



Marin Environmental, Inc.

Environmental Consultants and Engineers

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5 February 1998

Main Office:
7 Island Dock Road
Haddam, CT 06438
Phone: (860) 345-4578
Fax: (860) 345-3854

Mr. Chuck Schwer
Vermont Department of Environmental Conservation
Sites Management Section
103 South Main Street, West Building
Waterbury, Vermont 05671-0404

600 Charlton Street
Southbridge MA 01550
Phone: (508) 764-8755
Fax: (508) 764-4054

1700 Hegeman Avenue
Colchester, VT 05446
Phone: (802) 655-0011
Fax: (802) 655-6076

Dear Mr. Schwer:

Enclosed is one bound copy of the Initial Site Investigation Report conducted at the W.E. Jock Oil Company Facility located in Wells River, Vermont.

63 School Street
P.O. Box 1414
Concord, NH 03302
Phone: (603) 224-8871
Fax: (603) 224-8688

Please call me if you have any questions regarding the enclosed information.

Sincerely,

Terry W. Robbins, E.I.T.
Environmental Scientist

Internet:
www.marinenv.com

Enclosure

cc. Mr. Charles Engle, W.E. Jock Oil Company

Ref: 97044C02.DOC



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Feb 9 11:10 AM '98

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INITIAL SITE INVESTIGATION REPORT W.E. JOCK OIL COMPANY FACILITY

22 Main Street
Wells River, VT

14 January, 1998

Prepared for:

W.E. Jock Oil Company, Inc.
22 Main Street
Wells River, VT 05081

Contact: Mr. Charles Engle
Phone: 802-757-2163

Prepared by:

Marin Environmental, Inc.
Ground Water of Vermont
1700 Hegeman Avenue
Colchester, VT 05446

Contact: Terry W. Robbins, E.I.T
Phone: 802-655-0011

MARIN Project #: V97-044
MARIN Document #: 97044R01.DOC

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EXECUTIVE SUMMARY

Marin Environmental, Inc. (MARIN) has conducted an initial site investigation at the W.E. Jock Oil Company Facility located on U.S. Route 302, Wells River, VT and has concluded the following:

- Gasoline has been released to the subsurface at the site.
- Releases appear to have occurred from historical overflow events.
- Ground-water sampling results from monitoring wells in and downgradient of the former gasoline USTs and pump island locations suggest that gasoline contamination is largely confined to the immediate vicinity of the former USTs and pump island.
- The Vermont Ground Water Enforcement Standards (VGESs) for benzene and the gasoline additive methyl tertiary butyl-ether (MTBE) was exceeded in two wells—MW-4 located adjacent to the former USTs and MW-3 positioned approximately 40 feet downgradient of MW-4. The VGES for toluene was exceeded in MW-4.
- Other than the surficial aquifer directly beneath the site, the only other identified sensitive receptors in the vicinity of the site are the Connecticut River, located approximately 400 feet east-southeast of the former USTs and basements from three commercial and residential buildings located approximately 120 feet downgradient across U.S. Route 302. All the buildings in the area are served by municipal water and wastewater systems. No buildings are present on the site. The area containing residual contamination is used as a bulk petroleum storage facility.
- The apparent limited extent of subsurface contamination suggests that the risks posed to the identified receptors is low.
- Surficial materials at the site consist mainly of brown medium-fine sand and silt, with occasional brown/gray clay. On 26 August 1997, the water table was found to be about 11 to 13 feet below ground surface, and exhibited an south-southeasterly trending gradient of about 1.3 percent.

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

1. The four on-site monitoring wells should be sampled twice yearly commencing in the Spring of 1998. The samples should be analyzed for the possible presence of gasoline-related compounds by EPA 8020.
2. Following completion of each site-monitoring event, a report should be prepared including time-series graphs for water-quality analytical results from each location and figures showing ground-water flow direction and contaminant distribution.

1.0 INTRODUCTION

This report details the results of an initial site investigation conducted at the W.E. Jock Oil Company located on U.S. Route 302 in Wells River, Vermont (Figure 1). This report has been prepared by Marin Environmental, Inc. (MARIN) under the direction of Charles Engle of W.E. Jock Oil Company, Inc., owner of the underground petroleum storage systems. The site investigation was conducted in accordance with the Vermont Department of Environmental Conservation (VT DEC) Expressway process following the discovery of subsurface petroleum contamination during the removal of two underground storage tanks (USTs) on 14 May 1997.

1.1 Site Location and Physical Setting

The site is located along the north side of U.S. Route 302 in the town of Wells River, Vermont. The tanks were located approximately 50 feet from the northern edge of the roadway in a generally flat unpaved parking area, at the base of a steep embankment that rises to a rail line to the north. No buildings are located on-site; however, two retail offices and a private residence lie to the southeast, across Route 302. The ground surface around the facility has an average elevation of approximately 500 feet above mean sea level. The presumed direction of ground-water flow in the area is south-southeast toward the Connecticut River, located approximately 400 feet from the former USTs (USGS, 1986).

The site and all nearby residences are served by municipal water and wastewater systems.

Native surficial materials in the area are mapped as silt, silty clay, and clay (Stewart and MacClintock, 1970). Bedrock in the area is mapped as the Albee Formation, which is composed predominantly of massive gray, white-weathered quartzite interbedded with greenish-gray slate of Middle Ordovician Era (Doll, 1961).

1.2 Site History

The property is currently owned by W.E. Jock Oil Company. The facility has served as a bulk storage and distribution outlet for both private autos and larger mobile transfer vehicles since approximately 1980. The previous owner of the site was H.O. Taylor Chevrolet, which sold new automobiles in the vicinity of the former USTs and repaired automobiles across U.S. Route 302 at the current location of the real estate office.

On 14 May 1997, MARIN assessed the removal of two 10,000-gallon in-service, single-walled-steel gasoline underground storage tanks (USTs).

The two gasoline USTs were found to be in fair condition upon removal with some surface rust and minimal surface pitting. Associated fill, vent-line piping and pumps for the USTs had previously been removed and were not examined. A strong petroleum odor was detected in sandy soils beneath both fuel pump locations and in deeper soils beneath the tank fill assemblies at depths of 12-14 feet below ground surface (bgs). Photoionization detector (PID) readings on soil samples from the excavation ranged from 0 to 1,114 parts per million (ppm), with the highest readings at about 12-14 feet bgs, beneath the suction and fill ports for both USTs. PID readings in the excavation averaged 142 parts per million (ppm).

Ground water was observed at approximately 16 feet bgs in the excavation. No free product was observed in the excavation.

The removed USTs were replaced with two new 5,000 gallon USTs. Two additional 10,000-gallon gasoline USTs, which were installed in 1995, are located to the west of the former USTs.

MARIN initiated an initial site investigation under the VT DEC "Expressway" process after receiving approval on 11 July 1997 from Mr. Charles Engle of W.E. Jock Oil Company, 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 purposes, MARIN has:

- Supervised the installation of four soil borings/monitoring wells and determined the local ground-water flow direction.
- Screened subsurface soils from the soil borings for the possible presence of volatile organic compounds (VOCs) using a photoionization detector (PID).
- Collected and submitted ground-water samples from the on-site monitoring wells for laboratory analysis of volatile organic compounds (VOCs).
- Identified sensitive receptors in the area, and assessed the risk posed by the contamination to these potential receptors.
- Evaluated the need for treatment and/or a long-term monitoring plan for the site.
- 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 Soil Boring / Monitoring Well Installation

On 4 August 1997, MARIN supervised the completion of four soil borings/monitoring wells (MW-1 through MW-4). Approximate monitoring well locations are shown on Figure 2. The soil borings were installed using vibratory drilling technique by Adams Engineering of Underhill, Vermont.

The soils encountered in each boring generally consisted of brown/gray medium-fine sand and silt, with occasional silty sand and clay. All four borings were completed to approximately 20 feet below ground surface (bgs). Ground water was encountered between 12 and 15 feet bgs at the time of drilling. Soil samples were collected continuously from each boring using a five-foot long core tube lined with polyethylene. All downhole drilling and sampling equipment was decontaminated during use as appropriate.

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. The four on-site monitoring wells were developed after installation using a peristaltic pump. Monitoring-well construction details are included on the soil-boring and well-construction logs in Appendix A.

2.2 Soil-Screening Results

MARIN screened soil samples from each soil boring for the possible presence of volatile organic compounds (VOCs) using an HNU Model PI 101 portable photoionization detector (PID), which was calibrated with an isobutylene gas to a benzene reference.

PID readings from the suspected source area at MW-4 ranged from 1.4 to 260 ppm. PID readings on soils at MW-1 through MW-3 ranged from 0.2 to 1.4 ppm. PID screening results are included on the boring logs in Appendix A.

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 south-southeasterly direction, toward the Connecticut River. The average gradient of the local ground-water table on 26 August 1997 was about 1.3 percent. Water-level measurements and elevation calculations for 26 August 1997 are presented in Table 1. The ground-water contour map in Figure 3 was prepared using this data.

TABLE 1. Ground-Water Elevation Data

Well I. D.	Top of Casing Elevation *	Depth to Water (feet, TOC)	Ground Water Elevation
MW-1	99.29	12.57	86.72
MW-2	98.40	11.44	86.96
MW-3	99.27	12.68	86.59
MW-4	100.00	12.90	87.10

No free-phase petroleum was observed in any of the on-site monitoring wells. Static water-table elevations were computed for each monitoring well by subtracting the measured depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary site datum of 100.00 feet.

The surficial aquifer at the site consists mainly of brown/gray medium-fine sand and silt, with occasional silty sand and clay. These soil characteristics typically exhibit effective porosities of about 0.2 to 0.35 and hydraulic conductivities of about .03 to 3.0 ft/day (Fetter, 1994). Assuming Darcian flow, these estimated ranges of porosity and conductivity combine with the calculated average ground-water gradient of 1.3 percent to yield an estimated range of ground-water flow velocities in the surficial aquifer of between 0.1 and 20 ft/day.

2.4 Ground-Water Sampling and Analysis

The ground-water analytical results suggest that residual gasoline contamination is largely confined to the immediate vicinity of the former USTs. Contaminant concentrations exceeded applicable Vermont Ground Water Enforcement Standards (VGESs) for one or more gasoline compounds in MW-4, located at the former UST pit, and in MW-3, located approximately 40 feet downgradient of MW-4. 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 1997**

Well I.D.	Benzene	Ethyl benzene	Toluene	Xylenes	MTBE
MW-1	ND <1	ND <1	ND <1	ND <1	1.3
MW-2	ND <1	ND <1	ND <1	ND <1	ND <1
MW-3	47.7	ND <5	ND <5	ND <5	412
MW-4	69.2	147	2,250	1,460	218
Duplicate (MW-4)	35.6	77.9	1,350	824	139
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.
 Shaded areas denote VGES exceedence.

Ground-water samples were collected from the four existing monitoring wells on 26 August 1997. 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 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. 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 a moderate deviation of up to 50 percent was observed for VOCs in the duplicate sample.

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 W.E. Jock Oil Company Facility that could potentially be impacted by residual soil and ground-water contamination. All buildings in the area are served by municipal water and wastewater systems. No buildings are located on the site. The following sensitive receptors were identified in the vicinity of the site:

- Basement air quality in the two retail businesses and a private residence located approximately 120 feet southeast of the former USTs, across U.S. Route 302, in the presumed downgradient direction.
- The Connecticut River, located approximately 400 feet east-southeast of the former gasoline USTs and pump island.

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 residual subsurface petroleum contamination at the site does not appear to pose a significant threat to the Connecticut River. Given the apparent limited extent of subsurface contamination, the risk posed to the basement air quality in the downgradient buildings is also considered to be low. Observations made during the UST closure and recent ground-water sample results from monitoring wells completed in and downgradient of the former USTs and pump island suggest that residual contamination is limited to the immediate vicinity of the former USTs and pump island. Current information suggests that it is unlikely that any significant ground-water contamination associated with the former UST system would migrate 400 feet to the Connecticut River.

4.0 CONCLUSIONS

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

- Gasoline has been released to the subsurface at the site.
- Releases appear to have occurred from historical overflow events.
- Ground-water sampling results from monitoring wells in and downgradient of the former gasoline USTs and pump island locations suggest that gasoline contamination is largely confined to the immediate vicinity of the former USTs and pump island.
- The Vermont Ground Water Enforcement Standards (VGESs) for benzene and the gasoline additive methyl tertiary butyl-ether (MTBE) was exceeded in two wells—MW-4 located adjacent to the former USTs and MW-3 positioned approximately 40 feet downgradient of MW-4. The VGES for toluene was exceeded in MW-4.
- Other than the surficial aquifer directly beneath the site, the only other identified sensitive receptors in the vicinity of the site are the Connecticut River, located approximately 400 feet east-southeast of the former USTs and basements from three commercial and residential buildings located approximately 120 feet downgradient across U.S. Route 302. All the buildings in the area are served by municipal water and wastewater systems. No buildings are present on the site. The area containing residual contamination is used as a bulk petroleum storage facility.
- The apparent limited extent of subsurface contamination suggests that the risks posed to the identified receptors is low.
- Surficial materials at the site consist mainly of brown medium-fine sand and silt, with occasional brown/gray clay. On 26 August 1997, the water table was found to be about 11 to 13 feet below ground surface, and exhibited an south-southeasterly trending gradient of about 1.3 percent.

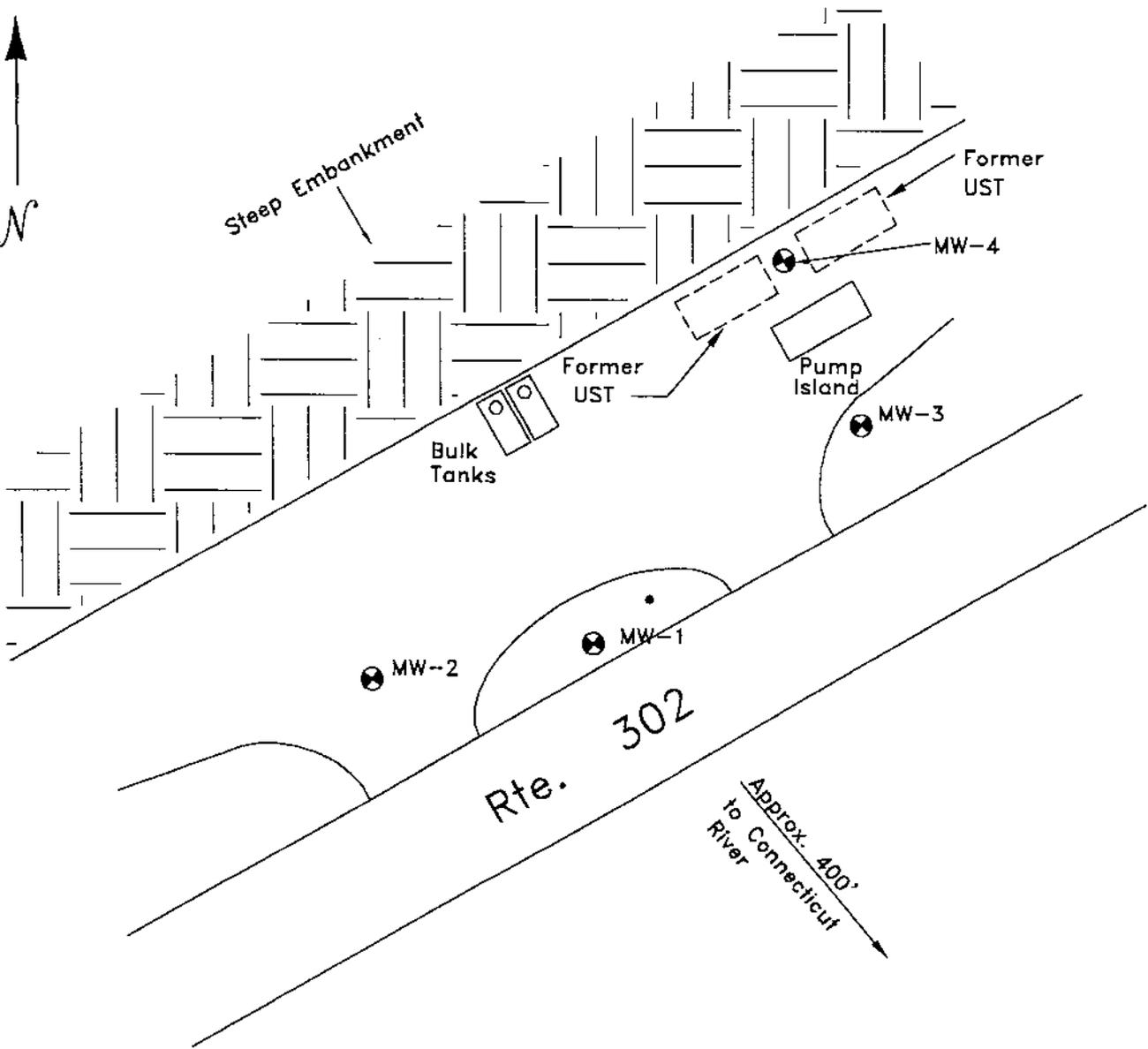
5.0 RECOMMENDATIONS

On the basis of the results of this investigation and the conclusions stated above, MARIN recommends the following:

1. The four on-site monitoring wells should be sampled twice yearly commencing in the Spring of 1998. The samples should be analyzed for the possible presence of gasoline-related compounds by EPA 8020.
2. Following completion of each site-monitoring event, a report should be prepared including time-series graphs for water-quality analytical results from each location and figures showing ground-water flow direction and contaminant distribution

6.0 REFERENCES

- Doll, C.G. and others, 1961. *Geologic Map of Vermont*, Office of the State Geologist.
- Fetter, C.W., 1994. *Applied Hydrogeology, 3rd Ed.*, Prentice Hall, Englewood Cliffs, New Jersey, 98 p.
- USGS, 1988. Woodsville, VT- NH Quadrangle . VT Geological Survey. 7.5x15 minute series (topographic). Provisional Edition, 1988.



Marin Environmental, Inc.

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

JOCK OIL BULK FACILITY
WELLS RIVER, VT

FIGURE 2.
SITE MAP
With Proposed Well Locations

LEGEND:

⊕ Monitoring Well

DRAWN BY: MJB

DATE: OCT 97

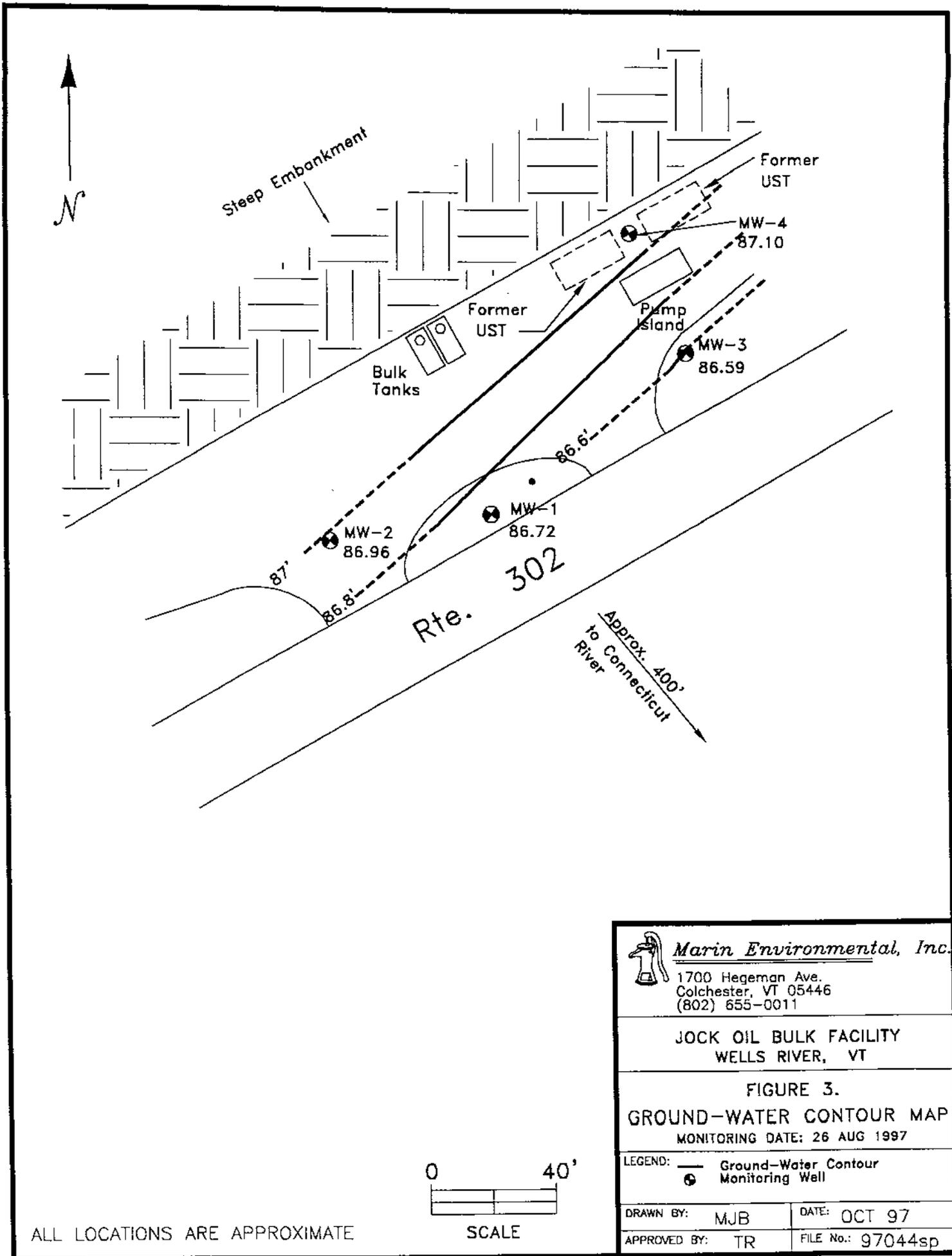
APPROVED BY: TR

FILE No.: 97044sp



SCALE

ALL LOCATIONS ARE APPROXIMATE



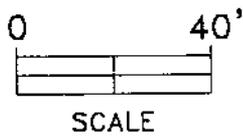

Marin Environmental, Inc.
 1700 Hegeman Ave.
 Colchester, VT 05446
 (802) 655-0011

JOCK OIL BULK FACILITY
WELLS RIVER, VT

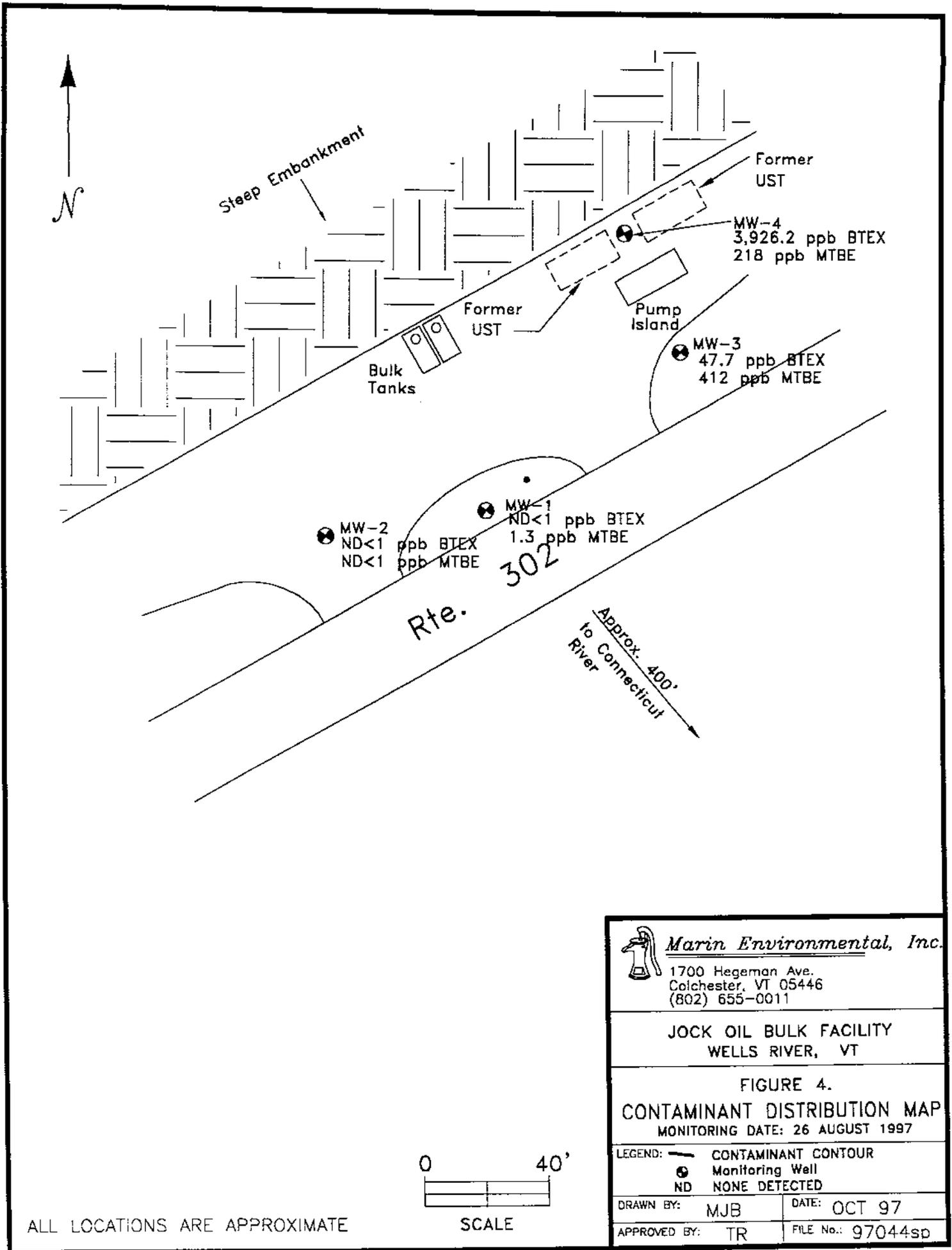
FIGURE 3.
GROUND-WATER CONTOUR MAP
 MONITORING DATE: 26 AUG 1997

LEGEND: — Ground-Water Contour
 ⊙ Monitoring Well

DRAWN BY: MJB	DATE: OCT 97
APPROVED BY: TR	FILE No.: 97044sp



ALL LOCATIONS ARE APPROXIMATE



Marin Environmental, Inc.

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

JOCK OIL BULK FACILITY
WELLS RIVER, VT

FIGURE 4.
CONTAMINANT DISTRIBUTION MAP
MONITORING DATE: 26 AUGUST 1997

LEGEND: — CONTAMINANT CONTOUR
● Monitoring Well
ND NONE DETECTED

DRAWN BY: MJB

DATE: OCT 97

APPROVED BY: TR

FILE No.: 97044sp

APPENDIX A

Soil Boring and Well Construction Logs



Ground Water of Vermont

FIELD SUPERVISOR **A. HOAK**
 CONTRACTOR **ADAMS ENGINEERING**
 DRILLERS **GERAULD ADAMS**

JOB LOCATION **JACK O'LEWY**
WELLS RIVER, VT
 DATE **8/4/97**

DRILLING METHOD **VIBRATORY**
 BORING DIAMETER **2 3/4" OD**

AND 40 - 50%
 SOME 10 - 40%
 TRACE 0 - 10%

BORING LOCATION NEAR **BORING #MW-1**
FIRE HYDRANT
 sketch on back or on site plan
 with measurements TOTAL DEPTH **20'**

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"					REG.	SAMPLE DESCRIPTION	STRAT CHG	GENERAL DESCRIPTION	WELL DETAIL	DEPTH
			0	6	12	18	24						
								TOP SOIL AND DUFF		BKGD / READ PID = 0.2 / 0.2 PPM			
5'								BROWN MEDIUM TO FINE SAND WITH SILT, MOIST		PID = 0.2 / 0.2 PPM		5'	
								BROWN MEDIUM SAND WITH GRAVEL, MOIST	0 0 0	PID = 0.2 / 0.2 PPM			
10'								BROWN MEDIUM TO FINE SAND WITH SILT, FEW MOTTLED AREAS, MOIST		PID = 0.2 / 0.2 PPM		10'	
								BROWN / DARK GREY MED. TO FINE SAND W/ SILT		PID = 0.2 / 0.2 PPM			
15'								DARK GREY MEDIUM SAND, LITTLE SILT, WET WOOD PIECES		PID = 0.2 / 1.4 PPM		15'	
								DARK GREY / BROWN CLEAN MEDIUM SAND W/ FEW PEBBLES, WET		PID = 0.2 / 0.2 PPM			
20'								GREY FINE SILTY SAND AND CLAY, FEW FINE SAND LAMINAE THROUGHOUT, WET		PID = 0.2 / 0.2 PPM		20'	
25'												25'	
30'												30'	
35'												35'	
40'												40'	

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	1 1/2" 0.010 SLOT	10 FT	GROUT		
SLOT SIZE	1 1/2"	10 FT	BACKFILL		
RISER PIPE	20 - 6.5 FT BGS		WATER USED		
GRADED SAND	6.5 - 1 FT BGS		STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE					



Ground Water of Vermont

FIELD SUPERVISOR A. HOAG
CONTRACTOR ADAMS ENGINEERING
DRILLERS G. ADAMS

JOB LOCATION JACK OIL
WELL REVER, VT
DATE 2/4/77

DRILLING METHOD		BORING LOCATION		BORING #							
VIBRATORY		WEST END OF LOT		MW-2							
BORING DIAMETER 2 3/4" OD		AND 40 - 50%		TOTAL DEPTH 19' 8"							
		SOME 10 - 40%									
		TRACE 0 - 10%									
DEPTH	SAMPLES SAMPLE NUMBER	BLOWS PER 6"				REC.	SAMPLE DESCRIPTION	STRAT CHG	GENERAL DESCRIPTION	WELL DETAIL	DEPTH
		0	6	12	18						
							PARKING LOT GRAVEL AND BROWN MEDIUM SAND		BKGD / READ PID = 0.2 / 0.2 PPM		
							BROWN MEDIUM DRY SAND		PID = 0.2 / 0.4 PPM		
5'							BROWN FINE MOIST SAND WITH SILT		PID = 0.2 / 0.2 PPM		5'
							BROWN FINE SILTY SAND WITH FEW PEBBLES, MOIST, SOME BLACK STAINING IN BASAL REGION		PID = 0.2 / 0.2 PPM		10'
10'							BROWN / GREY MEDIUM SAND W/ LITTLE SILT, MOIST		PID = 0.2 / 0.2 PPM		15'
15'							COARSE GRAVELLY SAND WITH FEW LARGE COBBLES, WET AT 13'		PID = 0.2 / 0.2 PPM		20'
							COARSE BROWN GRAVELLY SAND W/ COBBLES, WET		PID = 0.2 / 0.2 PPM		25'
							BROWN FINE SILTY SAND		PID = 0.2 / 0.2 PPM		30'
20'							GREY FINE WET SAND WITH LITTLE SILT		PID = 0.2 / 0.2 PPM		35'
											40'
25'											
30'											
35'											
40'											

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	1/2" PVC	10 FT	GROUT		
SLOT SIZE	0.010		BACKFILL		
RISER PIPE	1/2" PVC	8 FT	WATER USED		
GRADED SAND	1/2 - 4.5 FT BGS		STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE	4.5 - 1 FT BGS				



Ground Water of Vermont

FIELD SUPERVISOR A. HOAK
CONTRACTOR ADAMS ENGINEERING
DRILLERS G. ADAMS

JOB LOCATION JACK OIL
WELLS RIVER, VT
DATE 8/4/97

DRILLING METHOD VIBRATORY

BORING DIAMETER 2 3/4" OD

AND 40 - 50%
SOME 10 - 40%
TRACE 0 - 10%

BORING LOCATION BORING #
NEAR TELEPHONE POLE MW-3
startch on back or on-site plan
with measurements TOTAL DEPTH
20'

DEPTH	SAMPLES SAMPLE NUMBER	BLOWS PER 6"				REC.	SAMPLE DESCRIPTION	STRAT CHG	GENERAL DESCRIPTION	WELL DETAIL	DEPTH
		0 6	6 12	12 18	18 24						
						TOPSOIL, DUFF & COBBLES		BKGD / READ PID = 0.2 / 0.2 PPM			
5'						BROWN COARSE SAND WITH LITTLE SILT, BLACK STAINS		PID = 0.2 / 0.2 PPM			
						BROWN MEDIUM TO FINE SAND W/ SOME SILT, MOIST		PID = 0.2 / 0.2 PPM			
						BROWN MEDIUM TO FINE SAND W/ SILT, MOIST, COARSE IN BASAL REGIONS		PID = 0.2 / 0.2 PPM			
10'						LIGHT BROWN MEDIUM CLEAN DRY SAND		PID = 0.2 / 0.2 PPM			
						LIGHT BROWN MEDIUM CLEAN DRY SAND		PID = 0.2 / 0.4 PPM			
15'						DARK BROWN MEDIUM SAND WITH SOME SILT, MOIST TO WET		PID = 0.2 / 0.4 PPM			
						DARK BROWN/GREY MED. SAND W/ SOME SILT		PID = 0.2 / 0.4 PPM			
20'						GREY VERY FINE SILTY SAND AND CLAY, WET AND STICKY		PID = 0.2 / 0.2 PPM			
25'											
30'											
35'											
40'											

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	1 1/2" PVC	10 FT	GROUT		
SLOT SIZE	0.010		BACKFILL		
RISER PIPE	1 1/2" PVC	8 FT	WATER USED		
GRADED SAND	18 - 4.5 FT BGS		STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE	4.5 - 1 FT BGS				



Ground Water of Vermont

FIELD SUPERVISOR A. Hoak
 CONTRACTOR ADAMS ENGINEERING
 DRILLERS G. ADAMS

JOB LOCATION Jock OEL
WELLS RIVER, VT
 DATE 8/4/97

DRILLING METHOD VIBRATORY

BORING DIAMETER 2 3/4" OD

AND 40 - 50%
 SOME 10 - 40%
 TRACE 0 - 10%

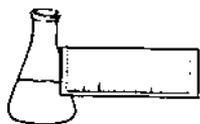
BORING LOCATION ON PUMP ISLAND
sketch on back of on-site plan
 with measurements
 BORING # MW-4
 TOTAL DEPTH 20'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"					REG.	SAMPLE DESCRIPTION	STRAT CHG	GENERAL DESCRIPTION	WELL DETAIL	DEPTH
			0	6	12	18	24						
								PUMP ISLAND CONCRETE					
5'								LIGHT BROWN MEDIUM TO FINE CLEAN DRY SAND (FILL)					5'
								LIGHT BROWN MEDIUM TO FINE CLEAN DRY SAND (FILL)					
10'								BROWN MEDIUM TO FINE MOIST SAND W/ SELT					10'
								DARK GREY FINE SILTY SAND, WET AT 14'					
15'								DARK GREY MEDIUM TO FINE SAND, WET					15'
								GREY FINE SILTY SAND AND CLAY, WET, FEW PEBBLES					
20'													20'
25'													25'
30'													30'
35'													35'
40'													40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	1 1/2" PVC	10 FT	GROUT		
SLOT SIZE	0.010		BACKFILL		
RISER PIPE	1 1/2" PVC	8 FT	WATER USED		
GRADED SAND	20 - 6 FT BGS		STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE	6 - 1.5 FT BGS				

APPENDIX B

Laboratory Report Forms



ENDYNE, INC.

Laboratory Services

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

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Marin Environmental

DATE RECEIVED: August 28, 1997

PROJECT NAME: Jock Oil Bulk Facility

REPORT DATE: September 5, 1997

CLIENT PROJ. #: V97044

PROJECT CODE: GWVT1118

Ref. #:	108,845	108,846	108,847	108,848	108,849
Site:	Duplicate	Trip Blank	MW-1	MW-2	MW-3
Date Sampled:	8/26/97	8/26/97	8/26/97	8/26/97	8/26/97
Time Sampled:	NI	9:20	10:15	10:05	10:30
Sampler:	J. Gonyaw				
Date Analyzed:	9/4/97	9/3/97	9/4/97	9/4/97	9/4/97
UIP Count:	4	0	0	0	0
Dil. Factor (%):	5	100	100	100	20
Surr % Rec. (%):	100	103	103	103	104
Parameter	Conc. (ug/L)				
Benzene	35.6	<1	<1	<1	47.7
Chlorobenzene	<20	<1	<1	<1	<5
1,2-Dichlorobenzene	<20	<1	<1	<1	<5
1,3-Dichlorobenzene	<20	<1	<1	<1	<5
1,4-Dichlorobenzene	<20	<1	<1	<1	<5
Ethylbenzene	77.9	<1	<1	<1	<5
Toluene	1,350.	<1	<1	<1	<5
Xylenes	824.	<1	<1	<1	<5
MTBE	139.	<1	1.3	<1	412.

Ref. #:	108,850				
Site:	MW-4				
Date Sampled:	8/26/97				
Time Sampled:	10:45				
Sampler:	J. Gonyaw				
Date Analyzed:	9/5/97				
UIP Count:	4				
Dil. Factor (%):	5				
Surr % Rec. (%):	101				
Parameter	Conc. (ug/L)				
Benzene	69.2				
Chlorobenzene	<20				
1,2-Dichlorobenzene	<20				
1,3-Dichlorobenzene	<20				
1,4-Dichlorobenzene	<20				
Ethylbenzene	147.				
Toluene	2,250.				
Xylenes	1,460.				
MTBE	218.				

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

CHAIN-OF-CUSTODY RECORD

22794

V97044

Project Name: JOCK OIL BULK	Reporting Address: 1500 HOGEMAN AVE	Billing Address:
Site Location: Facility Colchester, VT	Company: Marin Env.	Sampler Name: J. Gonyaw
Endyne Project Number: GWVT 1118	Contact Name/Phone #: M. Ross 655-0011	Phone #: 655-0011

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				
108845	Duplicate	H ₂ O	X		8/26/97	2	4000 gls		30	HCl	
108846	Trip Blank	↓	↓		0920	↓	↓		↓	↓	
108847	mw-1*	↓	↓		1015	↓	↓		↓	↓	
108848	mw-2	↓	↓		1005	↓	↓		↓	↓	
108849	mw-3	↓	↓		1030	↓	↓		↓	↓	
108850	mw-4	↓	↓		1045	↓	↓		↓	↓	

Relinquished by: Signature	Received by: Signature RANDOM (EXP)	Date/Time 8/28/97 15:28
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 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): SOLOMETRIE										