



Marin Environmental, Inc.

Hydrogeology, Engineering & GIS Services

30 March 1998

Mr. Charles Schwer
Department of Environmental Conservation
Waste Management Division
West Building, 103 South Main Street
Waterbury, Vermont 05671-0404

RE: *Initial Site Investigation Report,
East Corinth General Store, East Corinth, VT*

Dear Mr. Schwer,

Enclosed one bound copy of the Initial Site Investigation Report for the East Corinth General Store, located in East Corinth, Vermont. This report outlines the findings of the expressway investigation completed in March 1998.

Please contact me or Ron Miller, Regional Manager, if you have any questions or comments regarding this report.

Sincerely,

Marin Environmental, Inc.

Robert J. Ross, CGWP
Hydrogeologist

rjr

enclosure

cc: Mr. Eugene Pushee, Bradford Oil Company (w/o enclosure)

Ref: 97091C02.DOC

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#972300
APR 1 10 33 AM '98



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INITIAL SITE INVESTIGATION REPORT

EAST CORINTH GENERAL STORE

Vermont Route 25
East Corinth, VT

26 March, 1998

Prepared for:

Bradford Oil Company
P.O. Box 394
Bradford, Vermont 05033

Contact: Mr. Eugene Pushee
Phone: 802-222-5100

Prepared by:

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Marin Project #: V97-117
Marin Document #: 97117R02.DOC

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EXECUTIVE SUMMARY

Marin Environmental, Inc. (Marin) has conducted an initial site investigation at the East Corinth General Store located in East Corinth, Vermont and has concluded the following:

- Petroleum releases from former underground storage tank (UST) systems at the site appear to have resulted in an impact to ground water in the vicinity of the former UST systems.
- The distribution of dissolved-phase gasoline in ground water suggests that both of the former gasoline UST locations and the former kerosene UST location are sources of contamination.
- Adsorbed-phase soil contamination in the vicinity of the former USTs may represent a continuing source of ground-water contamination.
- The Vermont Groundwater Enforcement Standards (VGES) for benzene and the gasoline additive, methyl tertiary butyl ether (MTBE), were exceeded in ground-water samples collected from MW-1 and MW-4, both of which are located within excavations for former USTs.
- MTBE was detected at 8.7 ppb, which is below the Vermont health Advisory (VHA) of 40 ppb, in the on-site drinking-water supply well. This shallow dug well, which is approximately 14 feet deep, is located 40 feet north (crossgradient) of the former gasoline USTs.
- The presence of the gasoline additive MTBE in ground water beneath the site suggests that gasoline was released after 1980.
- No petroleum contamination was detected in the off-site bedrock supply well owned by Shire Machine Shop, located approximately 130 feet east (downgradient) of the nearest former UST.
- The Waits River, located 150 feet north (crossgradient) and 280 feet east (downgradient) of the former USTs, does not appear to be impacted at this time.
- The downgradient extent of petroleum contamination has not been determined.
- Surficial soils at the site consist primarily of sand and gravel to a depth of 13 feet, with a two-foot layer of cobbles and boulders overlying bedrock at 15 feet below grade.
- On 30 January 1998, the water table was found to be about eight feet below ground surface, and exhibited a southeasterly trending gradient of about two percent.

On the basis of the results of this investigation, Marin recommends that further work be performed to determine the extent of the residual contamination and the risk posed to sensitive receptors.

1. Install three additional downgradient soil borings/monitoring wells to determine the downgradient extent of the dissolved-phase gasoline plume; one between the former kerosene UST and the Shire Machine Shop supply well, one between the gasoline pump island and the Shire Machine Shop supply well, and one southeast of the former gasoline USTs on the south side of Route 25.
2. Sample the existing and newly installed monitoring wells in May 1998, and analyze the samples for gasoline VOCs by EPA Method 8020.
3. Sample the on-site supply well and the Shire Machine Shop supply well in May 1998, and analyze the samples for gasoline VOCs by EPA Method 8020.
4. Upon completion of the work described above, evaluate the appropriateness of long-term monitoring or active remediation of the site.
5. Complete a report summarizing the findings of the additional work outlined above including time-series graphs for water-quality analytical results from each location and figures showing approximate sample locations, ground-water flow direction, and contaminant distribution.
6. Monitor the on-site soil stockpile twice annually in May and October to confirm that the petroleum concentrations are declining and to verify that the integrity of the soil stockpile cover is being maintained.

1.0 INTRODUCTION

This report details the results of an initial site investigation conducted at the East Corinth General Store located in East Corinth, Vermont (Figure 1, Appendix A). This report has been prepared by Marin Environmental, Inc. (Marin) under the direction of Bradford Oil, the owner of the former underground storage tanks (USTs). The site investigation was initiated, with Vermont Department of Environmental Conservation (VT DEC) approval, under the expressway notification procedure following the discovery of subsurface petroleum contamination during the removal of four petroleum USTs on 3 December 1997.

1.1 Site Location and Physical Setting

The East Corinth General Store, located at the intersection of Vermont Route 25 and Topsham Road ($44^{\circ} 3' 18'' \text{N} / 72^{\circ} 13' 18'' \text{W}$), is occupied by a single-story wood-framed structure, which currently serves as a retail grocery outlet and petroleum fuel dispensing station (Figure 2, Appendix A). A majority of the property is open land with parking areas surrounding the store. The ground surface is generally flat with an average elevation of about 730 feet above mean sea level (amsl). The Waits River is located approximately 150 feet north and 280 feet east of the former USTs (USGS 1973).

In general, on-site ground water wells are the primary sources of drinking water for East Corinth and the surrounding communities. Drinking water for the store is provided by a dug well approximately 14 feet deep, which is located about 40 feet north of the former gasoline USTs. Drinking water for the adjacent property, owned by the Shire Machine Shop, is provided by a 300-foot bedrock well located approximately 130 feet east (downgradient) of the former kerosene UST and 180 feet east of the former gasoline USTs. Domestic wastewater disposal for the site and surrounding properties is provided by individual on-site septic systems.

The eastern property boundary is formed by the Topsham Road. The Shire Machine Shop, a local welding and machine shop, is located across Topsham Road east of the site. The southern property boundary is formed by Vermont Route 25, with a steep embankment adjacent to the south side of the road. An undeveloped parcel of land abuts the site to the west and the Waits River, located approximately 150 feet north of the former USTs, forms the northern property boundary. Photographs of the site and surrounding property are included in Appendix B.

Native surficial materials in the vicinity of the East Corinth General Store are mapped as glaciolacustrine sediments, consisting of pebbly sands (Stewart and MacClintock, 1970). Bedrock in the area is mapped as the Waits River Formation, which is composed of gray quartzose and micaceous crystalline limestone of lower Devonian age (Doll, 1961). No bedrock outcrops were observed on-site or on adjacent properties; however, bedrock was encountered at approximately 15 feet below ground surface (bgs) during the UST closure.

1.2 Site History

The site is currently a convenience store and gasoline retail outlet owned by Mr. Ken Johnston. Mr. Johnston purchased the property in the late 1980s from Mr. Martin. According to Mr. Johnston, the East Corinth General Store was built in the late 1940s and has had several owners throughout that time. Mr. Johnston added that the facility was initially operated as a Texaco owned gasoline retail outlet. The original USTs were reportedly removed in 1985, when the second generation of USTs, which were owned by Bradford Oil and operated by Mr. Ken Johnston, were installed. No information is available regarding the condition of the previous UST systems or the possible presence of contamination during the 1985 removal activities.

On 3 December 1997, four USTs — one 4,000-gallon gasoline tank (UST #1), two 6,000-gallon gasoline tanks (UST #2 and UST #3), and a 550-gallon kerosene tank (UST #4) — were removed from the site under the supervision of Marin Environmental, Inc. The three gasoline USTs were located on the southwestern portion of the property; the kerosene UST was located along the eastern side of the on-site building (Figure 2, Appendix A).

Soils beneath the three gasoline USTs showed evidence of significant petroleum releases, with strong gasoline odors and photoionization detector (PID) readings of up to 1,038 parts per million (ppm). Soils beneath the kerosene UST showed evidence of an older petroleum release with PID readings exceeding 1,000 ppm. The VT DEC PID-based guidelines for gasoline and kerosene contaminated soils requiring treatment or site characterization are 20 and 10 ppm, respectively. To facilitate installation of a new 15,000-gallon UST, approximately 30 cubic yards of petroleum-contaminated soils were removed from the vicinity of USTs #2 and #3 for on-site treatment by poly-encapsulation. The approximate location of the soil stockpile is shown on Figure 2.

Marin began an initial site investigation under the VT DEC "Expressway" process after receiving approval on 8 December 1997 from Bradford Oil, the UST owner, and the VT DEC.

1.3 Objectives and Scope of Work

The objectives of this initial site investigation were to:

- Evaluate the degree and extent of petroleum contamination in soil and ground water;
- Qualitatively assess the risks to environmental and public health via relevant sensitive receptors and potential contaminant migration pathways; and
- Identify potentially appropriate monitoring and/or remedial actions based on the site conditions.

To accomplish these objectives, Marin has:

- Supervised the installation of four monitoring wells, to evaluate the degree and extent of petroleum contamination, and the local ground-water flow direction.
- Collected and submitted ground-water samples from the four on-site monitoring wells, an on-site supply well, and an off-site supply well for laboratory analysis of volatile petroleum compounds.
- Identified sensitive receptors in the area, and assessed the risk posed by the contamination to these potential receptors.
- Prepared this summary report, which details the work performed, qualitatively assesses risks, provides conclusions and offers recommendations for further action.

2.0 INVESTIGATIVE PROCEDURES AND RESULTS

2.1 Monitoring Well Installation

Between 3 December 1997 and 8 December 1997, Marin supervised the installation of four monitoring wells (MW-1, MW-2, MW-3 and MW-4). The monitoring wells were installed with an excavator that was on site for the removal of the USTs. During excavation, soils in the excavations consisted of sand and gravel to a depth of approximately 13 feet below ground surface (bgs). A layer of cobbles and boulders was encountered overlying the top of bedrock, which was approximately 15 feet bgs. Ground water was encountered in each excavation at approximately 12 feet bgs. Strong petroleum odors were noted throughout each excavation and petroleum odors characteristic of weathered gasoline, presumably from a previous generation of USTs, were noted in the excavation for the former kerosene UST.

MW-1 was installed in the excavation of the former 4,000-gallon gasoline UST, located approximately 10 feet southwest of the store. MW-2 was installed between the former gasoline USTs and the on-site drinking-water supply well, and MW-3 was placed between the former gasoline USTs and the Waits River. MW-4 was placed in the excavation of the former kerosene UST, which was located on the east side of the on-site building. Approximate monitoring well locations are shown on Figure 2. Boring logs and monitoring-well construction details are included in Appendix C.

Monitoring wells were constructed of two-inch-diameter schedule 40 PVC, with 0.01-inch factory slotted screens. The screened sections of each well were placed to intercept the water table, with the bottom of each well set between 10 and 13 feet bgs. All of the wells were back filled with natural material from the excavations and protected by a flush-mounted steel roadbox cemented into place. Each well casing was topped with a water-tight compression cap.

2.2 Soil-Screening Results

PID readings associated with the well installation were based on the readings obtained during the UST closure assessment. PID readings on soil samples collected from the UST #1 excavation, where MW-1 was installed, ranged from 1.6 to 872 parts per million (ppm), with an average of 189 ppm. PID readings on soil samples collected from the excavations for MW-2 ranged from 20 to 260 ppm and for MW-3 ranged from 4.8 to 10.6 ppm. PID readings on soil samples collected from the UST #4 excavation, where MW-4 was installed, ranged from 0.1 to 1,055 ppm. PID screening results are included on the boring logs in Appendix C.

Marin field personnel screened soil samples from each excavation for the possible presence of volatile organic compounds (VOCs) using a PE PhotoVac Model 2020 portable photoionization detector (PID). The PID was calibrated in the field each day with an isobutylene standard gas to a benzene reference.

2.3 Determination of Ground-Water Flow Direction and Gradient

Ground water in the unconfined surficial aquifer directly beneath the site appears to be flowing in an easterly direction, parallel to the Waits River. The average gradient of the local ground-water table on 30 January 1998 was about two percent. Water-level measurements and elevation calculations for 30 January 1998 are presented in Table 1. The ground-water contour map in Figure 3 was prepared using this data.

The sand and gravel deposits comprising the shallow soil aquifer at the site typically exhibit effective porosities of about 0.3 to 0.4 and hydraulic conductivities of about 25 to 1,000 feet per day (Fetter, 1994). Assuming Darcian flow, these estimated combine with the calculated ground-water gradient of 2.0 percent to yield an estimated range of ground-water flow velocities in the surficial aquifer of between 20 and 500 feet per day.

TABLE 1. Ground-Water Elevation Data
Monitoring Date: 30 January 1998

Well I. D.	Top of Casing Elevation *	Depth to Water (feet, TOC)	Ground Water Elevation
MW-1	99.51	8.88	90.63
MW-2	99.45	8.05	91.40
MW-3	99.07	7.61	91.46
MW-4	100.00	9.65	90.35

*Top of casing (TOC) and ground water elevations are relative to an arbitrary site datum of 100.00 feet

2.4 Ground-Water Sampling and Analysis

On 30 January 1998, water samples were collected for laboratory analysis from four monitoring wells, (MW-1, MW-2, MW-3 and MW-4) and two drinking-water supply wells: the on-site supply well and the downgradient supply well, owned by Shire Machine Shop. The highest total BTEX (benzene, toluene, ethylbenzene, and xylenes) concentrations were detected in the samples collected from MW-1 (1,188.3 parts per billion - ppb) and MW-4 (248.1 ppb), which are both located within excavations of former USTs. The Vermont Groundwater Enforcement Standards (VGESs) for benzene and methyl-tertiary butyl ether (MTBE) were exceeded in MW-1 and MW-4. Low levels of MTBE (8.7 to 16.8 ppb) were detected MW-2, MW-3 and the on-site supply well. None of the BTEX compounds were detected in the samples collected from MW-2 and MW-3 or either supply well. Total petroleum hydrocarbons (TPH) were detected at 8.1 parts per million (ppm) in the sample collected from MW-4; TPH was not detected in either of the supply well samples. Ground-water analytical results are summarized below in Table 2; laboratory report forms are included in Appendix D.

Ground-water samples were collected from the four on-site monitoring wells and two supply wells on 30 January 1998. Each monitoring well was purged and then sampled using the dedicated bailer and dropline. Purge water was discharged directly to the ground in the vicinity of each well. The supply well samples were collected from the bathroom faucets after allowing the water to flow for approximately 10 minutes. A trip blank and a duplicate sample were collected during the sampling vent for quality assurance/quality control (QA/QC) purposes. All field procedures were conducted in accordance with Marin standard protocols.

The ground-water samples were submitted to Endyne, Inc. of Williston, Vermont, where they were analyzed for the possible presence of benzene, toluene, ethylbenzene, xylenes (BTEX) and methyl-

tertiary butyl ether (MTBE) by EPA Method 8020. Samples collected from both drinking-water supply wells and MW-4 were also analyzed for the possible presence of total petroleum hydrocarbons (TPH) by modified EPA Method 8100. Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis; however, toluene was detected at 1.4 ppb in the trip blank. Analytical results for the blind field duplicate sample collected from MW-1 were within 13 percent of the original sample results. QA/QC sample results are summarized on Table 2.

TABLE 2. Ground-Water Analytical Results
 Monitoring Date: 30 January 1998

SAMPLE I. D.	Benzene	Ethyl benzene	Toluene	Xylenes	Total BTEX	MTBE	TPH (ppm)
MW-1	6.9	58.7	22.7	1,100	1,188.3	182	---
MW-2	ND <1	ND <1	ND <1	ND <1	ND <1	15.1	---
MW-3	ND <1	ND <1	ND <1	ND <1	ND <1	16.8	---
MW-4	60.8	27.5	49.8	110	248.1	181	8.10
On-site Supply Well	ND <1	ND <1	ND <1	ND <1	ND <1	8.7	ND < 0.4
Shire Machine Shop	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND < 0.4
Dup. MW-1	7.2	60.6	25.5	1,140	1,233.3	208	---
Trip Blank	ND <1	ND <1	1.4	ND <1	1.4	ND <1	---
VGES/VHA	5	700	1,000	10,000	---	40	---

Results reported as parts per billion (ppb), unless noted otherwise.

ND = Compound not detected above indicated detection limit.

TBQ = Compound detected at trace levels below quantitation limit indicated.

VGES = Vermont Groundwater Enforcement Standard.

VHA = Vermont Health Advisory for drinking water supplies.

3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

3.1 Sensitive Receptor Survey

Marin conducted a survey to identify sensitive receptors in the vicinity of the East Corinth General Store. The following sensitive receptors were identified in the vicinity of the site:

- The East Corinth General Store, constructed on an at-grade slab foundation, located adjacent to the former USTs.
- The Waits River, located approximately 150 feet north (crossgradient) and 280 feet east (downgradient) of the former USTs.
- The shallow gravel drinking-water supply well for the on-site building located approximately 40 feet northeast of two former gasoline USTs.
- The bedrock drinking-water supply well for the Shire Machine Shop, located approximately 130 feet east (downgradient) of the former kerosene UST and 180 feet east of the former gasoline USTs.

3.2 Risk Assessment

Marin assessed the risks that the residual subsurface contamination poses to the receptors identified above. In general, human exposure to petroleum related contamination is possible through inhalation, ingestion, or direct contact while impacts to environmental receptors are due either to a direct release or contaminant migration through one receptor to another or along a preferential pathway.

The findings of our risk assessment indicate that the residual subsurface petroleum contamination at the site has impacted the on-site supply well, and poses a threat to the Shire Machine Shop supply well. Methyl tertiary butyl ether (MTBE), a gasoline additive, was detected at 8.7 ppb in the on-site supply well. No petroleum contamination was detected in the bedrock supply well serving the Shire Machine Shop; however this well is located downgradient of the former kerosene and gasoline USTs. At this time, it appears unlikely that the Waits River, located approximately 150 feet north (crossgradient) and 280 feet east (downgradient) of the former USTs, has been impacted. The risk to this downgradient receptor cannot be adequately evaluate, because the downgradient extent of ground-water contamination has not yet been determined. Also, ambient air in the store is not likely to be impacted by residual contamination, since it is constructed on an at-grade slab foundation.

4.0 CONCLUSIONS

Based on the results of the site investigation described above, Marin concludes the following:

- Petroleum releases from former underground storage tank (UST) systems at the site appear to have resulted in an impact to ground water in the vicinity of the former UST systems.
- The distribution of dissolved-phase gasoline in ground water suggests that both of the former gasoline UST locations and the former kerosene UST location are sources of contamination.
- Adsorbed-phase soil contamination in the vicinity of the former USTs may represent a continuing source of ground-water contamination.
- The Vermont Groundwater Enforcement Standards (VGES) for benzene and the gasoline additive, methyl tertiary butyl ether (MTBE), were exceeded in ground-water samples collected from MW-1 and MW-4, both of which are located within excavations for former USTs.
- MTBE was detected at 8.7 ppb, which is below the Vermont health Advisory (VHA) of 40 ppb, in the on-site drinking-water supply well. This shallow dug well, which is approximately 14 feet deep, is located 40 feet north (crossgradient) of the former gasoline USTs.
- The presence of the gasoline additive MTBE in ground water beneath the site suggests that gasoline was released after 1980.
- No petroleum contamination was detected in the off-site bedrock supply well owned by Shire Machine Shop, located approximately 130 feet east (downgradient) of the nearest former UST.
- The Waits River, located 150 feet north (crossgradient) and 280 feet east (downgradient) of the former USTs, does not appear to be impacted at this time.
- The downgradient extent of petroleum contamination has not been defined.
- Surficial soils at the site consist primarily of sand and gravel to a depth of 13 feet, with a two-foot layer of cobbles and boulders overlying bedrock.
- On 30 January 1998, the water table was found to be about eight feet below ground surface, and exhibited a southeasterly trending gradient of about two percent.

5.0 RECOMMENDATIONS

On the basis of the results of this investigation, Marin recommends that further work be performed to determine the extent of the residual contamination and the risk posed to sensitive receptors.

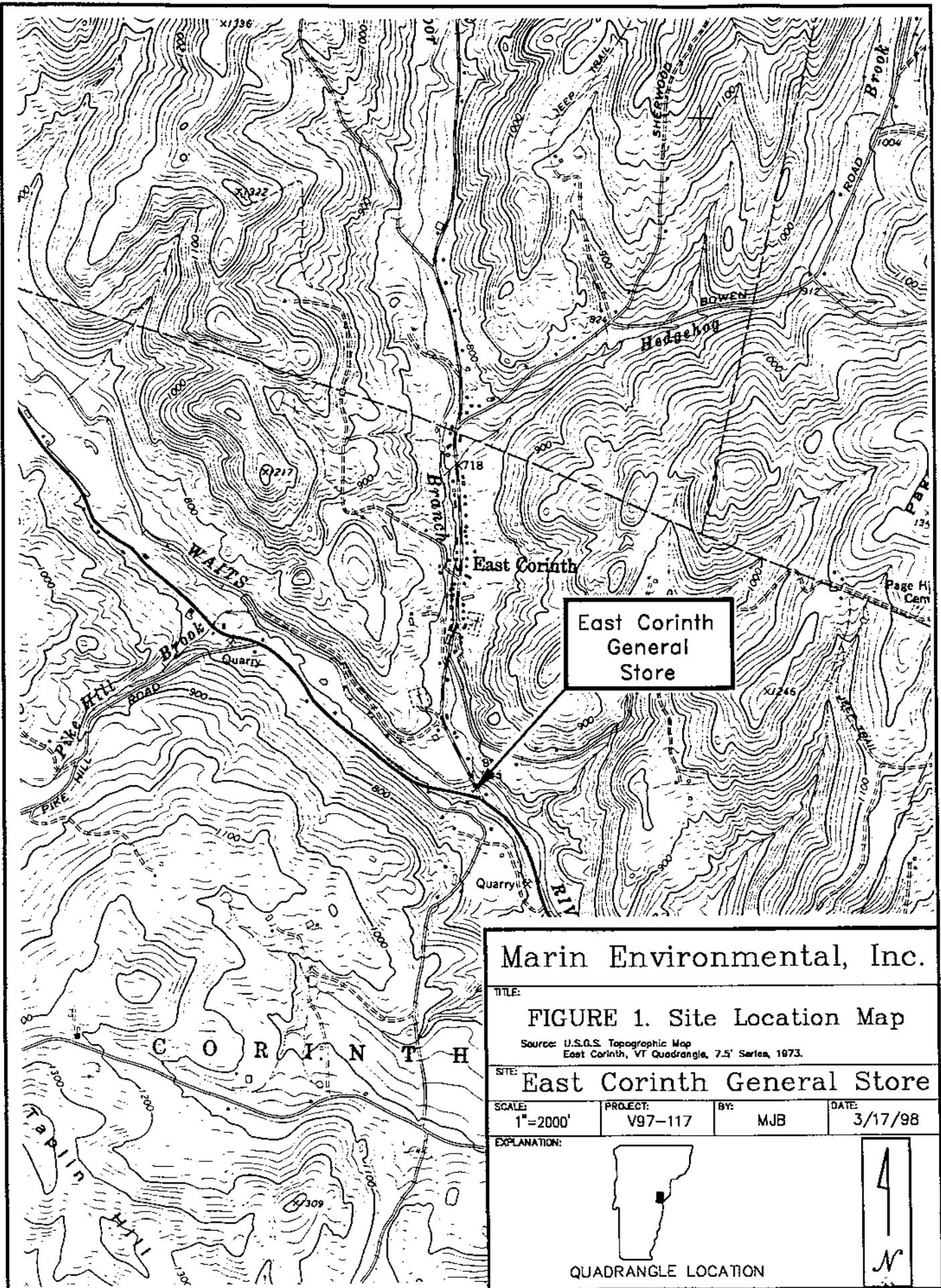
1. Install three additional downgradient soil borings/monitoring wells to determine the downgradient extent of the dissolved-phase gasoline plume; one between the former kerosene UST and the Shire Machine Shop supply well, one between the gasoline pump island and the Shire Machine Shop supply well, and one southeast of the former gasoline USTs on the south side of Route 25.
2. Sample the existing and newly installed monitoring wells in May 1998, and analyze the samples for gasoline VOCs by EPA Method 8020.
3. Sample the on-site supply well and the Shire Machine Shop supply well in May 1998, and analyze the samples for gasoline VOCs by EPA Method 8020.
4. Upon completion of the work described above, evaluate the appropriateness of long-term monitoring or active remediation of the site.
5. Complete a report summarizing the findings of the additional work outlined above, including time-series graphs for water-quality analytical results from each location and figures showing approximate sample locations, ground-water flow direction, and contaminant distribution.
6. Monitor the on-site soil stockpile twice annually in May and October to confirm that the petroleum concentrations are declining and to verify that the integrity of the soil stockpile cover is being maintained.

6.0 REFERENCES

- Doll, C.G. and others, 1961. *Centennial Geologic Map of Vermont*, Office of the State Geologist.
- Domenico, P.A., and Schwartz, F.W., 1990. *Physical and Chemical Hydrogeology*, John Wiley and Sons, New York, 824 p.
- Fetter, C.W., 1994. *Applied Hydrogeology, 3rd Ed.*, Prentice Hall, Englewood Cliffs, New Jersey, 691 p.
- Stewart, D.P. and MacClintock, P., 1970. *Surficial Geologic Map of Vermont*, Office of the State Geologist.
- USGS, 1973. East Corinth, VT Quadrangle . U.S. Geological Survey. 7.5 minute series (topographic). 1973.

APPENDIX A

Figures



East Corinth
General
Store

Marin Environmental, Inc.

TITLE:

FIGURE 1. Site Location Map

Source: U.S.G.S. Topographic Map
East Corinth, VT Quadrangle, 7.5' Series, 1973.

SITE:

East Corinth General Store

SCALE:

1"=2000'

PROJECT:

V97-117

BY:

MJB

DATE:

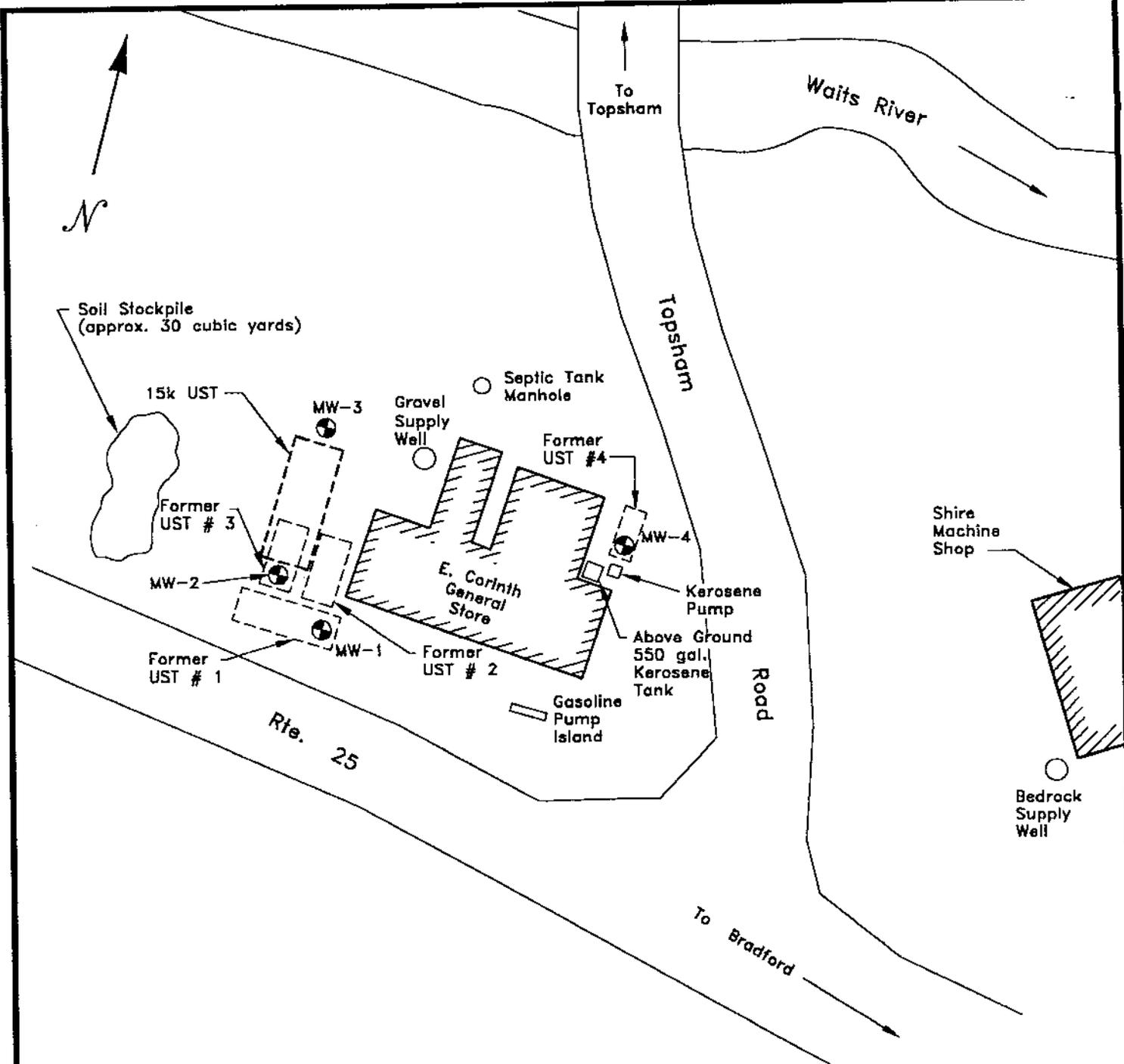
3/17/98

EXPLANATION:



QUADRANGLE LOCATION





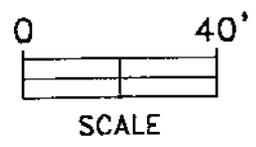
 **Marin Environmental, Inc.**
 1700 Hegeman Ave.
 Colchester, VT 05446
 (802) 655-0011

SITE: East Corinth General Store
 E. Corinth, VT

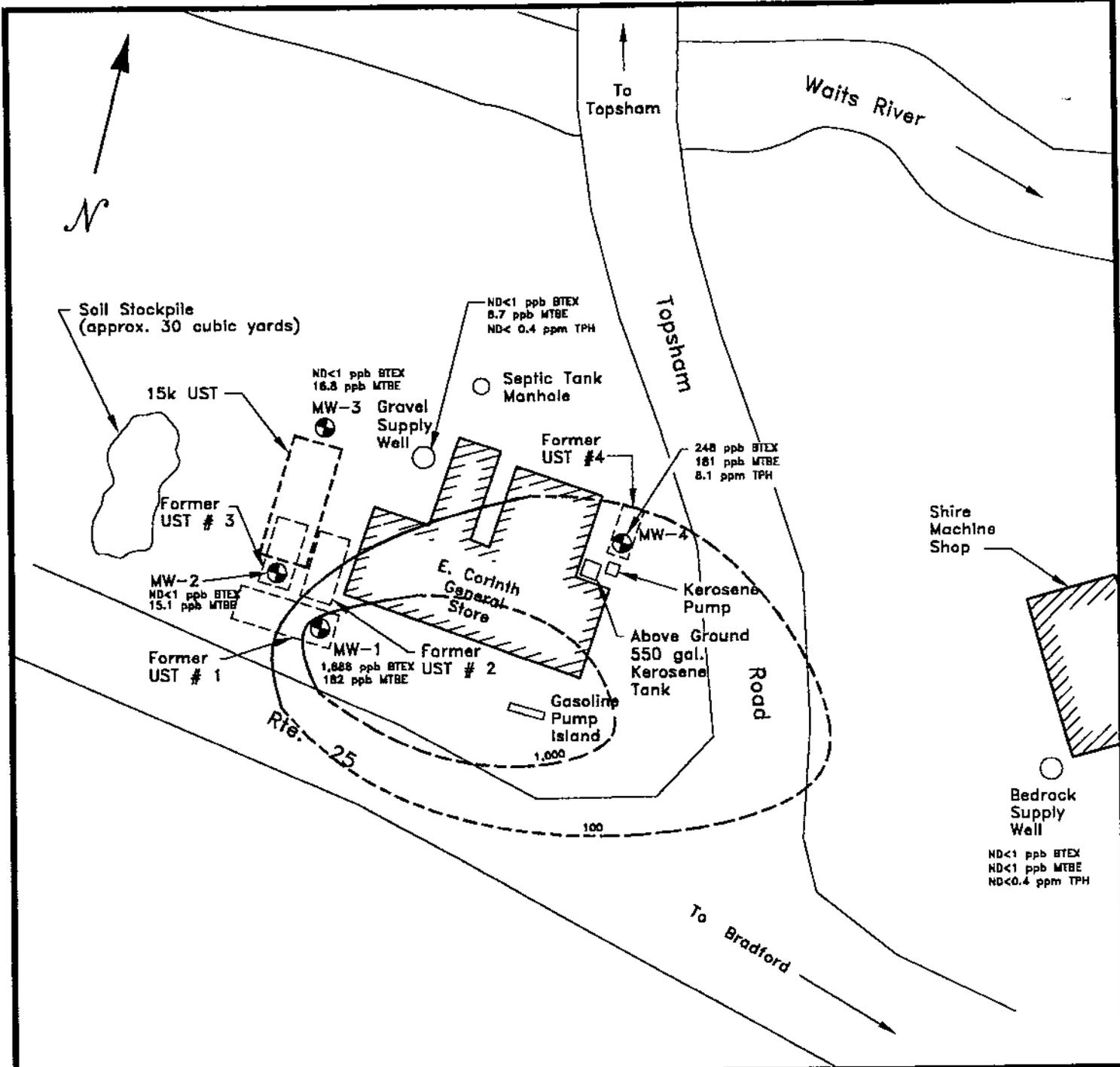
TITLE: FIGURE 2.
 SITE MAP
 With Monitoring Well Locations

LEGEND: ● Monitoring Well

DRAWN BY: MJB	DATE: FEB 98
APPROVED BY: JG	FILE No.: 97117



ALL LOCATIONS ARE APPROXIMATE



Marin Environmental, Inc.
 1700 Hegeman Ave.
 Colchester, VT 05446
 (802) 655-0011

SITE: East Corinth General Store
 E. Corinth, VT

TITLE: FIGURE 4.
 CONTAMINANT DISTRIBUTION MAP
 MONITORING DATE: 13 January 1998

LEGEND:
 ● Monitoring Well
 ND None detected
 - - - BTEX Contour

DRAWN BY: MJB **DATE:** FEB 98
APPROVED BY: JG **FILE No.:** 97117

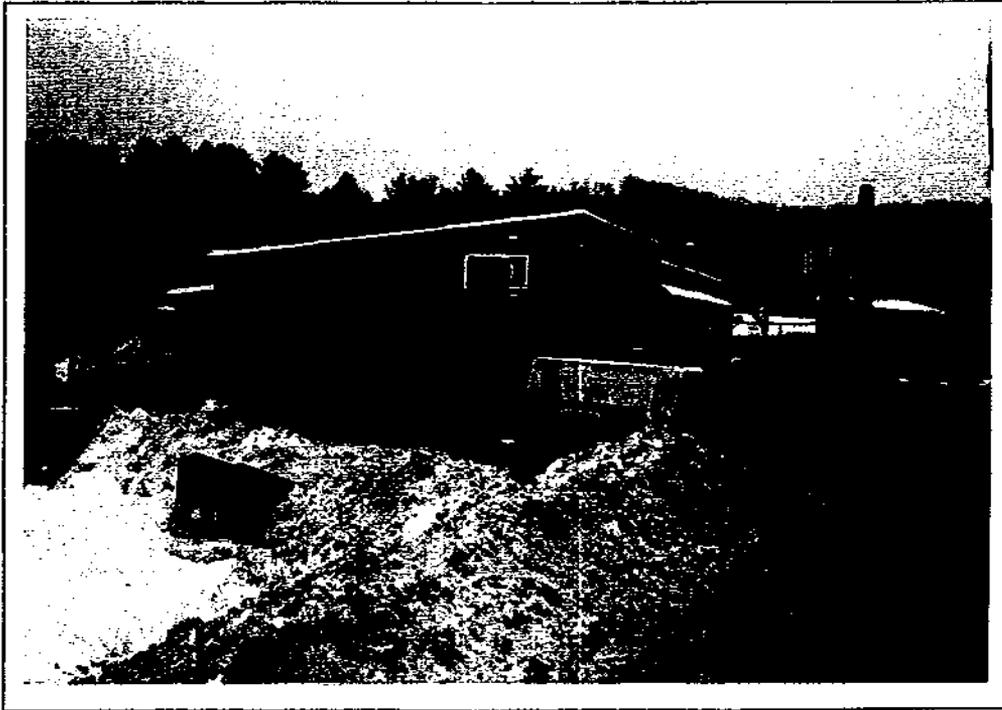


ALL LOCATIONS ARE APPROXIMATE

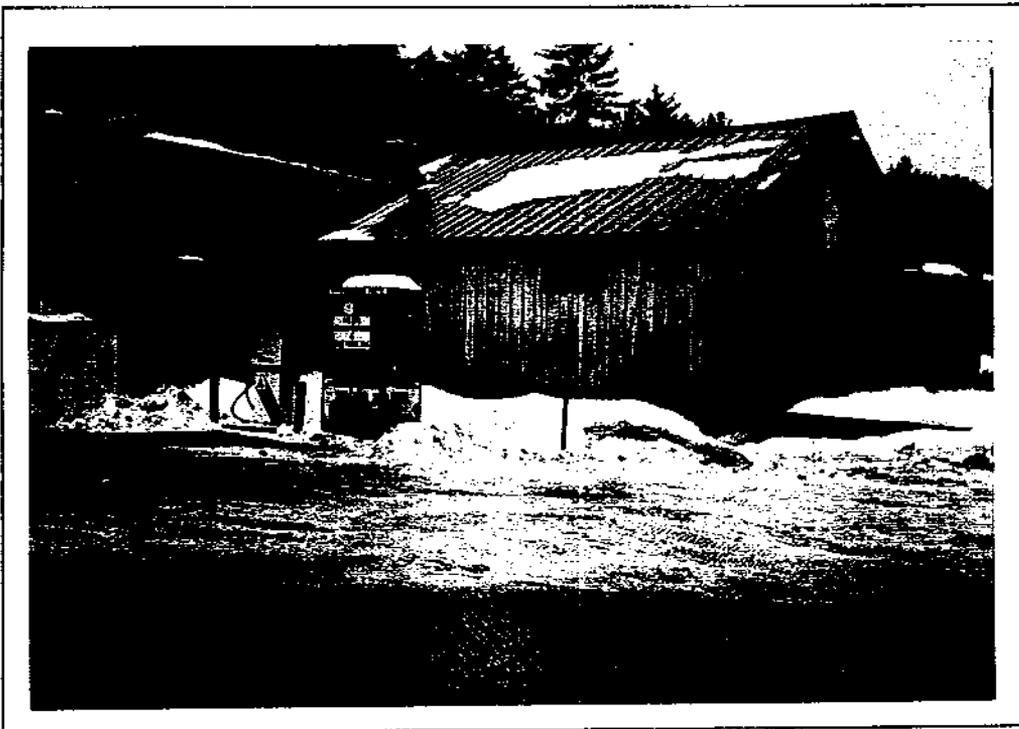
SCALE

APPENDIX B

Site Photographs



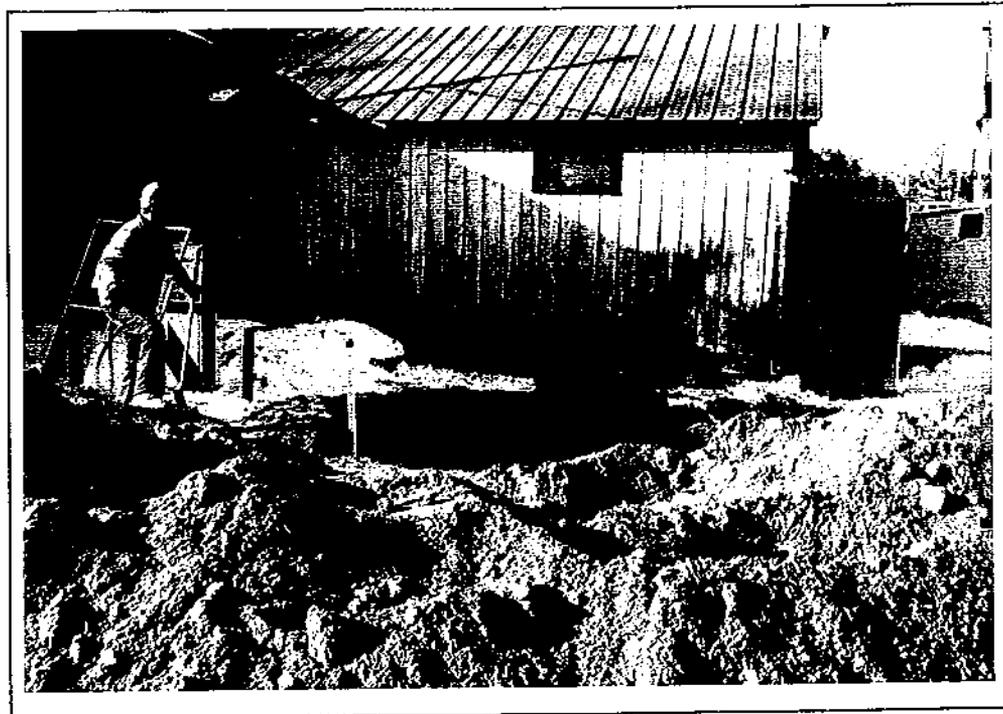
UST #1, #2, and #3 SITE OVERVIEW
View Toward East



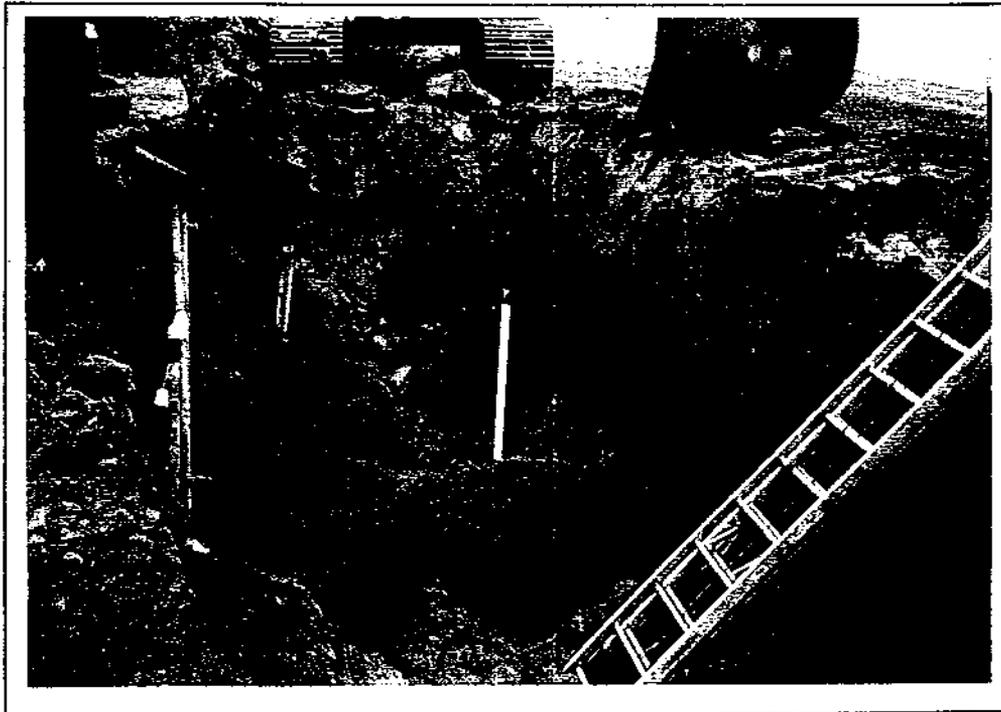
UST #4 SITE OVERVIEW
View Toward West



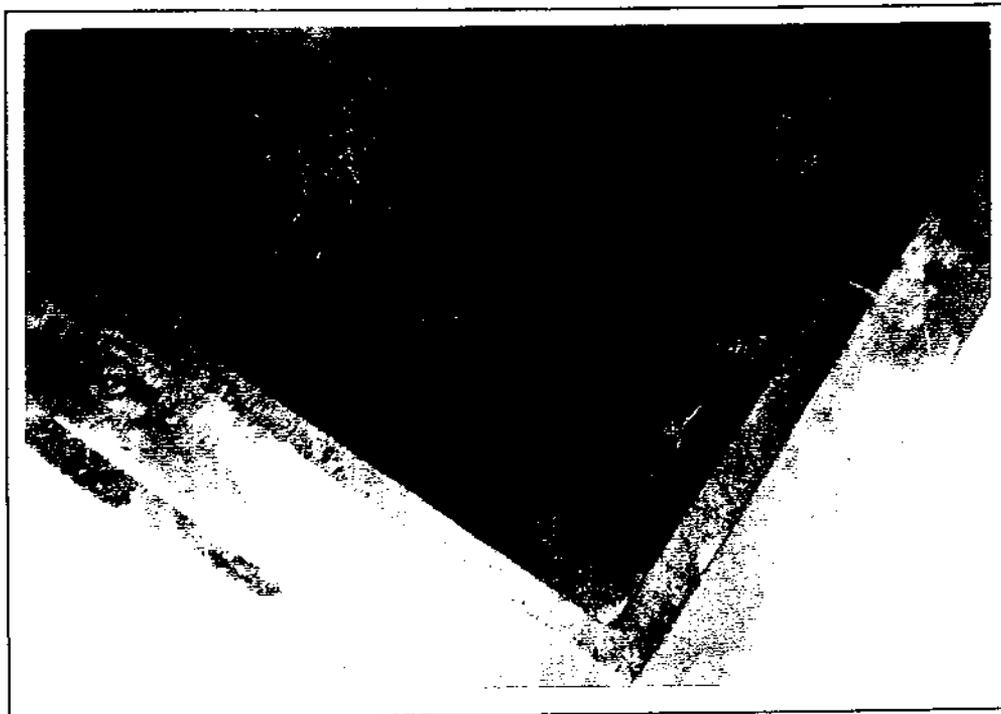
SITE OVERVIEW
(View Toward West)



MW-4 in UST #4 EXCAVATION
(View Toward West)



MW-1 in UST #1 EXCAVATION
(View Toward East)



On-site Gravel Supply Well
(located 40 feet north of former gasoline USTs)

APPENDIX C

Well Construction Logs

Marin Environmental, Inc.

SITE NAME: <i>East Corinth Gen. store</i>		BORING NO: <i>MW-1</i>		
LOCATION: <i>East Corinth, VT</i>		TOTAL DEPTH: <i>12.35 ft</i>		
JOB NO. <i>V97117</i>		DEPTH TO WATER: <i>8.88 ft</i>		
DATE: <i>12/3/97</i>		FIELD SUPERVISOR: <i>Jay Gonyaw</i>		
DRILLING METHOD <i>Excavator</i>		CONTRACTOR: <i>Bradford oil</i>		
BORING DIAMETER		DRILLERS:		

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0	6	12	18	24				
	<i>SS-1</i>									<i>2.4</i>
<i>5'</i>							<i>dry, SAND with some Gravel, strong Petroleum odor</i>			
	<i>SS-2</i>									<i>3.6</i>
	<i>SS-3</i>						<i>∇ @ 8.88 ft</i>			<i>443</i>
<i>10'</i>										
	<i>SS-4</i>						<i>wet, COBBLES with some Boulders strong Petroleum odor</i>			<i>872</i>
<i>15'</i>										
<i>20'</i>										
<i>25'</i>										
<i>30'</i>										
<i>35'</i>										
<i>40'</i>										

	BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	VERY LOSE	WELL SCREEN	<i>2" 5ch. 40 PVC 10 ft</i>
SOME	20-33%	LOOSE	SLOT SIZE	<i>0.01"</i>
LITTLE	10-20%	MEDIUM	RISER	<i>2" PVC 5 ft</i>
TRACE	0-10%	DENSE	GRADED SAND	
		VERY DENSE	BENTONITE PELLETS	
			BENTONITE GROUT	

Marin Environmental, Inc.

SITE NAME: <i>East Corinth General Store</i>		BORING NO: <i>mw-2</i>			
LOCATION: <i>East Corinth, VT</i>		TOTAL DEPTH: <i>10.9 ft</i>			
JOB NO. <i>V97117</i>		DEPTH TO WATER: <i>8.05 ft</i>		<div style="border: 1px solid black; padding: 2px; display: inline-block;">E. Corinth General Store</div>	
DATE: <i>12/7/97</i>		FIELD SUPERVISOR: <i>Jay Gonyaw</i>			
DRILLING METHOD <i>Excavator</i>		CONTRACTOR: <i>Bradford oil</i>		Boring/Well Location	
BORING DIAMETER		DRILLERS:			

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0	6	12	18	24				
	<i>SS-1</i>									
<i>5'</i>	<i>SS-2</i>						<i>dry, SAND with some Gravel, strong petroleum odor</i>		<i>32.2</i>	<i>260</i>
							<i>~ @ 8.05 ft</i>			
<i>10'</i>	<i>SS-3</i>						<i>wet, COBBLES with some Boulders, slight petroleum odor.</i>		<i>20.1</i>	
<i>15'</i>							<i>Bedrock</i>			
<i>20'</i>										
<i>25'</i>										
<i>30'</i>										
<i>35'</i>										
<i>40'</i>										

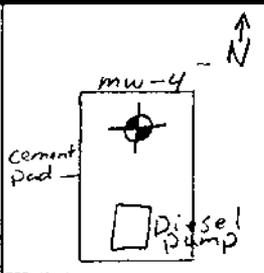
	BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	VERY LOOSE	2" Sch. 40 PVC	10 ft
SOME	20-33%	LOOSE	SLOT SIZE	
LITTLE	10-20%	MEDIUM	2" PVC	5 ft
TRACE	0-10%	DENSE		
		VERY DENSE		
		BENTONITE PELLETS		
		BENTONITE GROUT		

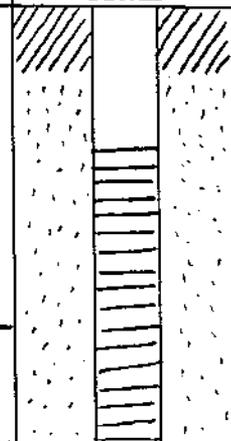
SITE NAME: East corinth Gen store		BORING NO: MW-3		
LOCATION: East corinth, VT		TOTAL DEPTH: 10.2		
JOB NO. V97117		DEPTH TO WATER: 7.61		
DATE: 12/17/97		FIELD SUPERVISOR: Jay Gonyaw		
DRILLING METHOD Excavator		CONTRACTOR: Bradford oil		
BORING DIAMETER		DRILLERS:		

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0	6	12	18	24				
	SS-1							dry, SAND with some Gravel		
	SS-2									4.8
5'										3.6
	SS-3						√ @ 7.61 ft			
10'	SS-4							wet, COBBLES with some Boulders		10.6
							Bedrock			
15'							// // // // //			
20'										
25'										
30'										
35'										
40'										

	BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
	0 - 4	VERY LOSE	WELL SCREEN	2" sch 40 PVC 10 ft
AND	33-50%	4 - 10	LOOSE	SLOT SIZE 0.01"
SOME	20-33%	10 - 30	MEDIUM	RISER 2" PVC 5 ft
LITTLE	10-20%	30 - 50	DENSE	GRADED SAND
TRACE	0-10%	> 50	VERY DENSE	BENTONITE PELLETS
				BENTONITE GROUT

Marin Environmental, Inc.

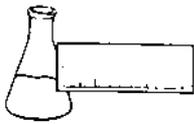
SITE NAME: <i>East Corinth Gen. Store</i> LOCATION: <i>East Corinth, VT</i> JOB NO. <i>V97117</i> DATE: <i>12/8/98</i>		BORING NO: <i>MW-4</i> TOTAL DEPTH: <i>12.95 ft</i> DEPTH TO WATER: <i>9.65 ft</i>		East Corinth General Store			
DRILLING METHOD <i>Excavator</i>		FIELD SUPERVISOR: <i>Jay Gonyaw</i>					
BORING DIAMETER		CONTRACTOR: <i>Bradford Oil</i>					
		DRILLERS:		Boring/Well Location			

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0	6	12	18	24				
	SS-1							dry, SAND with some Gravel strong petroleum odor		1.5
	SS-2						13			
5'	SS-3						7.1			
	SS-4						305			
	SS-5						170			
10'	SS-6						1,055			
	SS-7						99.7			
15'										
20'										
25'										
30'										
35'										
40'										

		BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
		0 - 4	VERY LOSE	WELL SCREEN	2" sch. 40 PVC 10 ft
AND	33-50%	4 - 10	LOOSE	SLOT SIZE	0.01"
SOME	20-33%	10 - 30	MEDIUM	RISER	2" PVC 5 ft
LITTLE	10-20%	30 - 50	DENSE	GRADED SAND	
TRACE	0-10%	> 50	VERY DENSE	BENTONITE PELLETS	
			BENTONITE GROUT		

APPENDIX D

Laboratory Report Forms



EPA METHOD 602--PURGEABLE AROMATICS

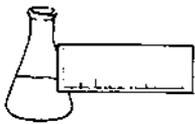
CLIENT: Marin Enviromental
PROJECT NAME: East Corinth
CLIENT PROJ. #: V97117

DATE RECEIVED: February 2, 1998
REPORT DATE: February 4, 1998
PROJECT CODE: GWVT1226

Ref. #:	116,175	116,176	116,177	116,178	116,179
Site:	Duplicate	Trip Blank	Supply Well	Shire Mach. Shop	MW-1
Date Sampled:	1/30/98	1/30/98	1/30/98	1/30/98	1/30/98
Time Sampled:	NI	7:00	13:30	10:55	13:10
Sampler:	J.G.	J.G.	J.G.	J.G.	J.G.
Date Analyzed:	2/3/98	2/3/98	2/3/98	2/3/98	2/3/98
UIP Count:	>10	0	0	0	>10
Dil. Factor (%):	20	100	100	100	20
Surr % Rec. (%):	103	89	95	92	103
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)
Benzene	7.2	<1	<1	<1	6.9
Chlorobenzene	<5	<1	<1	<1	<5
1,2-Dichlorobenzene	<5	<1	<1	<1	<5
1,3-Dichlorobenzene	<5	<1	<1	<1	<5
1,4-Dichlorobenzene	<5	<1	<1	<1	<5
Ethylbenzene	60.6	<1	<1	<1	58.7
Toluene	25.5	1.4	<1	<1	22.7
Xylenes	1,140.	<1	<1	<1	1,100.
MTBE	208.	<1	8.7	<1	182.

Ref. #:	116,180	116,181	116,182		
Site:	MW-2	MW-3	MW-4		
Date Sampled:	1/30/98	1/30/98	1/30/98		
Time Sampled:	12:48	12:30	12:03		
Sampler:	J.G.	J.G.	J.G.		
Date Analyzed:	2/3/98	2/3/98	2/3/98		
UIP Count:	0	0	>10		
Dil. Factor (%):	100	100	20		
Surr % Rec. (%):	92	92	101		
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)		
Benzene	<1	<1	60.8		
Chlorobenzene	<1	<1	<5		
1,2-Dichlorobenzene	<1	<1	<5		
1,3-Dichlorobenzene	<1	<1	<5		
1,4-Dichlorobenzene	<1	<1	<5		
Ethylbenzene	<1	<1	27.5		
Toluene	<1	<1	49.8		
Xylenes	<1	<1	110.		
MTBE	15.1	16.8	181.		

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



ENDYNE, INC.

Laboratory Services

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

LABORATORY REPORT

TOTAL PETROLEUM HYDROCARBONS (TPH) BY MODIFIED EPA METHOD 8100

DATE: February 10, 1998
CLIENT: Marin Environmental
PROJECT: East Corinth
PROJECT CODE: GWVT1227
COLLECTED BY: J.G.
DATE SAMPLED: January 30, 1998
DATE RECEIVED: February 2, 1998

Reference #	Sample ID	Concentration (mg/L) ¹
116,183	Supply Well; 1330	ND ²
116,184	Shire Mach. Shop; 1055	ND
116,185	MW-4; 1203	8.10

Notes:

- 1 Method detection limit is 0.4 mg/L.
- 2 None detected