

MARIN

ENVIRONMENTAL

21 October 1998

Mr. Bob Butler
State of Vermont DEC
Waste Management Division
103 South Main Street, West Building
Waterbury, VT 05671-0404

Re: *Initial Site Investigation Report- Washburn's Laundromat, Randolph, VT*

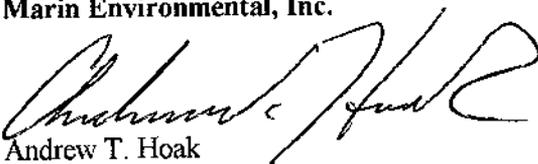
Dear Mr. Butler,

Enclosed is one bound copy of the Initial Site Investigation Report outlining the findings of the "Expressway" investigation conducted at the above referenced property located in Randolph, Vermont.

Please give me a call if you have any questions or comments regarding this report.

Sincerely,

Marin Environmental, Inc.


Andrew T. Hoak
Hydrogeologist

ATH/98050101.doc
Enclosures
cc: John Washburn

SCIENTISTS
ENGINEERS
GIS SPECIALISTS

WASTE MANAGEMENT DIVISION

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INITIAL SITE INVESTIGATION REPORT

WASHBURN'S LAUDROMAT
SMS SITE # 98-2390
75 Main Street
Randolph, VT

21 October, 1998

Prepared for:

Washburn's Laundromat
75 Main Street
Randolph, Vermont 05060

Contact: Mr. John Washburn
Phone: 802-728-6430

Prepared by:

Marin Environmental, Inc.
1700 Hegeman Avenue
Colchester, Vermont 05446

Contact: Andrew T. Hoak
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Marin Project #: VT980050
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EXECUTIVE SUMMARY

Marin Environmental, Inc. (**Marin**) has conducted an initial site investigation at Washburn's Laudromat located at 75 Main Street, Randolph, VT and has concluded the following:

- Petroleum released from damaged or loose piping associated with the former underground storage tank (UST) system at the site appears to have resulted in a minor impact to ground water in the vicinity of the former UST system. Analytical results of ground-water samples collected from four on-site monitoring wells did not detect the presence of petroleum compounds above the Vermont Groundwater Enforcement Standards (VGESs).
- Observations made during the UST closure and photoionization detector (PID) readings and ground-water sample results from soil borings/monitoring wells completed in and downgradient of the former UST and pump island locations suggest that residual contamination is largely limited to soils in the immediate vicinity of the former diesel pump island.
- The residual subsurface contamination at the site does not appear to pose a threat to any nearby sensitive receptors. Drinking-water for the site and adjacent properties is supplied by a municipal system. The nearby Third Branch of the White River does not appear to be at risk at this time from the residual contamination.
- Surficial materials at the site consist mainly of medium to fine silty sand. On 12 August 1998, the water table was found to be present at about 40 feet below ground surface, and exhibited a east - southeasterly trending gradient of about three percent.

On the basis of the results of this investigation, **Marin** makes the following recommendations:

1. The four on-site monitoring wells should be resampled to confirm the August 1998 analytical results. The samples should be analyzed for petroleum-related compounds by EPA Method 8021B and for Total Petroleum Hydrocarbons (TPH) by modified EPA Method 8100.
2. If the subsequent ground-water analytical results confirm the findings of the August 1998 analytical data (no exceedance of VGESs), **Marin** recommends that the site be considered for "Site Management Activities Completed" (SMAC) status by the Vermont Department of Environmental Conservation (VT DEC).

1.0 INTRODUCTION

This report details the results of an initial site investigation conducted at Washburn's Laundromat located at 75 Main Street in Randolph, Vermont (Figure 1, Appendix A). This report has been prepared by Marin Environmental, Inc. (Marin) under the direction of John Washburn, owner of the site. The site investigation was initiated at the request of the Vermont Department of Environmental Conservation (VT DEC) following the discovery of subsurface petroleum contamination encountered during the removal of three USTs on 29 and 30 April 1998.

1.1 Site Location and Physical Setting

Washburn's Laundromat, located on Main Street in downtown Randolph, is a coin-operation laundromat, with off-site dry cleaning services. The building consists of a single story, with a crawl-space basement. The structure was previously used as a gas station and auto repair shop. The on-site building is located immediately north of the former USTs (Figure 2). The site geographic coordinates are 44° 55' 28" N / 72° 40' 5" W.

The site and all adjacent properties are supplied with municipal water and sewer services. The Third Branch of the White River, which flows from the west, is located approximately 400 feet northeast of the site.

Native surficial materials in the area of the site are mapped as littoral pebbly sand (Stewart and MacClintock, 1970). Bedrock in the area is mapped as the Barton River Member of the Waits River Formation which is comprised of interbedded siliceous crystalline limestone and sericite (Doll, 1961).

1.2 Site History

The site was used as a retail gasoline station and automotive-service garage, until being converted to a laundromat facility.

Evidence of a petroleum release was discovered during the removal of six out-of-service petroleum underground storage tanks (USTs) on 29 and 30 April 1998. An UST closure assessment conducted at the site by Marin indicated that the conditions of removed USTs and associated piping ranged from excellent to poor condition at the time of removal, with significant surface rust and pitting and several holes in a 3,000-gallon UST (UST #2). Soils in the excavation showed evidence of petroleum releases, which appeared to be from overfills at the former diesel pump island. Soils within the tank

excavation were characterized as poorly sorted medium to coarse brown sands with some pebbles and cobbles to a depth of 15 feet below ground surface (bgs) and exhibited moderate petroleum odors. No ground water was encountered at a maximum depth of 15 feet bgs. All removed soils were subsequently returned to the tank excavation.

The ranges of PID readings, reported in parts per million (ppm), from the UST excavations were as follows: UST #1 - 0.0 ppm to 16.6 ppm, UST #2 - 0.0 ppm to 3.4 ppm, UST #3 - 0.0 ppm, UST #4 - 0.0 ppm to 268 ppm, UST #5 - 0.0 ppm, and UST #6 - 0.0 ppm.

The VT DEC requested further investigation at the Washburn's Laundromat site in order to evaluate the degree and extent of soil and ground-water contamination, and the risks posed by any identified contamination to sensitive receptors such as streams, drinking-water supplies, and building indoor air quality. As such, **Marin** began an initial site investigation at the request of John Washburn.

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;
- Assess the condition of the soil stockpile generated during the removal of three USTs from the site; 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 ground-water 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 and an on-site supply well for laboratory analysis of volatile petroleum compounds and total petroleum hydrocarbons (TPH).
- 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

On 29 and 30 July 1998, **Marin** supervised the installation of four monitoring wells (MW-1, MW-2, MW-3 and MW-4), to evaluate the degree and extent of petroleum contamination and the local ground-water flow direction. MW-1 was installed at the former diesel pump location; MW-2 was installed in the former location of UST #2 on the south side of the laundromat; MW-3 was installed approximately 15 feet off the southeast corner of the laundromat, in the presumed downgradient direction of the apparent on-site source; and MW-4 was installed approximately 40 feet off the southwest corner of the laundromat, in the presumed upgradient direction from the source area. Approximate monitoring well locations and site features are shown on Figure 2, Appendix A.

Soils encountered in the borings consisted of sands and silty-sands. Each boring encountered refusal presumably on top of bedrock, at depths between 12.5 and 18 feet bgs. Ground water was encountered in each boring at a depth of approximately 40 feet. Petroleum odors were detected in MW-1 to a depth of approximately 15 feet bgs.

The monitoring wells were installed by M&W Soils Engineering of Charlestown, New Hampshire using hollow-stem-auger drilling techniques. Soil samples were collected from each boring using a split-spoon sampling device at five-foot intervals. The soil samples were screened for the possible presence of volatile organic compounds (VOCs) with a photoionization detector (PID) and logged for lithology by a **Marin** geologist. All down-hole drilling and sampling equipment was decontaminated during use as appropriate.

A 10 foot section of 0.010-inch slot high-flow screen was placed such that approximately five feet of screen extended above the apparent water table. Solid two-inch diameter PVC riser extended from the top of screen to approximately 0.5 feet bgs. Clean quartz #1 filter sand was placed in the annulus around the well to at least two foot above the top of the screened interval. A bentonite seal, approximately two feet thick, was set above the sand pack and the remainder of the annular space was backfilled with native material. Each completed monitoring well was protected by a flush-mounted steel roadbox cemented into place. Each well casing was topped with a water-tight compression cap. Monitoring-well construction details are included on the soil-boring and well-construction logs in Appendix B.

2.2 Soil-Screening Results

The highest PID readings obtained during the soil boring program were observed in samples collected near the top of each boring; 72.8 parts per million (ppm) at five feet bgs in MW-1, 11.9 ppm at 15 feet bgs in MW-2, 7.9 ppm at 20 feet bgs in MW-3, and 3.6 ppm at 5 feet bgs in MW-4. Soil screening results are summarized on each of the boring logs provided in Appendix B.

Marin field personnel screened soil samples from each boring for the possible presence of volatile organic compounds (VOCs) using a PE PhotoVac Model 2020 portable photoionization detector (PID). The PID was field calibrated on the same day as soil boring 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 a east - southeasterly direction, toward the Third Branch of the White River. The average gradient of the local ground-water table on 12 August 1998 was about three percent. Water-level measurements and elevation calculations for 12 August 1998 are presented in Table 1. The ground-water contour map in Figure 3 was prepared using this data.

The sand 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 1.3 to 134 feet per day (Driscoll, 1986). Assuming Darcian flow, these estimates combine with the calculated ground-water gradient of three percent to yield an estimated range of ground-water flow velocities in the surficial aquifer of between 0.1 to 10 feet per day.

TABLE 1. Ground-Water Elevation Data

Monitoring Date: 12 August 1998

Well I. D.	Top of Casing Elevation *	Depth to Water (feet, bgs)	Ground Water Elevation
MW-1	100.00	40.37	59.63
MW-2	99.93	40.39	59.54
MW-3	99.70	41.36	58.34
MW-4	99.50	39.10	60.40

*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

The Vermont Groundwater Enforcement Standards (VGESs) for benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX) were not exceeded in any of the ground-water samples collected on-site. The sample collected from MW-2 contained small quantities of toluene at 2 parts per billion (ppb). Total petroleum hydrocarbons (TPH) were not detected in any of the samples. Ground-water analytical results are summarized below in Table 2; the contaminant distribution is shown on Figure 4. Laboratory report forms are included in Appendix B.

TABLE 2. Ground-Water Analytical Results
August 1998

Well I.D.	Benzene	Ethyl benzene	Toluene	Xylenes	MTBE	TPH
MW-1	ND <1	ND <1	ND <1	ND <1	ND <1	ND
MW-2	ND <1	ND <1	2.0	ND <1	ND <1	ND
MW-3	ND <1	ND <1	ND <1	ND <1	ND <1	ND
MW-4	ND <1	ND <1	ND <1	ND <1	ND <1	ND
Duplicate (MW-1)	ND <1	ND <1	ND <1	ND <1	ND <1	ND
Trip Blank	ND <1	ND <1	ND <1	ND <1	ND <1	ND
VGES*	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.

VGES = Vermont Groundwater Enforcement Standard.

TPH = Total petroleum hydrocarbons. MTBE = Methyl-tertiary butyl ether

Ground-water samples were collected from four monitoring wells on 12 August 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. A trip blank and a duplicate sample were collected

during the August sampling event 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 the Department of Environmental Conservation LaRosa Laboratory in Waterbury, 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. Total petroleum hydrocarbons (TPH) by modified EPA Method 8100 were analyzed by Endyne, Inc. of Williston, Vermont. Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis. No petroleum compounds were detected in the trip blank, and analytical results for the duplicate samples were within 5 percent for BTEX, MTBE, and TPH.

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 Washburn's Laundromat that could potentially be impacted by residual soil and ground water contamination. The on-site single story building and all nearby buildings are served by a municipal water system. Ambient air in the crawl space below the on-site building registered background levels on the PID. Due to limited access, no other basement spaces were screened with the PID. The following sensitive receptors were identified in the vicinity of the site:

- Buried utilities (water and wastewater systems) are located along the eastern edge of Main Street upgradient of the former UST location.
- The Third Branch of the White River, located approximately 400 feet to the northeast of the site, is the nearest downgradient surface-water body.

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 does not appear to pose a significant threat to any nearby sensitive receptors. Observations made during the UST closure, and PID readings and ground-water sample results from monitoring wells completed in and downgradient of the former UST suggest that residual contamination is largely limited to the soils beneath the former diesel pump island.

- Although the Third Branch of the White River likely represents the eventual surface discharge point of the ground water flowing beneath the site, the natural processes of dilution, dispersion and biodegradation — coupled with the relatively low levels of contamination noted in ground water at the release location — will likely prevent the discharge of significant concentrations of petroleum compounds to this river. No petroleum compounds were detected in the sample obtained from the well downgradient of the apparent on-site release sources.
- PID soil screening data from the UST excavation and monitoring-well borings suggest that the area of significant soil contamination is limited to the immediate vicinity of the former diesel pump island. The property is a commercial facility, which limits the potential for direct public exposure to contaminated soils.

4.0 CONCLUSIONS

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

- Petroleum released from damaged or loose piping associated with the former underground storage tank (UST) system at the site appears to have resulted in a minor impact to ground water in the vicinity of the former UST system. Analytical results of ground-water samples collected from four on-site monitoring wells did not detect the presence of petroleum compounds above the Vermont Groundwater Enforcement Standards (VGESs).
- Observations made during the UST closure and photoionization detector (PID) readings and ground-water sample results from soil borings/monitoring wells completed in and downgradient of the former UST and pump island locations suggest that residual contamination is largely limited to soils in the immediate vicinity of the former diesel pump island.
- The residual subsurface contamination at the site does not appear to pose a threat to any nearby sensitive receptors. Drinking-water for the site and adjacent properties is supplied by a municipal system. The nearby Third Branch of the White River does not appear to be at risk at this time from the residual contamination.
- Surficial materials at the site consist mainly of medium to fine silty sand. On 12 August 1998, the water table was found to be present at about 40 feet below ground surface, and exhibited a east - southeasterly trending gradient of about three percent.

5.0 RECOMMENDATIONS

On the basis of the results of this investigation, **Marin** makes the following recommendations:

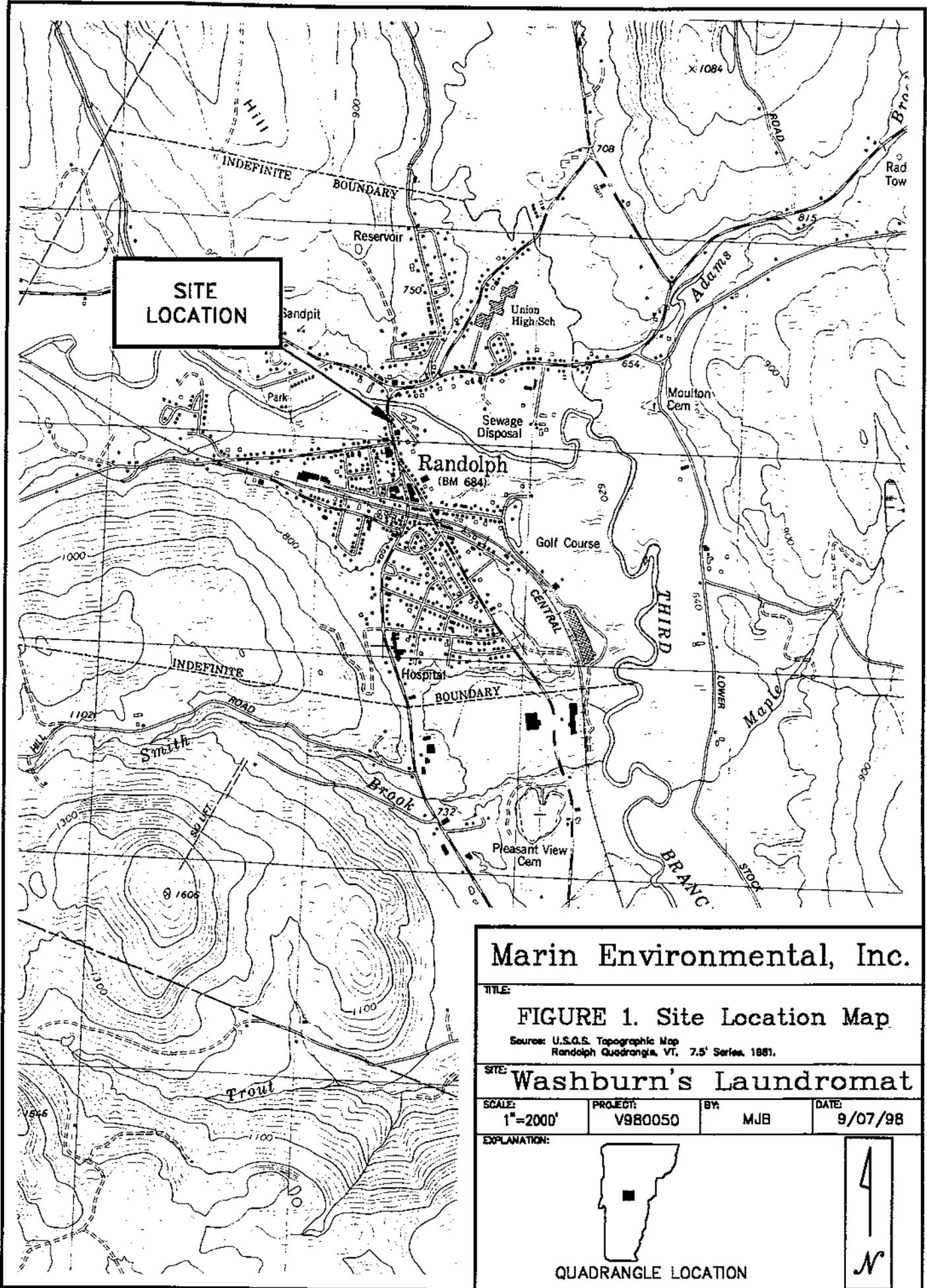
1. The four on-site monitoring wells should be resampled to confirm the August 1998 analytical results. The samples should be analyzed for petroleum-related compounds by EPA Method 8021B and for Total Petroleum Hydrocarbons (TPH) by modified EPA Method 8100.
2. If the subsequent ground-water analytical results confirm the findings of the August 1998 analytical data (no exceedance of VGESs), **Marin** recommends that the site be considered for "Site Management Activities Completed" (SMAC) status by the Vermont Department of Environmental Conservation (VT DEC).

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.
- Driscoll, Fletcher, G., 1986. *Groundwater and Wells*, Johnson Filtration Systems, Inc., St. Paul, Minnesota, 1089 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, 1981. Randolph, VT Quadrangle . U.S. Geological Survey. 7.5 minute series (topographic).

APPENDIX A

Figures



**SITE
LOCATION**

Marin Environmental, Inc.

TITLE:
FIGURE 1. Site Location Map

Source: U.S.G.S. Topographic Map
Randolph Quadrangle, VT. 7.5' Series, 1981.

SITE:
Washburn's Laundromat

SCALE: 1"=2000'	PROJECT: V980050	BY: MJB	DATE: 9/07/98
--------------------	---------------------	------------	------------------

EXPLANATION:



QUADRANGLE LOCATION





Main Street

Side Walk

Grassy Area

Telephone Pole

Parking Lot

Washburn's Laundromat

Top of Bank

Former Pump Islands

MW-1

UST#4

UST#5

UST#6

MW-4

Former USTs (6)

MW-2

MW-3

Sewer Manhole

Sewer Manhole

Grassy Area

Chandler Music Hall

Side Walk



Marin Environmental, Inc.

1700 Hegeman Ave.
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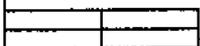
SITE: **WASHBURN'S LAUNDROMAT
RANDOLPH, VT**

TITLE: **FIGURE 2.
SITE MAP
With Monitoring Well Locations**

LEGEND:
● Monitoring Well

DRAWN BY: **MJB** DATE: **OCT 1998**
APPROVED BY: **ATH** FILE No.: **980050sp**

0 30'



SCALE

ALL LOCATIONS ARE APPROXIMATE



Main Street

Side Walk

Telephone Pole

Grassy Area

Parking Lot

Washburn's Laundromat

Former Pump Islands

MW-1
59.63'

MW-4
60.40'

Former USTs (6)

MW-2
59.54'

Sewer Manhole

Top of Bank

MW-3
58.34'

60.0'

Grassy Area

59.0'

58.5'

Chandler Music Hall

Side Walk



SCALE

ALL LOCATIONS ARE APPROXIMATE



Marin Environmental, Inc.

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Colchester, VT 05446
(802) 655-0011

SITE: WASHBURN'S LAUNDROMAT
RANDOLPH, VT

TITLE: FIGURE 3.
GROUNDWATER CONTOUR MAP
MONITORING DATE: 12 AUGUST 1998

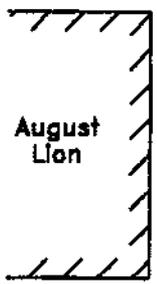
LEGEND: — Groundwater Contour
● Monitoring Well
➔ Approx. Groundwater Flow

DRAWN BY: MJB

DATE: OCT 1998

APPROVED BY: ATH

FILE No.: 980050sp



Main Street

Side Walk

Side Walk

Grassy Area

Telephone Pole

Parking Lot

Washburn's Laundromat

Former Pump Islands

MW-4 ND

Former USTs (6)

2.0 ppb BTEX

MW-3 ND

Sewer Manhole

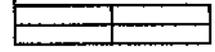
Sewer Manhole

Grassy Area

Chandler Music Hall

Top of Bank

0 30'



SCALE

ALL LOCATIONS ARE APPROXIMATE



Marin Environmental, Inc.

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Colchester, VT 05446
(802) 655-0011

SITE: WASHBURN'S LAUNDROMAT
RANDOLPH, VT

TITLE: FIGURE 4.
BTEX CONTAMINANT DISTRIBUTION MAP
MONITORING DATE: 12 AUGUST 1998

LEGEND: — Contaminant Contour
● Monitoring Well
ND None Detected

DRAWN BY: MJB DATE: OCT 1998

APPROVED BY: ATH FILE No.: 980050sp



Main Street

Side Walk

Grassy Area

Telephone Pole

Parking Lot

Washburn's Laundromat

Top of Bank

Former Pump Islands

MW-1 ND

MW-4 ND

Former USTs (8)

MW-2 ND

MW-3 ND

Sewer Manhole

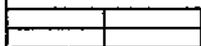
Sewer Manhole

Grassy Area

Chandler Music Hall

Side Walk

0 30'



SCALE

ALL LOCATIONS ARE APPROXIMATE



Marin Environmental, Inc.

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

SITE:

WASHBURN'S LAUNDROMAT
RANDOLPH, VT

TITLE:

FIGURE 5.
MTBE CONTAMINANT DISTRIBUTION MAP
MONITORING DATE: 12 AUGUST 1998

LEGEND:

— Contaminant Contour

⊙ Monitoring Well

ND None Detected

DRAWN BY:

MJB

DATE:

OCT 1998

APPROVED BY:

ATH

FILE No.:

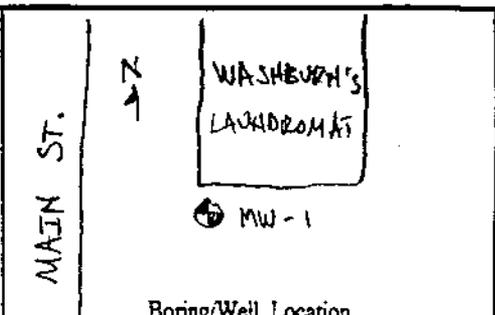
980050sp

APPENDIX B

Well Construction Logs

SITE NAME: WASHBURN'S LAUNDROMAT
 LOCATION: RANDOLPH, VT
 JOB NO. VT 980029
 DATE: 7/29/98

BORING NO: MW-1
 TOTAL DEPTH: 45'
 DEPTH TO WATER: 39'



DRILLING METHOD
 HSA

FIELD SUPERVISOR: A. HOAK

BORING DIAMETER
 6 1/2"

CONTRACTOR: M&W SOILS

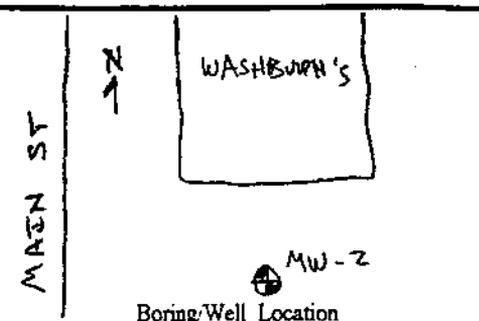
DRILLERS: MYRON & MIKE

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6	6-12	12-18	18-24	24-30				
5'		5	6							72.8
				6	6	20"	BROWN FINE TO MEDIUM SAND AND FILL; DRY; BLACK STAINING AND PETROL ODOR			
10'		6	6							26.4
				3	3	18"	BROWN MEDIUM TO COARSE GRAVELLY SAND; PETROL ODOR, DRY			
15'		5	6			22"				35.1
				6	5		BROWN MEDIUM TO FINE SAND, DRY WITH BLACK STAINING AND MOTTLING			
20'		5	5							5.6
				5	4	22"	BROWN FINE SAND WITH LITTLE SILT AND MOTTLES, DRY			
25'		5	5			24"				3.8
				5	5		BROWN FINE SAND WITH LITTLE SILT AND MOTTLES, DRY			
30'		4	4							0.0
				5	5	24"	BROWN FINE SAND WITH LITTLE SILT, DRY, CLAY LENSES APPROX. 1/2" THICK - WET			
35'		4	5							0.0
				6	6	20"	BROWN FINE SAND WITH LITTLE SILT, DRY TO MOIST			
40'		2	3	2	2	24"	GRAY FINE SILTY SAND, WET			10.6

		BLOW COUNT		MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0-4	VERY LOSE	WELL SCREEN	2" PVC	10 FT
SOME	20-33%	4-10	LOOSE	SLOT SIZE	0.010	
LITTLE	10-20%	10-30	MEDIUM	RISER	2" PVC	35 FT
TRACE	0-10%	30-50	DENSE	GRADED SAND	45-32 FT RES	
		> 50	VERY DENSE	BENTONITE PELLETS	32-29 FT RES	
				BENTONITE GROUT		

SITE NAME: WASHBURN'S LAUNDRY
 LOCATION: RANDOLPH, VT
 JOB NO. VT 980029
 DATE: 7/29/98

BORING NO: MW-2
 TOTAL DEPTH: 43 FT
 DEPTH TO WATER: 38 FT BGS



DRILLING METHOD
 HSA

FIELD SUPERVISOR: A. HOAK

BORING DIAMETER
 6 1/2"

CONTRACTOR: M&W SOILS ENG.

DRILLERS: MYRON & MIKE

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6	6-12	12-18	18-24	24-30				
5'		3	3					BROWN FINE TO MEDIUM SAND WITH TRACE SILT AND PEBBLES, DRY		9.9
10'		5	6					LIGHT BROWN WELL SORTED FINE SAND WITH TRACE SILT, DRY		10.8
15'		4	4					LIGHT BROWN WELL SORTED FINE SAND WITH TRACE SILT AND MOTTLES, DRY		11.9
20'		4	5					LIGHT GREY FINE SAND WITH THIN CLAY LENSES, DRY		9.0
25'		6	5					LIGHT GREY FINE SAND WITH LITTLE SILT AND MOTTLES; SILT LENS APPROX. 1.5" THICK, DRY		9.7
30'		4	3					BROWN FINE SILTY SAND WITH FEW SILT INTERBEDS, MOIST TO WET		11.7
35'		5	5					BROWN FINE SILTY SAND WITH FEW SILT INTERBEDS, MOIST TO WET		9.4
40'		1	2					BROWN FINE SILTY SAND, WET W/IT @ 38 FT BGS.		10.0

		BLOW COUNT		MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0-4	VERY LOSE	WELL SCREEN	2" PVC	10 FT
SOME	20-33%	4-10	LOOSE	SLOT SIZE	2, 0, 10	
LITTLE	10-20%	10-30	MEDIUM	RISER	2" PVC	33 FT
TRACE	0-10%	30-50	DENSE	GRADED SAND	43-31 FT BGS	
		> 50	VERY DENSE	BENTONITE PELLETS	31-29 FT BGS	
				BENTONITE GROUT		

Marin Environmental, Inc.

SITE NAME: WASHBURN'S LAUNDROMAT
 LOCATION: RANDOLPH, VT
 JOB NO. VT 980029
 DATE: 7/20/98

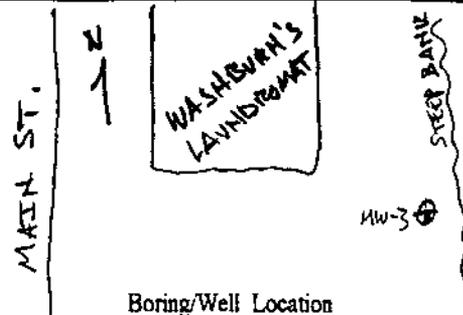
BORING NO: MW-3
 TOTAL DEPTH: 45 FT
 DEPTH TO WATER: 40 FT

DRILLING METHOD
 HSA

FIELD SUPERVISOR: A. HONIG
 CONTRACTOR: M&W SOILS ENG.

BORING DIAMETER
 6 1/2"

DRILLERS: MYRON & MIKE

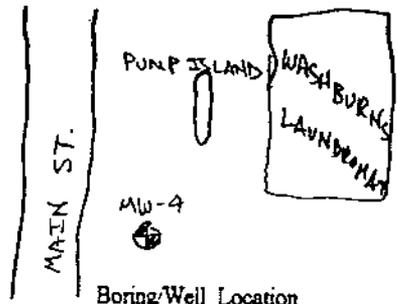


Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6"	6-12"	12-18"	18-24"	24-30"				
5'		3	1				16"	BROWN MEDIUM TO COARSE SAND AND ORGANIC MATTER		3.9
10'		10	11				18"	BROWN MEDIUM SAND WITH TRACE SILT AND SOME PEBBLES AND COBBLES UP TO 1/2" DIAMETER, DRY		4.7
15'		5	3				20"	BROWN MEDIUM TO FINE SANDS WITH LITTLE SILT AND FEW SILT INTERBEDS 1/2" THICK, DRY		7.3
20'		3	3				21"	GRAY FINE SAND WITH LITTLE SILT, DRY WITH MOTTLING		7.9
25'		5	3				23"	BROWN FINE SAND WITH LITTLE SILT, DRY WITH MOTTLING		4.9
30'		3	4				19"	BROWN FINE SILTY SAND, MOIST TO WET		4.4
35'		8	4				21"	BROWN VERY FINE SILTY SAND AND SANDY SILT, MOIST		2.3
40'		7	1				29"	BROWN VERY FINE SILTY SAND, WET, WATER TABLE @ ~40 FT BGS		4.8

BLOW COUNT		MATERIALS USED		SIZE/TYPE	QUANTITY	
AND	33-50%	0-4	VERY LOSE	WELL SCREEN	2" PVC	10 FT
SOME	20-33%	4-10	LOOSE	SLOT SIZE	0.010	
LITTLE	10-20%	10-30	MEDIUM	RISER	2" PVC	35 FT
TRACE	0-10%	30-50	DENSE	GRADED SAND	45-32' BGS	
		> 50	VERY DENSE	BENTONITE PELLETS	32-29' BGS	
				BENTONITE GROUT		

SITE NAME: WASHBURN'S LAUNDRY MAT
 LOCATION: RANDOLPH, VT
 JOB NO. VT 9K4029
 DATE: 7/29/98

BORING NO: MW-4
 TOTAL DEPTH: 43'
 DEPTH TO WATER: 38'



DRILLING METHOD
 HSA

FIELD SUPERVISOR: A. HOAK

BORING DIAMETER
 6 1/2"

CONTRACTOR: M & W Soils Eng.

BLOW COUNTS PER 6"

DRILLERS: MYRON & MIKE

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6	6-12	12-18	18-24	24-30				
5'		4	5					LIGHT BROWN WELL SORTED FINE SAND WITH TRACE SILT, DRY		3.6
10'		10	11					BROWN MEDIUM TO COARSE GRAVELY SAND WITH SOME PEBBLES, DRY		3.2
15'		6	5					LIGHT BROWN WELL SORTED FINE SAND WITH TRACE SILT AND MOTTLING, DRY		2.1
20'		4	5					LIGHT GRAY FINE SILTY SAND WITH THIN CLAY LENS APPROX 1/8" THICK, MOTTLING, DRY		0.0
25'		5	8					LIGHT GRAY FINE SILTY SAND WITH CLAY LENS, MOIST		2.4
30'		5	8					GRAY FINE SILTY SAND WITH LITTLE CLAY, MOIST		0.3
35'		6	5					GRAY FINE SILTY SAND WITH LITTLE CLAY, MOIST		0.0
40'		1	1					GRAY VERY FINE SILTY SAND AND SANDY SILT, WET W.I.T @ ~38'		1.7

		BLOW COUNT		MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0-4	VERY LOSE	WELL SCREEN	2" PVC	10 FT
SOME	20-33%	4-10	LOOSE	SLOT SIZE	0.01U	
LITTLE	10-20%	10-30	MEDIUM	RISER	2" PVC	33 FT
TRACE	0-10%	30-50	DENSE	GRADED SAND	43-31.5' BGS	
		> 50	VERY DENSE	BENTONITE PELLETS	31.5-29' BGS	
				BENTONITE GROUT		

APPENDIX C

Laboratory Report Forms

8/19/98

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 35451 Report To: Andrew Hoak
Location: Washburn's Laundry, MW-3

Phone: 655-0011 Date Collected: 8/12/1998
Program: 41 2390 Chain of Custody? Yes

Notes:

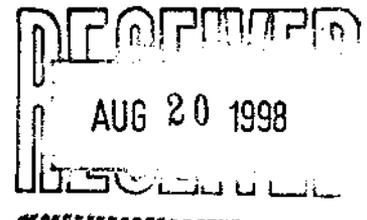
Date Analyzed: 8/13/1998 Over hold? No Dilution: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	1	N.D.				
Benzene	1	N.D.				
Toluene	1	N.D.				
Ethylbenzene	1	N.D.				
Total Xylenes	1	N.D.				
1,3,5-Trimethylbenzene	1	N.D.				
1,2,4-Trimethylbenzene	1	N.D.				
Naphthalene	1	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 112% 4-Bromofluorobenzene . 108%

Notes: No second column confirmation used.



Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

8/19/98

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 35450 Report To: Andrew Hoak
Location: Washburn's Laundry, MW-2

Phone: 655-0011
Program: 41 2390

Date Collected: 8/12/1998
Chain of Custody? Yes

Notes:

Date Analyzed: 8/13/1998 Over hold? No Dilution: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	1	N.D.				
Benzene	1	N.D.				
Toluene	1	2				
Ethylbenzene	1	N.D.				
Total Xylenes	1	N.D.				
1,3,5-Trimethylbenzene	1	N.D.				
1,2,4-Trimethylbenzene	1	N.D.				
Naphthalene	1	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 113% 4-Bromofluorobenzene . 107%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

8/19/98

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 35449 Report To: Andrew Hoak
Location: Washburn's Laundry, MW-1

Phone: 655-0011 Date Collected: 8/12/1998
Program: 41 2390 Chain of Custody? Yes

Notes:

Date Analyzed: 8/13/1998 Over hold? No Dilution: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	1	N.D.				
Benzene	1	N.D.				
Toluene	1	N.D.				
Ethylbenzene	1	N.D.				
Total Xylenes	1	N.D.				
1,3,5-Trimethylbenzene	1	N.D.				
1,2,4-Trimethylbenzene	1	N.D.				
Naphthalene	1	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 113% 4-Bromofluorobenzene . 106%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

8/19/98

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 35448 Report To: Andrew Hoak
Location: Washburn's Laundry, MW-4

Phone: 655-0011 Date Collected: 8/12/1998
Program: 41 2390 Chain of Custody? Yes

Notes:

Date Analyzed: 8/13/1998 Over hold? No Dilution: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	1	N.D.				
Benzene	1	N.D.				
Toluene	1	N.D.				
Ethylbenzene	1	N.D.				
Total Xylenes	1	N.D.				
1,3,5-Trimethylbenzene	1	N.D.				
1,2,4-Trimethylbenzene	1	N.D.				
Naphthalene	1	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 113% 4-Bromofluorobenzene . 107%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

8/19/98

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 35447 Report To: Andrew Hoak
Location: Washburn's Laundry, Duplicate

Phone: 655-0011
Program: 41 2390

Date Collected: 8/12/1998
Chain of Custody? Yes

Notes:

Date Analyzed: 8/13/1998 Over hold? No Dilution: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	1	N.D.				
Benzene	1	N.D.		1	Y	109
Toluene	1	N.D.		1	Y	112
Ethylbenzene	1	N.D.				
Total Xylenes	1	N.D.				
1,3,5-Trimethylbenzene	1	N.D.				
1,2,4-Trimethylbenzene	1	N.D.				
Naphthalene	1	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 110% 4-Bromofluorobenzene . 106%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

8/19/98

Department of Environmental Conservation Laboratory
Modified Method 8021 - Petroleum in Water

GJD

Lab Id: 35446 Report To: Andrew Hoak
Location: Washburn's Laundry, Trip Blank

Phone: 655-0011
Program: 41 2390

Date Collected: 8/12/1998
Chain of Custody? Yes

Notes:

Date Analyzed: 8/13/1998 Over hold? No Dilution: 1

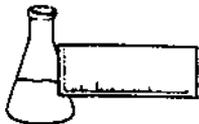
Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Methyl-t-butylether	1	N.D.				
Benzene	1	N.D.				
Toluene	1	N.D.				
Ethylbenzene	1	N.D.				
Total Xylenes	1	N.D.				
1,3,5-Trimethylbenzene	1	N.D.				
1,2,4-Trimethylbenzene	1	N.D.				
Naphthalene	1	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

α,α,α -Trifluorotoluene 113% 4-Bromofluorobenzene . 107%

Notes: No second column confirmation used.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve



ENDYNE, INC.

Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: State of Vt. Environmental Conservation
PROJECT NAME: Washburns Laundry
DATE REPORTED: August 26, 1998
DATE SAMPLED: August 12, 1998

PROJECT CODE: SOVE1277
REF. #: 125,649 - 125,654

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

Chain of custody did not indicate sample preservation.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

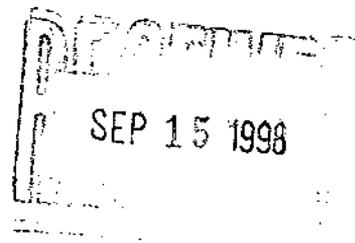
Blank contamination was not observed at levels affecting the analytical results.

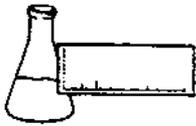
Analytical method precision and accuracy were monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures





LABORATORY REPORT

TOTAL PETROLEUM HYDROCARBONS (TPH) BY MODIFIED EPA METHOD 8100

DATE: August 26, 1998
CLIENT: State of Vermont Environmental Conservation
PROJECT: Washburns Laundry
PROJECT CODE: SOVE1277
COLLECTED BY: Gerald Divinzeno
DATE SAMPLED: August 12, 1998
DATE RECEIVED: August 18, 1998

Reference #	Sample ID	Concentration (mg/L) ¹
125,649	Trip Blank; 9:00	ND ²
125,650	Duplicate	ND
125,651	MW-4; 11:15	ND
125,652	MW-1; 12:00	ND
125,653	MW-2; 11:30	ND
125,654	MW-3; 11:45	ND

Notes:

- 1 Values quantitated based on the response of #2 Fuel Oil. Method detection limit is 0.4 mg/L.
- 2 None Detected

CHAIN-OF-CUSTODY RECORD

Project Name: <u>Washburns Laundry</u> Site Location:	Reporting Address: <u>103 South Main Street</u> <u>Washburn, VT 05671-1109</u>	Billing Address:
Endyne Project Number: <u>SOVE1227</u>	Company: <u>State of VT Environmental Conservation</u> Contact Name/Phone #: <u>Genald DiVincenzo</u>	Sampler Name: <u>Genald DiVincenzo</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				
125,649	trip blank		X		8-12-98	2	empty		8/10/98		
125,650	trip blank										
125,651	125,651										
125,652	125,652										
125,653	125,653										
125,654	125,654										

Relinquished by: Signature <u>(See attached)</u>	Received by: Signature <u>Genald DiVincenzo</u>	Date/Time <u>8-18-98</u> <u>2:30pm</u>
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes ___ No ___

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD,	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):										