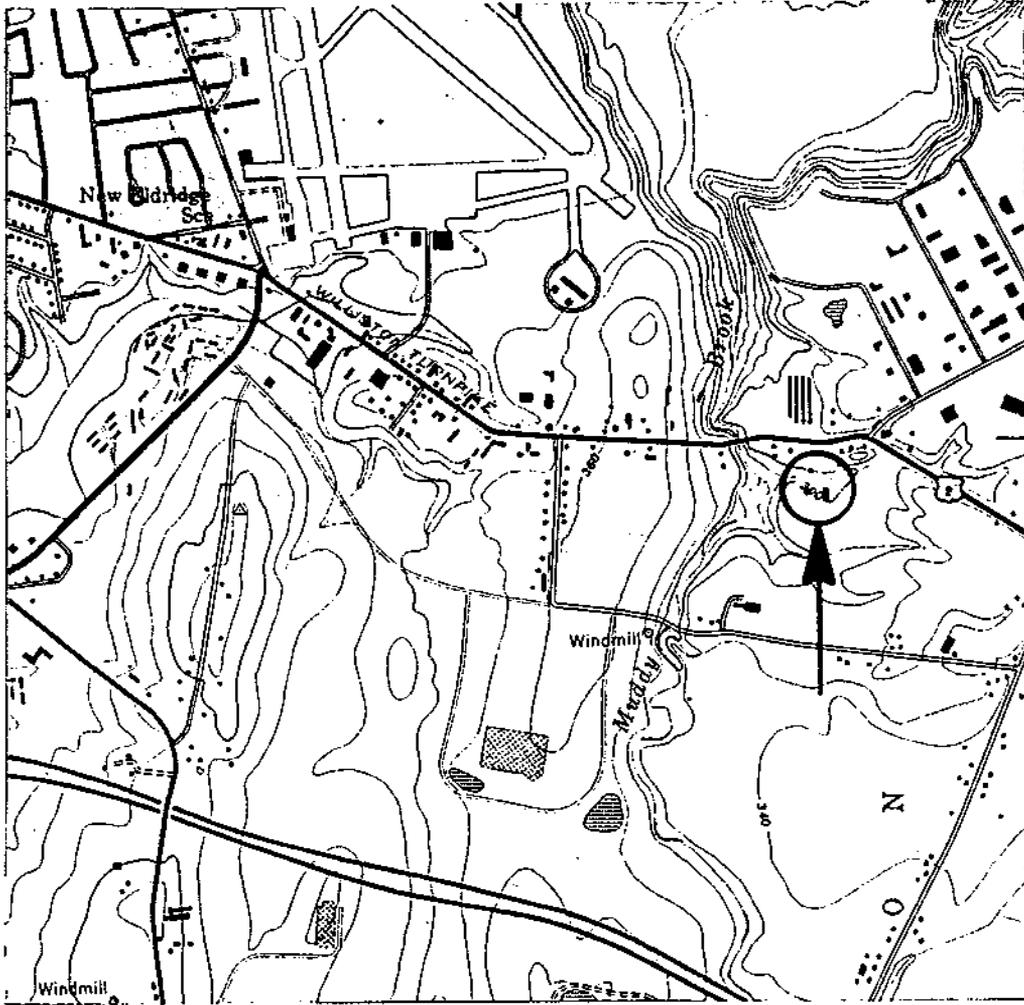
- 1) Very low levels of petroleum contamination exists in the soils (absorbed) and in the groundwater (dissolved) in the vicinity of the former waste oil UST. All detectable concentrations of contamination are significantly lower than Vermont Drinking Water Standards.
- 3) As the waste oil tank and other USTs have been removed from the ground in accordance with state guidelines, there does not exist on site a continuing source of petroleum contamination.
- 3) There is no unacceptable risk of petroleum contamination impact to potential receptors in the area.
- 4) Approximately 28 cubic yards of petroleum contaminated soils remain stockpiled at the site completely encapsulated in a polyethylene liner. Over time, the natural processes of volatilization and biodegradation will reduce contaminant concentrations present in the stockpiled soils to non-detectable concentrations as measured by a PID.

V. RECOMMENDATIONS

Based on the above conclusions, Griffin recommends the following action at Engineer's Construction, Inc. in Williston, Vermont:

- 1) Due to the lack of significant concentrations of petroleum contamination in monitoring wells at the site, the monitoring wells do not need to be sampled again. The integrity of the wells should remain in-tact, however, in case data collected from these wells may prove to be useful in the future.
- 2) The petroleum contaminated soils stockpiled at the site should be screened with a PID on a semi-annual basis (once in the spring after thaw, and once in the fall before freezing) until the VOC concentrations have been reduced to below detectable concentrations. Then, after proper approval from the Vermont DEC, the soils may be spread on-site and the site will be eligible to be considered for Sites Activity Management Completed (SMAC) status.

APPENDIX A
SITE LOCATION MAP



JOB #: 12934475
 SOURCE: USGS- BURLINGTON, VERMONT QUADRANGLE



ENGINEER'S CONSTRUCTION

WILLISTON, VERMONT

SITE LOCATION MAP

DATE: 6/2/94

DWG #1

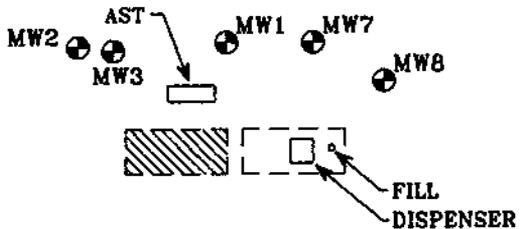
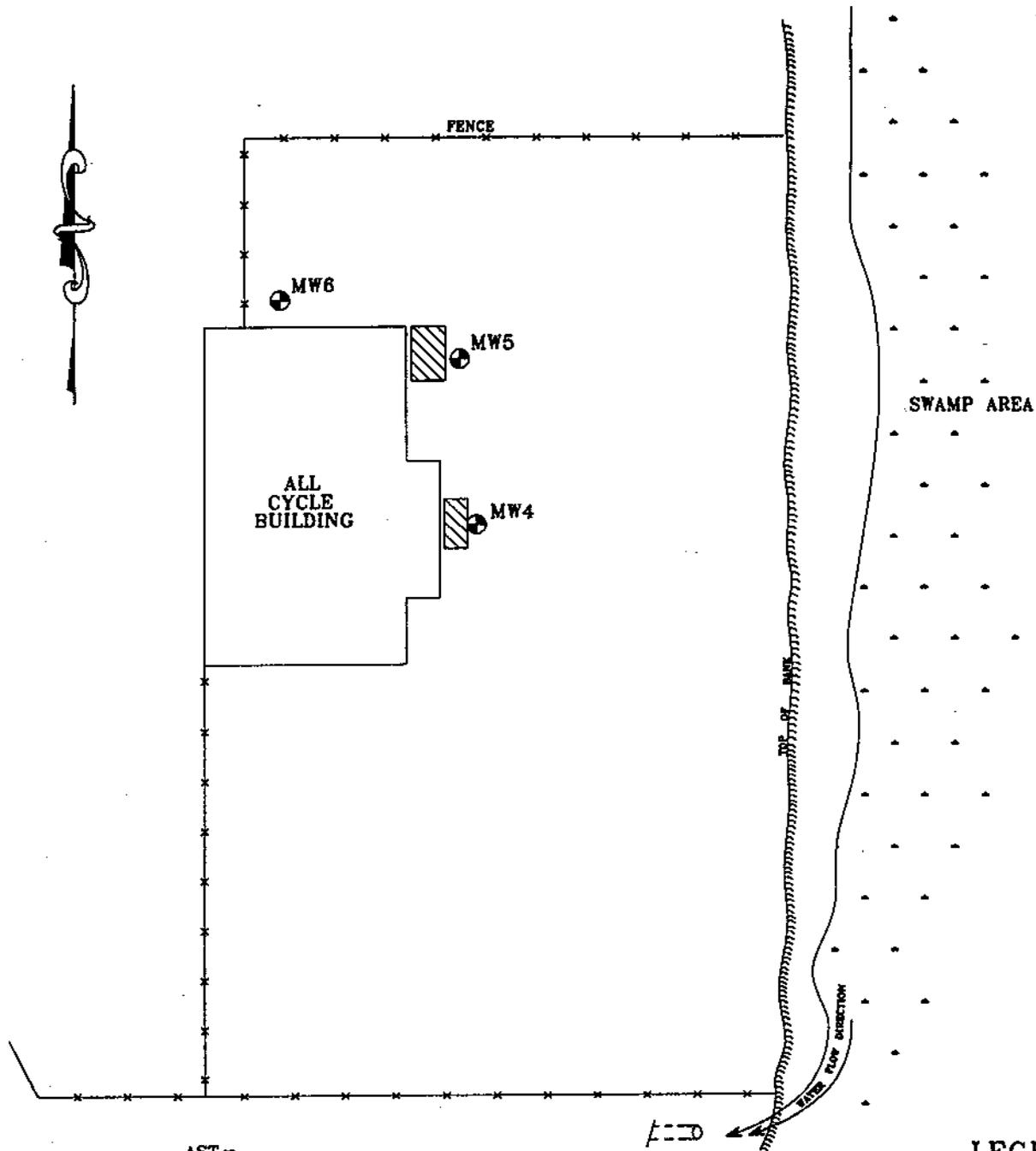
SCALE: 1:24000

DRN: SB

APP: ES

APPENDIX B

SITE MAPS



LEGEND

- MW4 MONITORING WELL
- FORMER UST TANK BASIN
- EXISTING UST

JOB #: 12934475

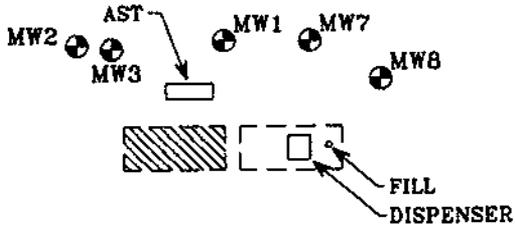
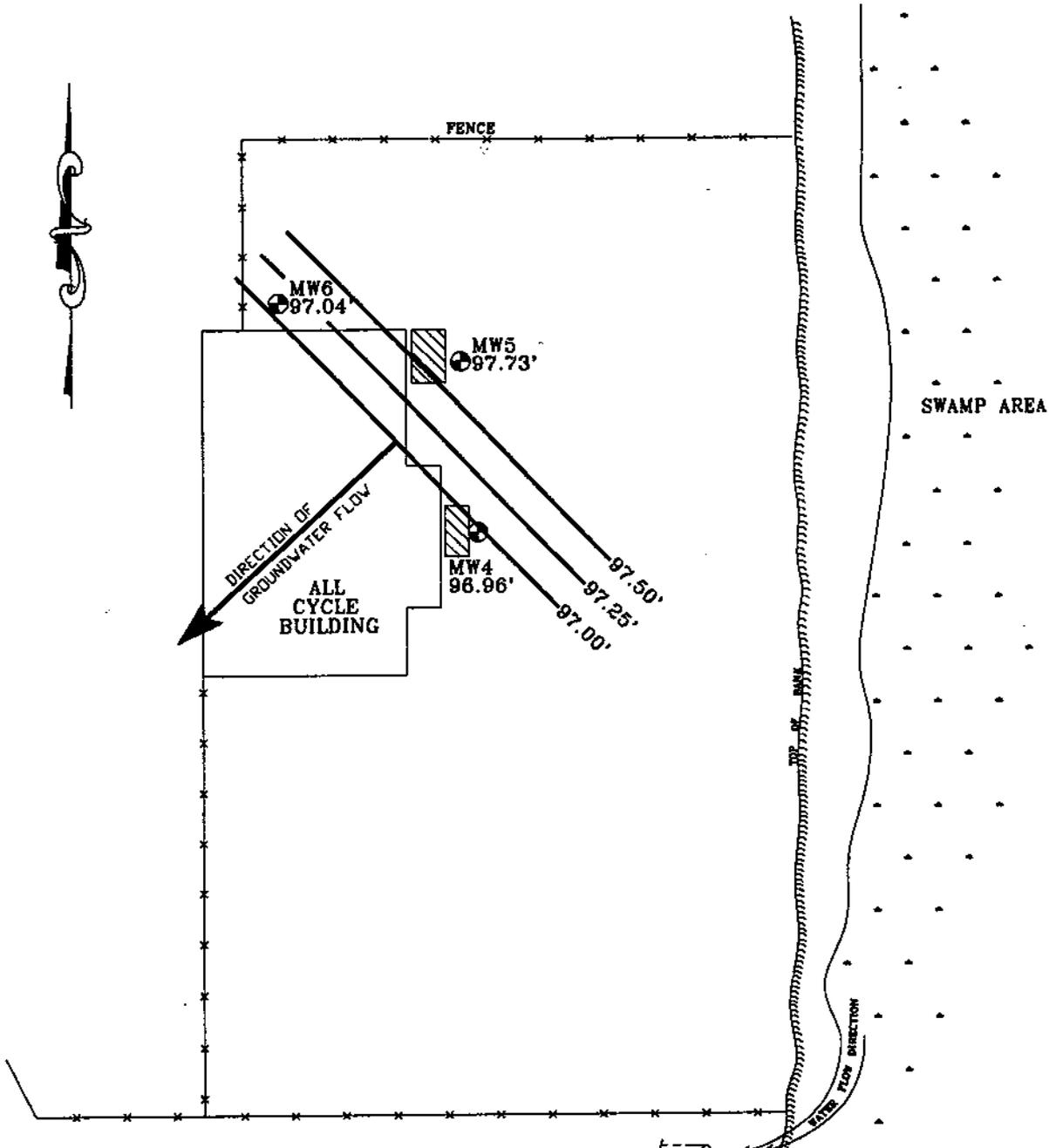


ENGINEER'S CONSTRUCTION

WILLISTON, VERMONT

SITE MAP

DATE: 6/2/94	DWG.#: 2	SCALE: 1"=50'	DRN: SB	APP:ES
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LEGEND

- MW4 96.96' MONITORING WELL AND WATER TABLE ELEVATION IN FEET
- 97.25' GROUNDWATER CONTOUR
- FORMER UST TANK BASIN
- EXISTING UST

JOB #: 12934475
DATE MEASURED: 6/10/94



ENGINEER'S CONSTRUCTION
WILLISTON, VERMONT
GROUNDWATER CONTOUR MAP

DATE: 6/2/94	DWG.#: 3	SCALE: 1"=50'	DRN: SB	APP:ES
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APPENDIX C
MONITORING WELL LOGS

PROJECT ENGINEER'S CONSTRUCTION

LOCATION WILLISTON, VERMONT

DATE DRILLED 6/2/94 TOTAL DEPTH OF HOLE 12'

DIAMETER 18"

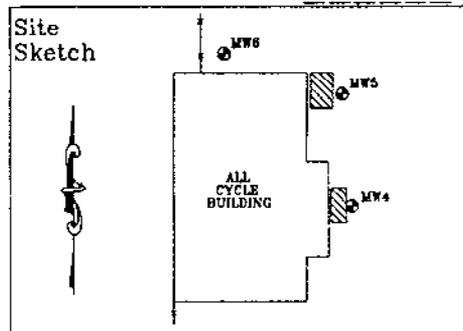
SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 0.5' TYPE sch 40 pvc

DRILLING CO. ENGR. CONST. DRILLING METHOD SPA

DRILLER LOG BY E. SANDBLOM

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	CONCRETE BENTONITE		0'-3' 0.1 ppm	Brown and red fine SAND w/gravel. no odor.	1
2	WELL RISER				2
3				3.5' WATER TABLE	3
4			3'-5' 0.2 ppm	Brown and red saturated SAND and SILT	4
5	WELL SCREEN				5
6					6
7					7
8	CLEAN SAND & NATIVE SAND/ SILT MIX				8
9			9'-10' 0.2 ppm	Gray saturated soupy SILT	9
10	BOTTOM CAP				10
11					11
12	UNDISTURBED NATIVE SOIL			BASE OF WELL AT 11' END OF EXPLORATION AT 12'	12
13					13
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 ENGINEER'S CONSTRUCTION
 LOCATION WILLISTON, VERMONT

WELL NUMBER MW5

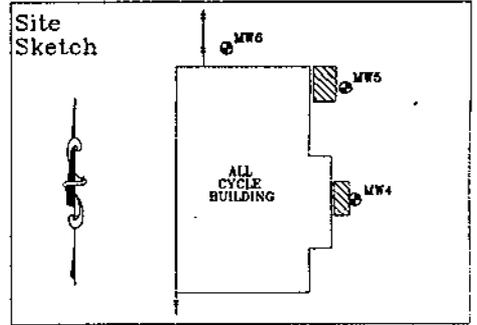
DATE DRILLED 6/2/94 TOTAL DEPTH OF HOLE 12'
 DIAMETER 18"

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

CASING DIA. 2" LENGTH 0.5' TYPE sch 40 pvc

DRILLING CO. ENGR. CONST. DRILLING METHOD SPA

DRILLER _____ LOG BY E. SANDBLOM



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
0		CONCRETE BENTONITE			0
1			0'-3'	Brown medium SAND, wet, no odor.	1
2		WELL RISER	0.4 ppm		2
3				3.5' WATER TABLE	3
4			3'-5'	Gray saturated silty CLAY, wet, no odor.	4
5		WELL SCREEN	0.3 ppm		5
6					6
7					7
8		CLEAN SAND & NATIVE SAND/SILT MIX			8
9			9'-10'	Blue/gray saturated soupy SILT, wet, no odor.	9
10		BOTTOM CAP	0 ppm		10
11					11
12		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 11' END OF EXPLORATION AT 12'	12
13					13
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 ENGINEER'S CONSTRUCTION

LOCATION WILLISTON, VERMONT

DATE DRILLED 6/2/94 TOTAL DEPTH OF HOLE 12'

DIAMETER 18"

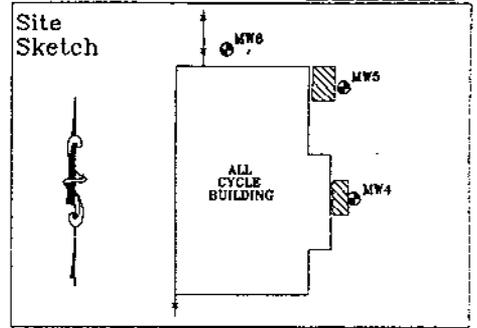
SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 1.0' TYPE sch 40 pvc

DRILLING CO. ENGR. CONST. DRILLING METHOD SPA

DRILLER _____ LOG BY E. SANDBLOM

WELL NUMBER MW6



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	BENTONITE	0'-2'	Dark brown fine SAND/TOPSOIL over light brown fine SAND/FILL, dry.	1
2	WELL RISER		2'-3'	Brown medium clumpy silty CLAY, no odor	2
3			0.2 ppm		3
4			4'-5'	4.0' WATER TABLE	4
5	WELL SCREEN		0.2 ppm	Gray CLAY w/medium sand, wet.	5
6					6
7					7
8	CLEAN SAND & NATIVE SAND/SILT MIX				8
9			9'-10'	Gray dense CLAY with black and white coarse sand.	9
10	BOTTOM CAP		0.1 ppm		10
11					11
12	UNDISTURBED NATIVE SOIL			BASE OF WELL AT 11.5'	12
13				END OF EXPLORATION AT 12'	13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

APPENDIX D

GROUNDWATER QUALITY SUMMARY DATA

**Groundwater Quality Summary
Engineers Construction, Inc.
Williston, Vermont**

Monitoring Well 3 (MW-3)

PARAMETER	Date of Sample Collection			Vermont Drinking Water Standards
	6/10/94			
Benzene	ND			5.0*
Chlorobenzene	ND			100*
1,2-DCB	ND			600*
1,3-DCB	ND			600**
1,4-DCB	ND			75*
Ethylbenzene	ND			700*
Toluene	ND			1,000*
Xylenes	ND			10,000*
Total BTEX	ND			-
MTBE	ND			40**
BTEX + MTBE	ND			-

Monitoring Well 4 (MW-4)

PARAMETER	Date of Sample Collection			Vermont Drinking Water Standards
	6/10/94			
Benzene	ND			5.0*
Chlorobenzene	7.0			100*
1,2-DCB	TBQ			600*
1,3-DCB	ND			600**
1,4-DCB	TBQ			75*
Ethylbenzene	ND			700*
Toluene	ND			1,000*
Xylenes	TBQ			10,000*
Total BTEX	TBQ			-
MTBE	ND			40**
BTEX + MTBE	TBQ			-

Monitoring Well 5 (MW-5)

PARAMETER	Date of Sample Collection			Vermont Drinking Water Standards
	6/10/94			
Benzene	ND			5.0*
Chlorobenzene	ND			100*
1,2-DCB	ND			600*
1,3-DCB	ND			600**
1,4-DCB	ND			75*
Ethylbenzene	ND			700*
Toluene	ND			1,000*
Xylenes	ND			10,000*
Total BTEX	ND			-
MTBE	ND			40**
BTEX + MTBE	ND			-

All values reported in ug/L (ppb)

ND - None Detected

TBQ - Trace below quantitation Limits

* - EPA Established Maximum Contaminant Level

** - Vermont Health Advisory Level

**Groundwater Quality Summary
Engineers Construction, Inc.
Williston, Vermont**

Monitoring Well 6 (MW-6)

PARAMETER	Date of Sample Collection			Vermont Drinking Water Standards
	6/10/94			
Benzene	ND			5.0*
Chlorobenzene	ND			100*
1,2-DCB	ND			600*
1,3-DCB	ND			600**
1,4-DCB	ND			75*
Ethylbenzene	ND			700*
Toluene	ND			1,000*
Xylenes	ND			10,000*
Total BTEX	ND			-
MTBE	ND			40**
BTEX + MTBE	ND			-

**Vermont Drinking Water Standards and
Quality Assurance and Control Samples**

Sample Date: May 20, 1994

PARAMETER	Equipment Blank	Trip Blank	Duplicate	Vermont Drinking Water Standards
Benzene	ND	ND	ND	5.0*
Chlorobenzene	ND	ND	ND	100*
1,2-DCB	ND	ND	ND	600*
1,3-DCB	ND	ND	ND	600**
1,4-DCB	ND	ND	ND	75*
Ethylbenzene	ND	ND	ND	700*
Toluene	ND	ND	ND	1,000*
Xylenes	ND	ND	ND	10,000*
Total BTEX	ND	ND	ND	-
MTBE	ND	ND	ND	40**
BTEX + MTBE	ND	ND	ND	-

ND - None Detected

All Values Reported in ug/L (ppb)

TBQ - Trace Below Quantitation Limits

APPENDIX E
GROUNDWATER LEVEL DATA

7/11/94

**Liquid Level Monitoring Data
Engineer's Construction, Inc.
Williston, Vermont**

**Monitoring Date:
June 10, 1994**

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-3	-	-	-	8.22	-	-	-	8.22	-
MW-4	11.0	100.00	-	3.04	-	-	-	3.04	96.96
MW-5	11.0	100.07	-	2.34	-	-	-	2.34	97.73
MW-6	11.5	100.94	-	3.90	-	-	-	3.90	97.04

Notes: All values reported in feet.

APPENDIX F
LABORATORY ANALYSIS RESULTS



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: Engineers Construction
REPORT DATE: June 20, 1994
DATE SAMPLED: June 10, 1994

PROJECT CODE: GIEN1975
REF.#: 60,627 - 60,632

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: Engineers Construction
REPORT DATE: June 20, 1994
DATE SAMPLED: June 10, 1994
DATE RECEIVED: June 10, 1994
ANALYSIS DATE: June 16, 1994

PROJECT CODE: GIEN1975
REF.#: 60,627
STATION: MW 3
TIME SAMPLED: 12:08
SAMPLER: P. Hack

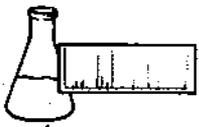
<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND ¹
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	10	ND

Bromobenzene Surrogate Recovery: 98%

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: Engineers Construction
REPORT DATE: June 20, 1994
DATE SAMPLED: June 10, 1994
DATE RECEIVED: June 10, 1994
ANALYSIS DATE: June 17, 1994

PROJECT CODE: GIEN1975
REF.#: 60,628
STATION: MW 5
TIME SAMPLED: 11:35
SAMPLER: P. Hack

<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: 100%

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: Engineers Construction
REPORT DATE: June 20, 1994
DATE SAMPLED: June 10, 1994
DATE RECEIVED: June 10, 1994
ANALYSIS DATE: June 17, 1994

PROJECT CODE: GIEN1975
REF.#: 60,629
STATION: MW 6
TIME SAMPLED: 11:47
SAMPLER: P. Hack

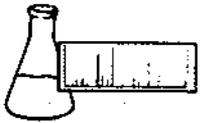
<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND ¹
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	10	ND

Bromobenzene Surrogate Recovery: 99%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



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LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Engineers Construction
REPORT DATE: June 20, 1994
DATE SAMPLED: June 10, 1994
DATE RECEIVED: June 10, 1994
ANALYSIS DATE: June 17, 1994

PROJECT CODE: GIEN1975
REF.#: 60,630
STATION: Trip
TIME SAMPLED: 11:05
SAMPLER: P. Hack

<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



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LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Engineers Construction
REPORT DATE: June 20, 1994
DATE SAMPLED: June 10, 1994
DATE RECEIVED: June 10, 1994
ANALYSIS DATE: June 17, 1994

PROJECT CODE: GIEN1975
REF.#: 60,631
STATION: Duplicate
TIME SAMPLED: 11:35
SAMPLER: P. Hack

<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



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LABORATORY REPORT

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Engineers Construction
REPORT DATE: June 20, 1994
DATE SAMPLED: June 10, 1994
DATE RECEIVED: June 10, 1994
ANALYSIS DATE: June 17, 1994

PROJECT CODE: GIEN1975
REF.#: 60,632
STATION: Equipment
TIME SAMPLED: 11:40
SAMPLER: P. Hack

<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: 98%

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: Engineers Construction
REPORT DATE: June 20, 1994
DATE SAMPLED: June 10, 1994
DATE RECEIVED: June 10, 1994
ANALYSIS DATE: June 16, 1994

PROJECT CODE: GIEN1975
REF.#: 60,627
STATION: MW 3
TIME SAMPLED: 12:08
SAMPLER: P. Hack

<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	9.3	9.5	94%
Toluene	ND	10	9.0	9.3	91%
Ethylbenzene	ND	10	9.2	9.3	93%
Xylenes	ND	30	27.2	27.5	91%

NOTES:

1 None detected

CHAIN-OF-CUSTODY RECORD

10917

60,627-10135

Project Name: <u>Engineers Construction</u>	Reporting Address: <u>Box 443, Williston</u>	Billing Address: <u>cash</u>
Site Location: <u>Williston</u>		
Endyne Project Number: <u>GTCN 1975</u>	Company: <u>Griffin Int'l</u>	Sampler Name: <u>D Hacke</u>
	Contact Name/Phone #: <u>Eric Sandblom</u>	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				
60627	MW3	H ₂ O			6/10/94 12:08	2	40ml		20		
	MW4				11:20	2		will call on this?	21		
60628	MW5				11:35	2			20		
60629	MW6				11:47	2		20			
60630	Trip				11:05	2		20			
60631	Duplicate				11:35	2		20			
60632	Equipment				11:40	2		20			

Relinquished by: Signature <u>[Signature]</u>	Received by: Signature <u>[Signature]</u>	Date/Time <u>6/10/94</u>
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/PCP
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):										



ENDYNE, INC.

Job #

ERIK

Laboratory Services

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REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Engineers Construction
REPORT DATE: June 15, 1994
DATE SAMPLED: June 10, 1994

PROJECT CODE: GIEN1976
REF.#: 60,633

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody.

Chain of custody indicated the 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.

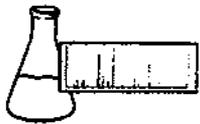
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

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

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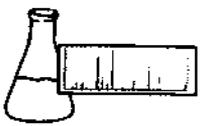
LABORATORY REPORT

EPA METHOD 8240 WATER MATRIX

CLIENT: Griffin International
PROJECT NAME: Engineers Construction
REPORT DATE: June 15, 1994
DATE SAMPLED: June 10, 1994
DATE RECEIVED: June 10, 1994
ANALYSIS DATE: June 15, 1994

PROJECT CODE: GIEN1976
REF.#: 60,633
STATION: MW 4
TIME SAMPLED: 11:20
SAMPLER: P. Hack

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Dichlorodifluoromethane	10	ND ¹
Chloromethane	10	ND
Vinyl Chloride	10	ND
Bromomethane	5	ND
Chloroethane	5	ND
Trichlorofluoromethane	2	ND
Acetone	50	ND
1,1-Dichloroethene	2	ND
Methylene Chloride	20	ND
Carbon Disulfide	7	ND
MTBE	3	ND
trans-1,2-Dichloroethene	2	ND
1,1-Dichloroethane	2	ND
2-Butanone	20	ND
Chloroform	10	ND
1,1,1-Trichloroethane	1	ND
Carbon Tetrachloride	1	ND
1,2-Dichloroethane	1	ND
Benzene	1	ND
Trichloroethene	1	ND
1,2-Dichloropropane	1	ND
Bromodichloromethane	1	ND



REF.#: 60,633

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
4-Methyl-2-Pentanone	10	ND
cis-1,3-Dichloropropene	1	ND
Toluene	2	ND
trans-1,3-Dichloropropene	1	ND
1,1,2-Trichloroethane	2	ND
2-Hexanone	10	ND
Tetrachloroethene	2	ND
Dibromochloromethane	2	ND
Chlorobenzene	2	7.0
Ethyl Benzene	1	ND
Total Xylenes	3	TBQ ²
Styrene	1	ND
Bromoform	5	ND
1,1,2,2-Tetrachloroethane	1	ND
1,3 Dichlorobenzene	2	ND
1,4 Dichlorobenzene	2	TBQ
1,2 Dichlorobenzene	2	TBQ

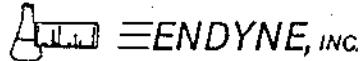
NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

ANALYTICAL SURROGATE RECOVERY:

1,2-Dichloroethane-d4 : 95.%
Toluene-d8 : 99.%
4-Bromofluorobenzene : 106.%

NOTES:

- 1 None detected
- 2 Trace below quantitation limit



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Williston, Vermont 05495
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CHAIN-OF-CUSTODY RECORD

Project Name: <i>Engineers Construction</i>	Reporting Address: <i>Box 943, Williston</i>	Billing Address: <i>same</i>
Site Location: <i>Williston</i>		
Endyne Project Number: <i>GCN1976</i>	Company: <i>Griffin Int'l</i>	Sampler Name: <i>D Hack</i>
	Contact Name/Phone #: <i>Eric Sandblom</i>	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				
	<i>MW3</i>	<i>H₂O</i>			<i>6/10/94</i> <i>12:05</i>	<i>2</i>	<i>40ml</i>		<i>20</i>	<i>HCl</i>	
<i>6/10/94</i>	<i>MW4</i>	<i>7</i>			<i>11:20</i>	<i>2</i>	}	<i>will call on this?</i>	<i>25</i>	}	<i>As per</i>
	<i>MW5</i>		<i>11:35</i>	<i>2</i>	<i>20</i>						
	<i>MW6</i>		<i>11:47</i>	<i>2</i>	<i>20</i>						
	<i>TRIP</i>		<i>11:05</i>	<i>2</i>	<i>20</i>						
	<i>Duplicate</i>		<i>11:35</i>	<i>2</i>	<i>20</i>						
	<i>Equipment</i>	<i>11:40</i>	<i>2</i>	<i>20</i>							

Relinquished by: Signature <i>[Signature]</i>	Received by: Signature <i>[Signature]</i>	Date/Time <i>6/10/94</i>
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 Pcs/PCB
4	Nitrite N	9	BOD ₅	14	Turbidity	19	BTEX	24	EPA 608 Pcs/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):										

Lab #	Sample Location	Matrix	G R A B	U M P	Date/Time	Sample Volumes		Field results/Remarks	An Required	Preservation
						No.	Type/Size			
	MW3	H ₂ O			6/10/94 12:08	2	40ml		20	HCl
	MW4	}			11:20	2			21	
	MW5				11:35	2			20	
	MW6				11:47	2			20	
	Trip				11:05	2			20	
	Duplicate				11:35	2			20	
	Equipment				11:40	2			20	

Relinquished by: Signature <i>[Signature]</i>	Received by: Signature <i>[Signature]</i>	Date/Time 6/10/94	11:00
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 Pests/PCB
4	Nitrite N	9	BOD ₅	14	Turbidity	19	BTEX	24	EPA 608 Pests/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):										