



April 19, 1999

MAILED
APR 20 1999
FBI - BOSTON

Mr. Paul Dandrade
Cumberland Farms Inc.
777 Dedham Street
Canton, Massachusetts 02021-9118

RE: Cumberland Farms Inc., Station # 4008 (VDEC Site# 98-2514), Route 4, Woodstock, VT -
Subsurface Contaminant Investigation Report

Dear Mr. Dandrade:

Lincoln Applied Geology, Inc. (LAG) is pleased to present this Subsurface Contaminant Investigation Report for Cumberland Farms Inc. (CFI) Station # 4008 (VDEC Site # 98-2514) located on Route 4 in Woodstock, Vermont. In response to the discovery of gasoline contaminated soils during the replacement of Underground Storage Tank (UST) system, the Vermont Department of Environmental Conservation (VDEC) Sites Management Section (SMS) requested that a subsurface contaminant investigation be performed to determine the extent and magnitude of the petroleum contamination beneath the site. The enclosed report includes well logs, monitoring data, ground water quality results, observations made during the sensitive receptor survey, and our conclusions and recommendations for the site.

Results of the investigation show that ground water downgradient of the former and current UST system has been impacted by moderate levels of dissolved phase gasoline contaminants. Except for ground water beneath the site, there are no contaminant impacts to surrounding sensitive receptors. Based on data collected during the subsurface investigation, we recommend installing two additional ground water monitor wells behind the CFI facility to delineate the downgradient extent of the contaminant plume. Following the installation of the wells we recommend conducting another site monitoring and ground water sampling event. The data collected during the second site monitoring and sampling event will be summarized and presented in a Supplemental Subsurface Investigation Summary Report, which will include an appropriate list of conclusions and recommendations for the site.

Please do not hesitate to call me or Richard S. Vandenberg, Project Manager, at (800) 477-4384, if you have any questions or comments regarding the attached report.

Sincerely,
Lincoln Applied Geology, Inc.

Jason S. Barnard
Geologist

JSB/jb
cc: Chuck Schwer
enclosures

Subsurface Contaminant Investigation Report
Cumberland Farms Inc., Station # 4008
Route 4, Woodstock, Vermont
(VDEC Site #98-2514)

Prepared for:

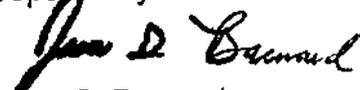
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Prepared by:

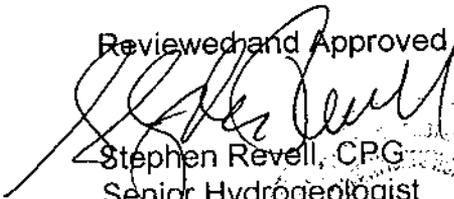
Lincoln Applied Geology, Inc.
Revell Drive
Lincoln, Vermont 05443
Contact: Jason S. Barnard
Phone: (802) 453-4384

April 19, 1999

Prepared by:


Jason S. Barnard
Geologist

Reviewed and Approved by:


Stephen Revell, CPG
Senior Hydrogeologist




Lincoln Applied Geology, Inc.
Environmental Consultants

Executive Summary

In September 1998, CFI and their subcontractors completed the removal, closure, and replacement of three underground storage tanks (USTs) and related piping at CFI facility #4008, which is located on Route 4 in Woodstock, Vermont. Lincoln Applied Geology, Inc. (LAG) conducted the assessment work between September 21 and 23, 1998 and completed the UST closure report, which was submitted to the Vermont Department of Environmental Conservation (VDEC), Underground Storage Tank Program (USTP) on September 29, 1998. During the assessment the three 8,000 gallon, single wall fiberglass USTs and associated piping were noted in excellent condition. During the UST and piping removal activities excavated soils were screened with a photoionization detector (PID) for the presence of volatile organic compounds (VOCs). As a result of the assessment work, approximately 50 cubic yards (yds³) of the most highly contaminated soil were removed from the former UST area and temporarily stockpiled on-site. Following VDEC approval, the gasoline contaminated soils were transported to the MTS Environmental, Inc. facility in Epsom New Hampshire on September 28, 1998, where they were thermally treated.

Based on the results of the September UST removal, the Sites Management Section (SMS) of the Vermont Department of Environmental Conservation (VDEC) requested that additional work be performed to further define the extent and magnitude of the petroleum contamination present beneath the site. In response to this request, LAG installed four monitor wells on-site on February 8 and 9, 1999 to define the extent and magnitude of the contamination. One well (MW-1) was installed upgradient, two wells (MW-2 and MW-3) were installed sidegradient, and one well (MW-4) was installed downgradient of the former UST and dispenser island areas. LAG also conducted a sensitive receptor survey by monitoring the ambient air space on the CFI and Albank buildings. Following installation, the wells were properly developed and sampled. Review of the February 24th water quality data shows that moderate concentrations of dissolved phase VOCs are present in monitor wells MW-3 and MW-4. No other petroleum compound, [other than total petroleum hydrocarbons (TPH)] were present in the remaining two wells sampled, above method detection limits. Based on the data collected during this initial subsurface investigation, we recommend that two additional ground water monitor wells be installed to completely define the on-site downgradient edge of the dissolved phase contaminant plume. Following the installation of these wells we also recommend a second complete site monitoring and ground water sampling round be performed.

Site Description

Cumberland Farms, Inc. (CFI) facility #4008 is located on Route 4 in Woodstock, Vermont (**Figure 1**). The property is bound by Vermont Route 4, Maple Fields Mobil (R.L. Vallee Inc.), Albank, and the Town of Woodstock sewage treatment facility (**Figure 2**). The one-story, slab on-grade CFI building is served by municipal water and sewer.



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Site History

CFI and their subcontractors completed the excavation, removal, and replacement of three 8,000 gallon, fiberglass, USTs and associated piping in September, 1998. During the work, LAG provided oversight and assessment of the UST system and soils. The UST Permanent Closure Form, photoionization detector (PID) data, and photographs of the site were submitted by LAG to the Vermont Department of Environmental Conservation (VDEC), Underground Storage Tank Program (USTP) in a report dated September 29, 1998. Excavated soils were screened for the presence of VOCs using a properly calibrated photoionization detector (PID). Data collected during the UST system assessment show that soils beneath the three removed USTs and in the vicinity of the former dispenser island area contained elevated concentrations of VOCs. Approximately 50 cubic yards (yds³) of the most highly contaminated soil were removed from the UST excavation and ultimately disposed of at MTS Environmental in Epsom, New Hampshire (a permitted asphalt batching facility). Due to the contamination remaining in soils directly beneath the site, the SMS requested that additional work be performed to further define the extent and magnitude of the soil and ground water contamination beneath the site.

Monitor Well Installation

Four monitor wells (MW-1, MW-2, MW-3, and MW-4) were drilled and installed using hollow stem auger drilling techniques on February 8 and 9, 1999 by T&K Drilling, Inc. The locations of the four monitor wells are shown on **Figure 2**. A description of the sediments encountered during the drilling, monitor well construction details, and PID data from the split-spoon samples, are included in the detailed well logs (**Appendix A**).

Site Geology

Soils encountered during the drilling include very fine to medium sands, overlying a dense, very fine sandy silt (glacial till), with a trace of fine to medium gravel. The uppermost sands were most likely deposited fluvially by the Ottauquechee River, which is located approximately 900 feet to the west of the site.

Review of the Centennial Geologic Map of Vermont (C.G. Doll, 1961) indicates that the underlying bedrock formation is that of the Lower Devonian Waits River Formation (367 to 408 million years ago) a Standing Pond Volcanic Member. The Standing Pond Volcanic Member of the Waits River Formation consists of a coarse garnet schist.

Site Survey and Monitoring

On February 9, 1999, LAG conducted a stadia survey of Wells MW-1, 2, 3, 4, and other site features pertinent to the subsurface investigation. On February 24th, LAG collected ground water level measurements from all monitor wells using an electronic interface probe capable of measuring 0.01 feet of free-floating petroleum product. LAG also assayed the headspace of each monitor well using a properly calibrated PID for the presence of petroleum



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related VOCs.

No free-floating petroleum product was present in any of the wells. The depth to ground water ranged between 20.75 feet (MW-2) and 30.15 feet (MW-4) across the site. A summary of ground water elevation data is presented in **Table 1**, and PID assays are included in **Table 2**. Review of **Table 2** indicates that the well headspace PID readings collected on February 24th ranged between 5 parts per million [ppm (MW-1)] and 162 ppm (MW-4) in the four evaluated wells. The two catch basins at either end of the parking area assayed at background (BG) levels during both the sensitive receptor survey (February 9th) and the February 24th monitoring event.

Site Hydrogeology

Ground water elevation data was used to develop a Ground Water Contour Map (**Figure 3**). Ground water flows across the site in a west/northwesterly direction, along a relatively steep gradient of 0.15 feet/foot (calculated using data from MW-2 and MW-3).

Water Quality Sampling

On February 24, 1999, LAG collected water quality samples from monitor wells MW-1, 2, 3, and 4 using industry accepted methods. All samples were analyzed along with a trip blank for the presence of VOCs using EPA Method 8021 and for total petroleum hydrocarbons (TPH) using EPA Method 8015 [gasoline range organics (GRO)] at Toxicon Laboratories, Inc. in Bedford, Massachusetts.

The water quality results are summarized in **Table 3** and are presented on the Water Quality Summary Map included as **Figure 4**. Copies of the laboratory reports are included as **Appendix B**. Review of **Table 3**, **Figure 4**, and **Appendix B** indicate that MW-4 (downgradient of former UST and dispenser island areas) contained 17,162 parts per billion (ppb) of benzene, toluene, ethylbenzene, and xylenes (BTEX) and 262 ppb of methyl-tert-butyl-ether (MTBE). The data also shows that MW-3 contained 1,120 ppb of MTBE. Wells MW-3 and MW-4 contained 1.268 ppm and 41 ppm of TPH. BTEX and MTBE compounds were not quantified above method detection limits in either MW-1 or MW-2 and 0.02 ppm TPH was detected in MW-2. Review of the water quality data also shows that the trip blank contained very low concentrations (0.06 ppm) of TPH, not thought to be from cross contamination. It is clear from these results that ground water downgradient of the former UST system has been impacted by moderate levels of dissolved phase petroleum related compounds, and that the plume extends beyond our existing monitor well array.

Sensitive Receptor Survey

On February 9, 1999 LAG conducted a sensitive receptor survey of the site and surrounding commercial properties. Potential sensitive receptors include the indoor air of the CFI and Albank buildings. The CFI building and surrounding commercial buildings are all served by municipal water and sewer. It was determined that indoor ambient air impacts are highly unlikely because the CFI building is constructed of a concrete slab on-grade. During



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the survey all on-site and one nearby building, and two catch basins at either end of the CFI facility were screened with a PID for the presence of VOCs. The collected data is summarized and presented in **Table 2**. No PID readings above BG levels were present in any of the evaluated building structures or the two catch basins. It is apparent that the indoor air space of any nearby buildings has not been impacted by the dissolved phase contamination identified beneath the site.

Summary of Findings

Based on the data collected, observations, and the evaluations presented, the following conditions exist at the site:

1. Ground water downgradient of the former and current UST system has been impacted by moderate levels of dissolved phase petroleum related contamination.
2. The dissolved phase contaminant plume is not completely delineated by our current monitor well array.
3. Low to moderate levels of vadose zone contamination exist downgradient of the former and current UST systems.
4. No contaminant impacts were noted in any of the evaluated building structures or the two catch basins.

Conclusions

Based on the data collected during this initial subsurface investigation, the sensitive receptor survey, and the September 1998 UST removal, the following conclusions can be made:

1. The moderate levels and spatial distribution of the vapor and dissolved phase contamination identified beneath the site are related to the former UST and dispenser island areas.
2. The moderate concentrations of petroleum related compounds in our most downgradient well suggest that the plume may have migrated to downgradient parts of the property.

Recommendations

Based on these conclusions, the following recommendations are made:

1. Install two additional ground water monitor wells behind (downgradient) the CFI building in order to delineate the on-site extent of the dissolved phase contaminant plume. The locations of these two wells are shown on **Figure 5**.



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3. Conduct a complete monitoring and ground water sampling event of the four existing and the two newly installed monitor wells.

3. Prepare a summary report that includes the data collected during the installation of the two additional monitor wells, and the second complete site monitoring and sampling event. The collected data will be used to determine the future status (i.e. off-site investigation, long-term monitoring, and/or remediation of the site). A cost estimate to implement the installation of the two additional wells, and the second complete monitoring and sampling round is included as **Appendix C**.

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Ground Water Elevation/Product Level (feet)

Data Point	TOC	02/24/99				
MW-1	100.10	79.20				
MW-2	100.00	79.25				
MW-3	99.73	71.43				
MW-4	99.92	69.77				

Notes:
1 - Elevation datum assumed
2 - Reference elevation is elevation of top of PVC well casing
Light Grey Cell = DRY
Dark Grey Cell = Inaccessible

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Appendix C	Cost Estimate



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Photoionization Results (PID - ppm)

Data Point	02/09/99	02/24/99			
MW-1		5			
MW-2		54			
MW-3		36			
MW-4		162			
CB-1	BG	BG			
CB-2	BG	BG			
CFI Store	BG				
Albank	BG				

Notes:
BG - Background
SL - Saturated Lamp

Ground Water Quality Results (ppb)

Data Point	Compound	02/24/99				
MW-1	Benzene	<5				
	Toluene	<5				
	Ethylbenzene	<5				
	Xylenes	<10				
	n-Propylbenzene	<5				
	1,3,5-Trimethylbenzene	<5				
	1,2,4-Trimethylbenzene	<5				
	Napthtalene	<5				
	MTBE	<5				
	BTEX	<25				
	BTEX + MTBE	<30				
TPH	<0.02					
MW-2	Benzene	<5				
	Toluene	<5				
	Ethylbenzene	<5				
	Xylenes	<10				
	n-Propylbenzene	<5				
	1,3,5-Trimethylbenzene	<5				
	1,2,4-Trimethylbenzene	<5				
	Napthtalene	<5				
	MTBE	<5				
	BTEX	<25				
	BTEX + MTBE	<30				
TPH	0.02					
MW-3	Benzene	<50				
	Toluene	<50				
	Ethylbenzene	<50				
	Xylenes	<100				
	n-Propylbenzene	<50				
	1,3,5-Trimethylbenzene	<50				
	1,2,4-Trimethylbenzene	<50				
	Napthtalene	<50				
	MTBE	1120				
	BTEX	<250				
	BTEX + MTBE	1370				
TPH	1.268					

NOTES:

< - Contaminant not detected at specified detection limit
 Total petroleum hydrocarbon (TPH) concentrations quantified in parts per million (ppm)

Ground Water Quality Results (ppb)

Data Point	Compound	02/24/99				
MW-4	Benzene	<250				
	Toluene	566				
	Ethylbenzene	786				
	Xylenes	15560				
	n-Propylbenzene	325				
	1,3,5-Trimethylbenzene	698				
	1,2,4-Trimethylbenzene	3180				
	Napthtalene	726				
	MTBE	262				
	BTEX	17162				
BTEX + MTBE	17424					
TPH	41					
TRIP BLANK	Benzene	<5				
	Toluene	<5				
	Ethylbenzene	<5				
	Xylenes	<10				
	n-Propylbenzene	<5				
	1,3,5-Trimethylbenzene	<5				
	1,2,4-Trimethylbenzene	<5				
	Napthtalene	<5				
	MTBE	<5				
	BTEX	<25				
BTEX + MTBE	<30					
TPH	0.06					

NOTES:

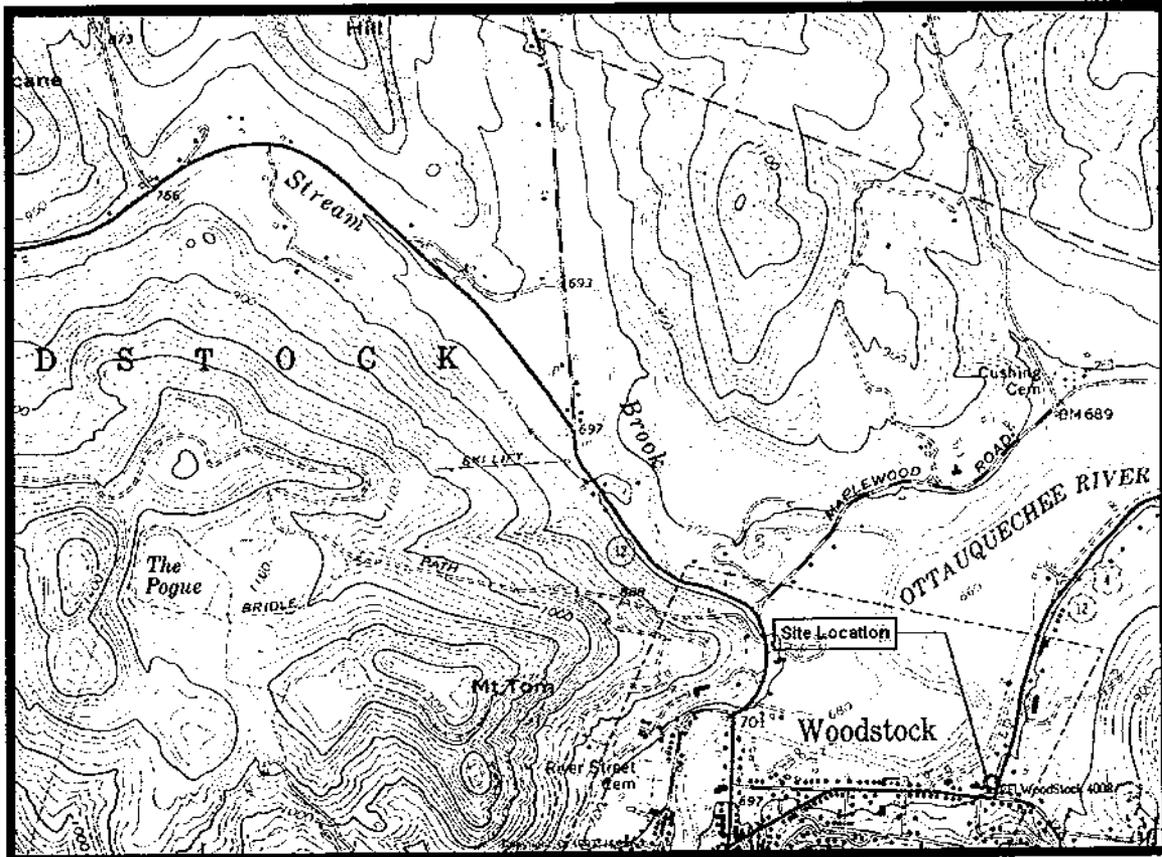
< - Contaminant not detected at specified detection limit
 Total petroleum hydrocarbon (TPH) concentrations quantified in parts per million (ppm)

Figure 1

Cumberland Farms, Inc.
Station # 4008
Woodstock, Vermont



GENERAL LOCATION MAP



Scale 1" = 2,000'

WOODSTOCK NORTH, VT.
NE/4 WOODSTOCK 15' QUADRANGLE
43072-F5-TF-024
1966
PHOTOINSPECTED 1976
DMA 6471 II NE—SERIES V813

TOWN OF WOODSTOCK
SEWAGE TREATMENT FACILITY

LEGEND

- MONITORING WELL LOCATION
- SEWER LINE
- WATER LINE

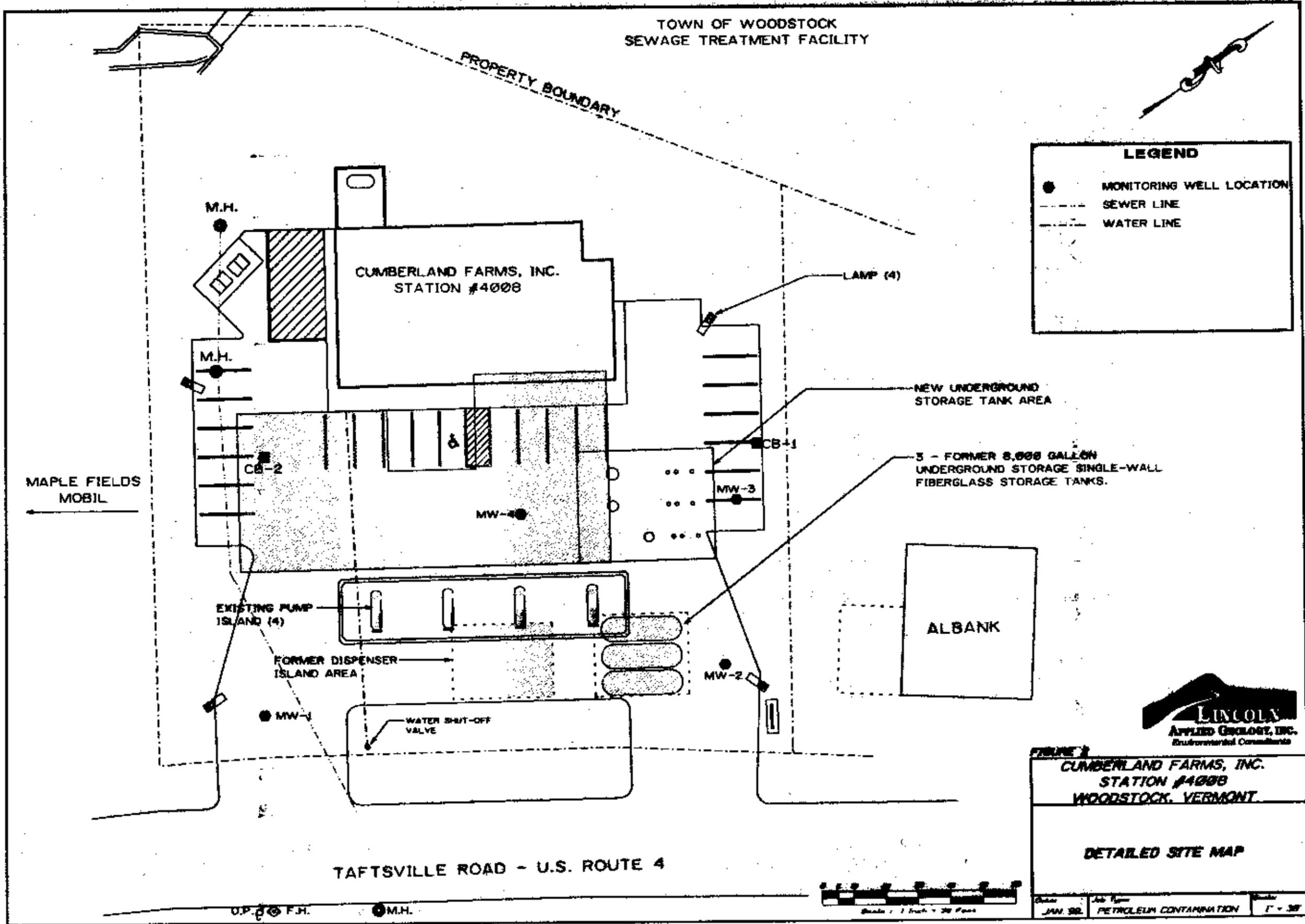


FIGURE 2
CUMBERLAND FARMS, INC.
STATION #4008
WOODSTOCK, VERMONT

DETAILED SITE MAP

Date	Job Type	Scale
JAN. 98.	PETROLEUM CONTAMINATION	1" = 30'

U.P. F.H. M.H.



TOWN OF WOODSTOCK
SEWAGE TREATMENT FACILITY

LEGEND

- MONITORING WELL LOCATION
- SEWER LINE
- WATER LINE
- 100- GROUND WATER CONTOUR LINE
- ← GROUND WATER FLOW DIRECTION

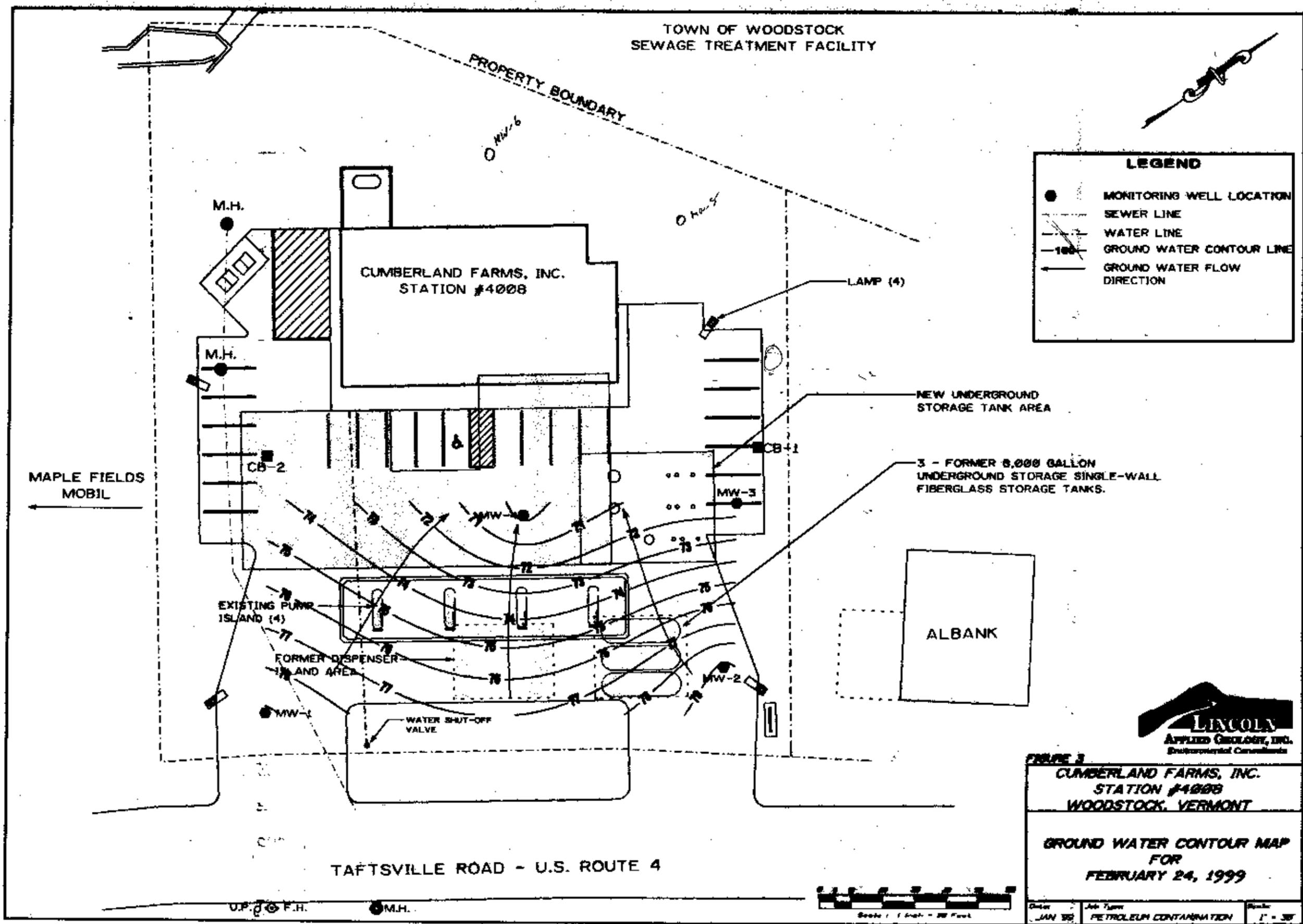
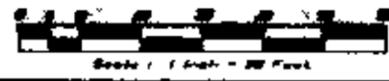


FIGURE 3
CUMBERLAND FARMS, INC.
STATION #4008
WOODSTOCK, VERMONT

GROUND WATER CONTOUR MAP
FOR
FEBRUARY 24, 1999

Order	Job Title	Sheet
JAN 99	PETROLEUM CONTAMINATION	1 - 38



U.P. F.H. M.H.

TOWN OF WOODSTOCK
SEWAGE TREATMENT FACILITY



LEGEND

- MONITORING WELL LOCATION
- SEWER LINE
- - - WATER LINE
- <25; <5 BTEX; MTBE CONTAMINANT CONCENTRATION (PPB)

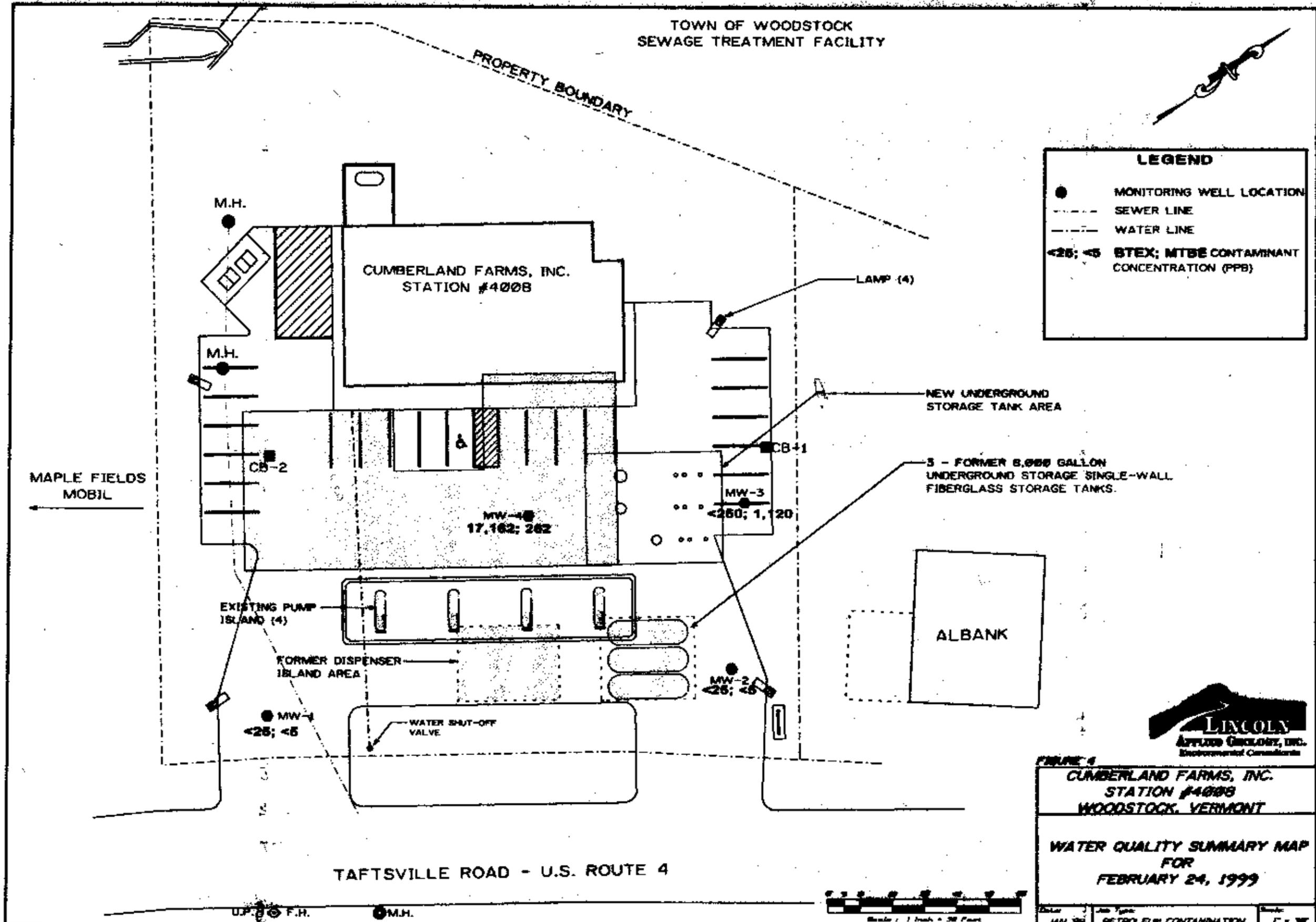


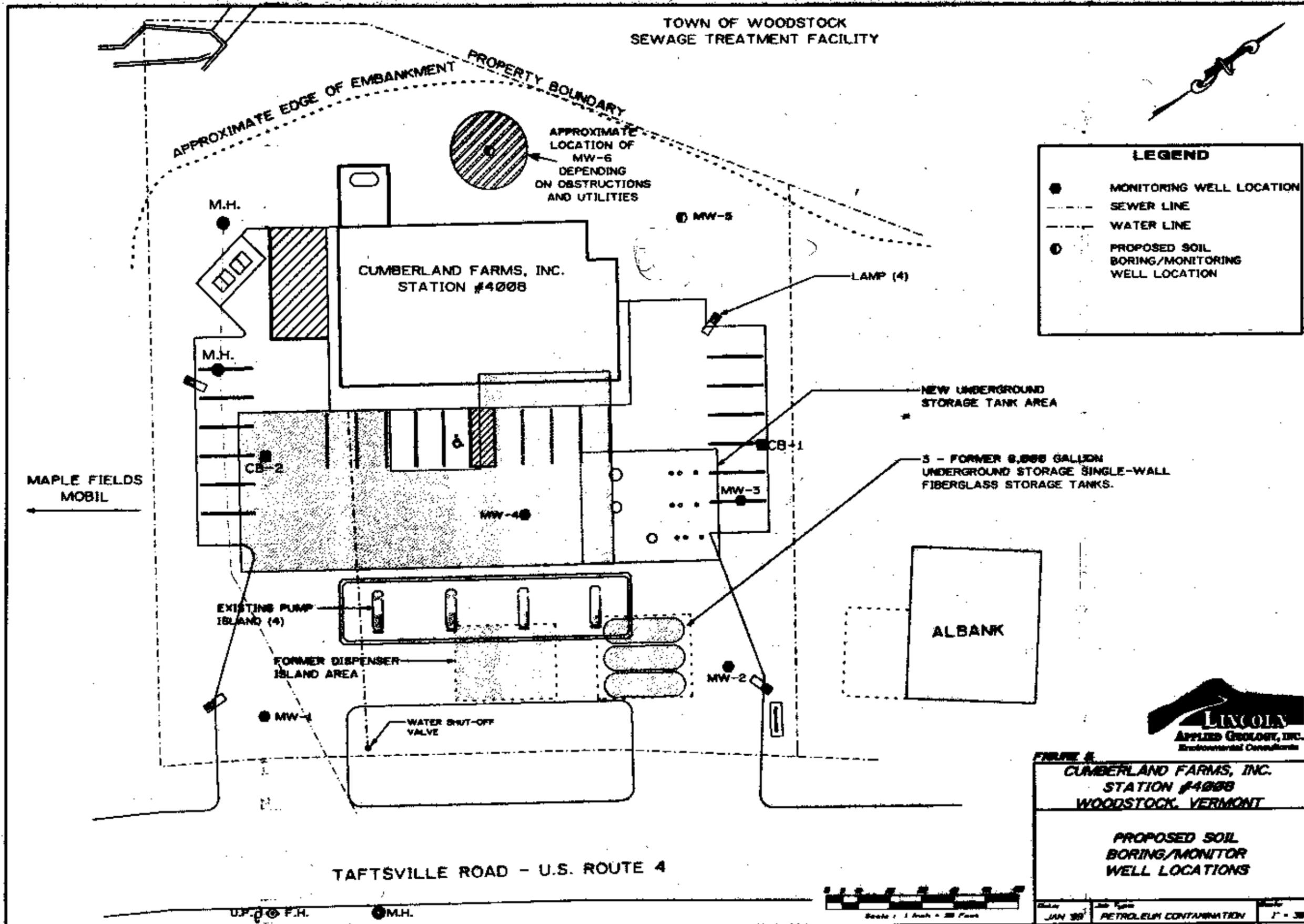
FIGURE 4
CUMBERLAND FARMS, INC.
STATION #4008
WOODSTOCK, VERMONT

WATER QUALITY SUMMARY MAP
FOR
FEBRUARY 24, 1999



Date: JAN 95	Job Title: PETROLEUM CONTAMINATION	Sheet: 1 of 30
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TOWN OF WOODSTOCK
SEWAGE TREATMENT FACILITY



Appendix A

Well Logs

WELL LOG

WELL: MW-1
LOCATION: Cumberland Farms, Inc., Woodstock, Vermont - Near west entrance of facility.
DRILLER: T&K Drilling, Inc.
HYDROGEOLOGIST: Jason Barnard, Lincoln Applied Geology, Inc.
DATE: 9 February, 1999

Soils Description: (BG = Background [0.2], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
5.0' - 7.0'	Brown, very fine to fine <u>sandy silt</u> , trace small to medium gravel, dry.	BG
10.0' - 10.9'	Brown, very fine <u>sandy silt</u> , weak blocky structure, dry.	BG
10.9' - 12.0'	Brown, fine to medium <u>sand</u> , trace small gravel, dry.	BG
15.0' - 17.0'	Brown, very fine <u>sandy silt</u> , trace small gravel, weak blocky structure, dry.	BG
20.0' - 22.0'	Brown, very fine <u>sandy silt</u> , some small to medium quartzite rock fragments, saturated.	BG
25.0' - 27.0'	Grey, very fine to fine <u>sandy silt</u> , some medium gravel, dense blocky structure, moist.	BG
30.0' - 31.0'	Grey, very fine <u>sandy silt</u> , some small to medium gravel, moist.	BG

Well Construction:

Bottom of Boring: 31'
Bottom of Well: 30'
Well Screen: 15' (15-30') of 2" sch. PVC, 0.010" slot
Solid Riser: 14.5' (0.5-15') of 2" sch. 40 PVC, 0.010" slot
Sand Pack: 17' (13'-30') of #1 sand.
Bentonite Seal: 1' (12'-13') of chips.
Backfill: 11' (10'-12') of drill cuttings
Well Box: Cemented flush

WELL LOG

WELL: MW-2
LOCATION: Cumberland Farms, Inc., Woodstock, Vermont - Near east entrance of facility, sidegradient of former UST area.
DRILLER: T&K Drilling, Inc.
HYDROGEOLOGIST: Jason Barnard, Lincoln Applied Geology, Inc.
DATE: 8 February, 1999

Soils Description: (BG = Background [0.2], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
5.0' - 7.0'	Brown, fine to medium <u>sand</u> , some small to medium gravel, trace silt, dry.	BG
10.0' - 12.0'	Brown, very fine to fine <u>sand</u> , trace silt, dry.	BG
15.0' - 17.0'	Brown, very fine <u>sandy silt</u> , trace small gravel, dry.	BG
20.0' - 22.0'	Grey, very fine <u>sandy silt</u> , trace small gravel, dense blocky structure, dry.	BG
25.0' - 27.0'	Grey, very fine <u>sandy silt</u> , some small gravel, dense blocky structure, reworked glacial till, dry.	BG
30.0' - 32.0'	Grey, very fine <u>sandy silt</u> , some small to medium gravel, dense blocky structure, reworked glacial till, moist.	

Well Construction:

Bottom of Boring: 35'
Bottom of Well: 35'
Well Screen: 10' (25-35') of 2" sch. 40 PVC, 0.010" slot
Solid Riser: 24.5' (0.5-25') of 2" sch 40 PVC
Sand Pack: 11' (24-35') of #1 sand
Bentonite Seal: 2' (22-24') of chips
Backfill: 21' (1.0 - 22') of drill cuttings
Well Box: Cemented flush

WELL LOG

WELL: MW-3
LOCATION: Cumberland Farms, Inc., Woodstock, Vermont - Sidegradient of former USTs and dispenser island areas.
DRILLER: T&K Drilling, Inc.
HYDROGEOLOGIST: Jason Barnard, Lincoln Applied Geology, Inc.
DATE: 8 February, 1999

Soils Description: (BG = Background [0.2], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
5.0' - 7.0'	Brown, fine to medium <u>sand</u> , some small gravel, dry.	3.2
10.0' - 12.0'	Brown, fine <u>sand</u> , some silt, trace small gravel, weak blocky structure, dry.	2.0
15.0' - 17.0'	Brown, silty fine <u>sand</u> , trace small gravel, dry.	3.2
20.0' - 22.0'	Brown, fine <u>sand</u> , some silt, trace medium gravel, dry.	4.6
25.0' - 27.0'	Brown, fine <u>sand</u> , some silt, trace schist rock fragments, dry.	3.0
30.0' - 32.0'	Brown, medium to coarse <u>sand</u> , some silt, trace fine to medium gravel, damp to 31.8' then moist (at tip of spoon).	8.3
35.0' - 35.7'	Brown, fine <u>sand</u> , some silt, saturated.	
35.7' - 37.0'	Grey, very fine to fine <u>sandy silt</u> , trace small gravel, moderately dense blocky structure, reworked glacial till, saturated.	2.3

Well Construction:

Bottom of Boring: 38'
Bottom of Well: 38'
Well Screen: 10' (28-38') of 2" sch. 40 PVC, 0.010" slot
Solid Riser: 27.5' (0.5-28'); 2" sch. 40 PVC
Sand Pack: 11' (27-38') of #1 sand
Bentonite Seal: 2' (25-27') of chips
Backfill: 24' (1.0 - 24') of drill cuttings
Well Box: Cemented flush.

WELL LOG

WELL: MW-4
LOCATION: Cumberland Farms, Inc., Woodstock, Vermont - Downgradient of former UST and dispenser island areas.
DRILLER: T&K Drilling, Inc.
HYDROGEOLOGIST: Jason Barnard, Lincoln Applied Geology, Inc.
DATE: 9 February, 1999

Soils Description: (BG = Background [0.2], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
5.0' - 7.0'	Brown, very fine <u>sandy silt</u> , dense blocky structure, trace small gravel, dry.	BG
10.0' - 12.0'	Brown, fine to medium <u>sand</u> , some silt, trace small gravel, dry.	BG
15.0' - 17.0'	Brown, very fine to fine <u>sandy silt</u> , weak blocky structure, dry.	BG
20.0' - 22.0'	Brown, medium to coarse <u>sand</u> , little silt, trace small gravel, dry.	BG
25.0' - 27.0'	Brown, medium to coarse <u>sand</u> , some small to medium gravel, dry.	BG
30.0' - 32.0'	Grey, very fine <u>sandy silt</u> , some small to medium gravel, saturated.	BG
35.0' - 37.0'	Brown to grey, very fine to fine <u>sandy silt</u> , some medium to large rock fragments (schist), saturated.	BG

Well Construction:

Bottom of Boring: 37'
Bottom of Well: 37'
Well Screen: 10' (27-37') of 2" sch. 40 PVC, 0.010" slot
Solid Riser: 26.5' (0.5-27') of 2" sch. 40 PVC
Sand Pack: 12' (25-37') of #1 sand
Bentonite Seal: 1' (24-25') of chips
Backfill: 23' (1-24') of drill cuttings
Well Box: Cemented flush

Appendix B

Laboratory Reports for February 24,
1999

Received: 02/26/99

03/05/99 15:05:40

REPORT LINCOLN APPLIED GEOLOGY
TO REVELL DRIVE
LINCOLN, VT. 05443
802-453-4384 FAX: 453-5399

PREPARED TOXIKON CORPORATION
BY 15 WIGGINS AVE
BEDFORD, MA 01730

[Signature]
CERTIFIED BY

ATTEN JASON BARNARD

ATTEN PAUL LEZBERG
PHONE (781)275-3330

CONTACT JOHN

CLIENT LINCOLN APP SAMPLES 5
COMPANY LINCOLN APPLIED GEOLOGY
FACILITY REVELL DRIVE
LINCOLN, VT. 05443

MA CERT # M-MA064: TRACE METALS, SULFATE, CYANIDE, RES. FREE
CHLORINE, Ca, TOTAL ALK., TDS, PH, THMS, VOC, PEST., NUTRIENTS.
DEMAND. O&G, PHENOLICS, PCBs . CT DHS #PH-0563, NY #10778
FL HRS E87143, NJ DEP 59538, NC DNR286, SC 88002, NH 204091-C.

WORK ID CFI WOODSTOCK
TAKEN 2/24/99
TRANS _____
TYPE WATER
P.O. # _____
INVOICE under separate cover

VERIFIED BY: *[Signature]*
CERT # MMA064

SAMPLE IDENTIFICATION

TEST CODES and NAMES used on this workorder

- 01 TRIP BLANK
- 02 MW-1
- 03 MW-2
- 04 MW-4
- 05 MW-3

- 8021M VOL. ORG. COMP.
- GRO GASOLINE RANGE ORGANICS

MAR 0 1999

TOXIKON CORP.

Results by Sample

SAMPLE ID TRIP BLANK

FRACTION 01A TEST CODE 8021M NAME VOL. ORG. COMP.

Date & Time Collected 02/24/99 08:00:00 Category WATER

	RESULT	LIMIT		RESULT	LIMIT
Dichlorodifluoromethane	ND	5.0	Ethyl benzene	ND	5.0
Chloromethane	ND	5.0	1,1,1,2-Tetrachloroethane	ND	5.0
Vinyl Chloride	ND	5.0	m+p-Xylene	ND	5.0
Bromomethane	ND	5.0	o-Xylene	ND	5.0
Chloroethane	ND	5.0	Styrene	ND	5.0
Trichlorofluoromethane	ND	5.0	Isopropyl benzene	ND	5.0
1,1-Dichloroethene	ND	5.0	Bromoform	ND	5.0
Methylene Chloride	ND	5.0	1,1,2,2-Tetrachloroethane	ND	5.0
trans-1,2-Dichloroethene	ND	5.0	1,2,3-Trichloropropane	ND	5.0
1,1-Dichloroethane	ND	5.0	n-Propyl benzene	ND	5.0
2,2-Dichloropropane	ND	5.0	Bromobenzene	ND	5.0
cis-1,2-Dichloroethene	ND	5.0	1,3,5-Trimethyl benzene	ND	5.0
Chloroform	ND	5.0	2-Chlorotoluene	ND	5.0
Bromochloromethane	ND	5.0	4-Chlorotoluene	ND	5.0
1,1,1-Trichloroethane	ND	5.0	tert-Butyl benzene	ND	5.0
1,1-Dichloropropene	ND	5.0	1,2,4-Trimethylbenzene	ND	5.0
Carbon Tetrachloride	ND	5.0	sec-Butylbenzene	ND	5.0
Benzene	ND	5.0	p-Isopropyltoluene	ND	5.0
1,2-Dichloroethane	ND	5.0	1,3-Dichlorobenzene	ND	5.0
Trichloroethene	ND	5.0	1,4-Dichlorobenzene	ND	5.0
1,2-Dichloropropane	ND	5.0	n-Butylbenzene	ND	5.0
Bromodichloromethane	ND	5.0	1,2-Dichlorobenzene	ND	5.0
Dibromomethane	ND	5.0	1,2-Dibromo-3-Chloropropane	ND	5.0
Toluene	ND	5.0	1,2,4-Trichlorobenzene	ND	5.0
1,1,2-Trichloroethane	ND	5.0	Hexachlorobutadiene	ND	5.0
Tetrachloroethene	ND	5.0	Naphthalene	ND	5.0
1,3-Dichloropropane	ND	5.0	1,2,3-Trichlorobenzene	ND	5.0
Dibromochloromethane	ND	5.0	Methyl-t-Butyl Ether	ND	5.0
1,2-Dibromoethane	ND	5.0			
Chlorobenzene					

Notes and Definitions for this Report:

DATE RUN 03/04/99
 ANALYST XL
 INSTRUMENT G
 DILUTION 1
 UNITS ug/L

Received: 02/26/99

TOXIKON CORP.

REPORT

Work Order # 99-02-477

Results by Sample

SAMPLE ID TRIP BLANK

FRACTION 01A

TEST CODE GRO

NAME GASOLINE RANGE ORGANICS

Date & Time Collected 02/24/99 08:00:00

Category WATER

8015 MODIFIED GRO

	RESULT	LIMIT
	*	
<u>ALIPHATICS</u>	<u>0.02</u>	<u>0.010</u>
<u>AROMATICS</u>	<u>0.04</u>	<u>0.010</u>

Notes and Definitions for this Report:

DATE RUN 03/03/99
 ANALYST SEP
 INSTRUMENT V5
 DIL. FACTOR 1
 UNITS = ug/L

ND = not detected at detection limit

RECEIVED

MAR 0 1999

Received: 02/26/99

Results by Sample

SAMPLE ID MW-1 FRACTION 02A TEST CODE 8021M NAME VOL. ORG. COMP. _____
 Date & Time Collected 02/24/99 11:00:00 Category WATER

	RESULT	LIMIT		RESULT	LIMIT
Dichlorodifluoromethane	ND	5.0	Ethyl benzene	ND	5.0
Chloromethane	ND	5.0	1,1,1,2-Tetrachloroethane	ND	5.0
Vinyl Chloride	ND	5.0	mtp-Xylene	ND	5.0
Bromomethane	ND	5.0	o-Xylene	ND	5.0
Chloroethane	ND	5.0	Styrene	ND	5.0
Trichlorofluoromethane	ND	5.0	Isopropyl benzene	ND	5.0
1,1-Dichloroethene	ND	5.0	Bromoform	ND	5.0
Methylene Chloride	ND	5.0	1,1,2,2-Tetrachloroethane	ND	5.0
trans-1,2-Dichloroethene	ND	5.0	1,2,3-Trichloropropane	ND	5.0
1,1-Dichloroethane	ND	5.0	n-Propyl benzene	ND	5.0
2,2-Dichloropropane	ND	5.0	Bromobenzene	ND	5.0
cis-1,2-Dichloroethene	ND	5.0	1,3,5-Trimethyl benzene	ND	5.0
Chloroform	ND	5.0	2-Chlorotoluene	ND	5.0
Bromochloromethane	ND	5.0	4-Chlorotoluene	ND	5.0
1,1,1-Trichloroethane	ND	5.0	tert-Butyl benzene	ND	5.0
1,1-Dichloropropene	ND	5.0	1,2,4-Trimethylbenzene	ND	5.0
Carbon Tetrachloride	ND	5.0	sec-Butylbenzene	ND	5.0
Benzene	ND	5.0	p-Isopropyltoluene	ND	5.0
1,2-Dichloroethane	ND	5.0	1,3-Dichlorobenzene	ND	5.0
Trichloroethene	ND	5.0	1,4-Dichlorobenzene	ND	5.0
1,2-Dichloropropane	ND	5.0	n-Butylbenzene	ND	5.0
Bromodichloromethane	ND	5.0	1,2-Dichlorobenzene	ND	5.0
Dibromomethane	ND	5.0	1,2-Dibromo-3-Chloropropane	ND	5.0
Toluene	ND	5.0	1,2,4-Trichlorobenzene	ND	5.0
1,1,2-Trichloroethane	ND	5.0	Hexachlorobutadiene	ND	5.0
Tetrachloroethene	ND	5.0	Naphthalene	ND	5.0
1,3-Dichloropropane	ND	5.0	1,2,3-Trichlorobenzene	ND	5.0
Dibromochloromethane	ND	5.0	Methyl-t-Butyl Ether	ND	5.0
1,2-Dibromoethane	ND	5.0			
Chlorobenzene					

Notes and Definitions for this Report:

DATE RUN 03/04/99
 ANALYST XL
 INSTRUMENT G
 DILUTION 1
 UNITS ug/L

MAR 0 1999

Received: 02/26/99

Results by Sample

SAMPLE ID MW-1

FRACTION 02A

TEST CODE GRO

NAME GASOLINE RANGE ORGANICS

Date & Time Collected 02/24/99 11:00:00

Category WATER

8015 MODIFIED GRO

	RESULT	LIMIT
	*	
ALIPHATICS	ND	0.010
AROMATICS	ND	0.010

Notes and Definitions for this Report:

DATE RUN 03/03/99
 ANALYST SEP
 INSTRUMENT V5
 DIL. FACTOR 1
 UNITS = mg/L

ND = not detected at detection limit



Received: 02/26/99

Results by Sample

SAMPLE ID MW-2 FRACTION 03A TEST CODE 8021H NAME VOL. ORG. COMP. _____
 Date & Time Collected 02/24/99 11:20:00 Category WATER

	RESULT	LIMIT		RESULT	LIMIT
Dichlorodifluoromethane	ND	5.0	Ethyl benzene	ND	5.0
Chloromethane	ND	5.0	1,1,1,2-Tetrachloroethane	ND	5.0
Vinyl Chloride	ND	5.0	m+p-Xylene	ND	5.0
Bromomethane	ND	5.0	o-Xylene	ND	5.0
Chloroethane	ND	5.0	Styrene	ND	5.0
Trichlorofluoromethane	ND	5.0	Isopropyl benzene	ND	5.0
1,1-Dichloroethene	ND	5.0	Bromoform	ND	5.0
Methylene Chloride	ND	5.0	1,1,2,2-Tetrachloroethane	ND	5.0
trans-1,2-Dichloroethene	ND	5.0	1,2,3-Trichloropropane	ND	5.0
1,1-Dichloroethane	ND	5.0	n-Propyl benzene	ND	5.0
2,2-Dichloropropane	ND	5.0	Bromobenzene	ND	5.0
cis-1,2-Dichloroethene	ND	5.0	1,3,5-Trimethyl benzene	ND	5.0
Chloroform	ND	5.0	2-Chlorotoluene	ND	5.0
Bromochloromethane	ND	5.0	4-Chlorotoluene	ND	5.0
1,1,1-Trichloroethane	ND	5.0	tert-Butyl benzene	ND	5.0
1,1-Dichloropropene	ND	5.0	1,2,4-Trimethylbenzene	ND	5.0
Carbon Tetrachloride	ND	5.0	sec-Butylbenzene	ND	5.0
Benzene	ND	5.0	p-Isopropyltoluene	ND	5.0
1,2-Dichloroethane	ND	5.0	1,3-Dichlorobenzene	ND	5.0
Trichloroethene	ND	5.0	1,4-Dichlorobenzene	ND	5.0
1,2-Dichloropropane	ND	5.0	n-Butylbenzene	ND	5.0
Bromodichloromethane	ND	5.0	1,2-Dichlorobenzene	ND	5.0
Dibromomethane	ND	5.0	1,2-Dibromo-3-Chloropropane	ND	5.0
Toluene	ND	5.0	1,2,4-Trichlorobenzene	ND	5.0
1,1,2-Trichloroethane	ND	5.0	Hexachlorobutadiene	ND	5.0
Tetrachloroethene	ND	5.0	Naphthalene	ND	5.0
1,3-Dichloropropane	ND	5.0	1,2,3-Trichlorobenzene	ND	5.0
Dibromochloromethane	ND	5.0	Methyl-t-Butyl Ether	ND	5.0
1,2-Dibromoethane	ND	5.0			
Chlorobenzene					

Notes and Definitions for this Report:

DATE RUN 03/05/99
 ANALYST XL
 INSTRUMENT G
 DILUTION 1
 UNITS ug/L

MAR 1 1999

APPLIED GEOLOGY

Received: 02/26/99

Results by Sample

SAMPLE ID MJ-2

FRACTION 03A

TEST CODE GRO

NAME GASOLINE RANGE ORGANICS

Date & Time Collected 02/24/99 11:20:00

Category WATER

8015 MODIFIED GRO

	RESULT	LIMIT
	*	
ALIPHATICS	0.020	0.010
AROMATICS	ND	0.010

Notes and Definitions for this Report:

DATE RUN 03/03/99
 ANALYST NLC
 INSTRUMENT V5
 DIL. FACTOR 1
 UNITS = mg/L

ND = not detected at detection limit

MAR 7 1999

Received: 02/26/99

Results by Sample

SAMPLE ID MW-4 FRACTION D4A TEST CODE 8021M NAME VOL. ORG. COMP.
 Date & Time Collected 02/24/99 11:40:00 Category WATER

	RESULT	LIMIT		RESULT	LIMIT
Dichlorodifluoromethane	ND	250	Ethyl benzene	786	250
Chloromethane	ND	250	1,1,1,2-Tetrachloroethane	ND	250
Vinyl Chloride	ND	250	m+p-Xylene	10500	250
Bromomethane	ND	250	o-Xylene	5060	250
Chloroethane	ND	250	Styrene	ND	250
Trichlorofluoromethane	ND	250	Isopropyl benzene	ND	250
1,1-Dichloroethene	ND	250	Bromoform	ND	250
Methylene Chloride	ND	250	1,1,2,2-Tetrachloroethane	ND	250
trans-1,2-Dichloroethene	ND	250	1,2,3-Trichloropropane	ND	250
1,1-Dichloroethane	ND	250	n-Propyl benzene	325	250
2,2-Dichloropropane	ND	250	Bromobenzene	ND	250
cis-1,2-Dichloroethene	ND	250	1,3,5-Trimethyl benzene	698	250
Chloroform	ND	250	2-Chlorotoluene	ND	250
Bromochloromethane	ND	250	4-Chlorotoluene	ND	250
1,1,1-Trichloroethane	ND	250	tert-Butyl benzene	ND	250
1,1-Dichloropropene	ND	250	1,2,4-Trimethylbenzene	3180	250
Carbon Tetrachloride	ND	250	sec-Butylbenzene	ND	250
Benzene	ND	250	p-Isopropyltoluene	ND	250
1,2-Dichloroethane	ND	250	1,3-Dichlorobenzene	ND	250
Trichloroethene	ND	250	1,4-Dichlorobenzene	ND	250
1,2-Dichloropropane	ND	250	n-Butylbenzene	ND	250
Bromodichloromethane	ND	250	1,2-Dichlorobenzene	ND	250
Dibromomethane	ND	250	1,2-Dibromo-3-Chloropropane	ND	250
Toluene	566	250	1,2,4-Trichlorobenzene	ND	250
1,1,2-Trichloroethane	ND	250	Hexachlorobutadiene	ND	250
Tetrachloroethene	ND	250	Naphthalene	726	250
1,3-Dichloropropane	ND	250	1,2,3-Trichlorobenzene	ND	250
Dibromochloromethane	ND	250	Methyl-t-Butyl Ether	262	250
1,2-Dibromoethane	ND	250			
Chlorobenzene					

Notes and Definitions for this Report:

DATE RUN 03/04/99
 ANALYST XL
 INSTRUMENT G
 DILUTION 50
 UNITS ug/L

APPLIED GEOTECHNICAL

Received: 02/26/99

Results by Sample

SAMPLE ID MW-4 FRACTION 04A TEST CODE GRO NAME GASOLINE RANGE ORGANICS
 Date & Time Collected 02/24/99 11:40:00 Category WATER

8015 MODIFIED GRO

	RESULT	LIMIT
	*	
ALIPHATICS	4.5	0.50
AROMATICS	36.5	0.50

Notes and Definitions for this Report:

DATE RUN 03/04/99
 ANALYST NLC
 INSTRUMENT V5
 DIL. FACTOR 50
 UNITS = mg/L

ND = not detected at detection limit

[Faint, illegible stamp or signature]

Received: 02/26/99

TOXIKON CORP.

REPORT

Work Order # 99-02-477

Results by Sample

SAMPLE ID MW-3

FRACTION Q5A

TEST CODE 8021M

NAME VOL. ORG. COMP.

Date & Time Collected 02/24/99 12:00:00

Category WATER

	RESULT	LIMIT		RESULT	LIMIT
Dichlorodifluoromethane	ND	50	Ethyl benzene	ND	50
Chloromethane	ND	50	1,1,1,2-Tetrachloroethane	ND	50
Vinyl Chloride	ND	50	m+p-Xylene	ND	50
Bromomethane	ND	50	o-Xylene	ND	50
Chloroethane	ND	50	Styrene	ND	50
Trichlorofluoromethane	ND	50	Isopropyl benzene	ND	50
1,1-Dichloroethene	ND	50	Bromoform	ND	50
Methylene Chloride	ND	50	1,1,2,2-Tetrachloroethane	ND	50
trans-1,2-Dichloroethene	ND	50	1,2,3-Trichloropropane	ND	50
1,1-Dichloroethane	ND	50	n-Propyl benzene	ND	50
2,2-Dichloropropane	ND	50	Bromobenzene	ND	50
cis-1,2-Dichloroethene	ND	50	1,3,5-Trimethyl benzene	ND	50
Chloroform	ND	50	2-Chlorotoluene	ND	50
Bromochloromethane	ND	50	4-Chlorotoluene	ND	50
1,1,1-Trichloroethane	ND	50	tert-Butyl benzene	ND	50
1,1-Dichloropropene	ND	50	1,2,4-Trimethylbenzene	ND	50
Carbon Tetrachloride	ND	50	sec-Butylbenzene	ND	50
Benzene	ND	50	p-Isopropyltoluene	ND	50
1,2-Dichloroethane	ND	50	1,3-Dichlorobenzene	ND	50
Trichloroethene	ND	50	1,4-Dichlorobenzene	ND	50
1,2-Dichloropropane	ND	50	n-Butylbenzene	ND	50
Bromodichloromethane	ND	50	1,2-Dichlorobenzene	ND	50
Dibromomethane	ND	50	1,2-Dibromo-3-Chloropropane	ND	50
Toluene	ND	50	1,2,4-Trichlorobenzene	ND	50
1,1,2-Trichloroethane	ND	50	Hexachlorobutadiene	ND	50
Tetrachloroethene	ND	50	Naphthalene	ND	50
1,3-Dichloropropane	ND	50	1,2,3-Trichlorobenzene	ND	50
Dibromochloromethane	ND	50	Methyl-t-Butyl Ether	1120	50
1,2-Dibromoethane	ND	50			
Chlorobenzene					

Notes and Definitions for this Report:

DATE RUN 03/05/99
 ANALYST JCP
 INSTRUMENT G
 DILUTION 10
 UNITS ug/L

APPLIED GEOL

Results by Sample

SAMPLE ID MW-3

FRACTION 05A

TEST CODE GRO

NAME GASOLINE RANGE ORGANICS

Date & Time Collected 02/24/99 12:00:00

Category WATER

8015 MODIFIED GRO

	RESULT	LIMIT
	*	
ALIPHATICS	0.979	0.010
AROMATICS	0.289	0.010

Notes and Definitions for this Report:

DATE RUN 03/03/99
 ANALYST NLC
 INSTRUMENT V5
 DIL. FACTOR 1
 UNITS = mg/L

ND = not detected at detection limit

(Signature)
 APPLIED GEOLOGICAL

Received: 02/26/99

Test Methodology

TEST CODE 8021M NAME VOL. ORG. COMP.

EPA METHOD 8021B

Reference: Test Methods for Evaluating Solid Waste Physical/Chemical Methods. 3rd Edition, SW846. Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography With Photoionization and Electrolytic Conductivity Detectors in Series. FINAL UPDATE 111, 1996.

TEST CODE GRO NAME GASOLINE RANGE ORGANICS

METHOD: EPA METHOD 8015 Modified; Gasoline Range Organics

Nonhalogenated Volatile Organics. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods 3rd Edition, Final Update I.

Quantitation for BTEX/MTBE is performed by analysis on a PID detector. Miscellaneous aromatics eluting between o-xylene and 1,2,4-trimethylbenzene are quantitated on the PID detector using the response factor of o-xylene. Miscellaneous aliphatics eluting between 3-methylpentane and isooctane are quantitated on the FID detector using the response factor of n-hexane.

This method meets the specifications of Maine DEP Method 3.1.1.2.6

TOXIKON
CORPORATION
1000
1000

Appendix C

Cost Estimate

Cumberland Farms, Inc. (CFI)
Route 4, Woodstock, Vermont
VDEC #98-2514
19-Apr-99

Cost Estimate for Additional Monitor Well Installation and Water Quality Sampling

Task A. Soil Boring and Well Installation

Two 40' deep borings/wells -	2	@	\$950.00	per well	\$	1,900.00
Principal/Senior Hydrogeologist -	0.5	hr(s) @	\$85.00	per hour	\$	42.50
Hydrogeologist -	1	hr(s) @	\$65.00	per hour	\$	65.00
Geologist -	14	hr(s) @	\$50.00	per hour	\$	700.00
Mileage -	200	mile(s) @	\$0.30	per mile	\$	60.00
Subtotal						\$ 2,767.50

Task B. Ground Water Sampling (One Round)

Hydrogeologist/Site Manager -	0.5	hr(s) @	\$65.00	per hour	\$	32.50
Field Technician -	8	hr(s) @	\$35.00	per hour	\$	280.00
Disposable Bailer (1.5") -	6	@	\$8.89	each	\$	53.34
EPA 8020 -	7	@	\$60.00	each	\$	420.00
EPA 8015 TPH -	7	@	\$40.50	each	\$	283.50
Mileage -	200	mile(s) @	\$0.30	per mile	\$	60.00
Sampling Equipment -	1	day(s) @	\$110.00	per day	\$	110.00
Subtotal						\$ 1,239.34

Task C. Preparation of Summary Report

Principal/Senior Hydrogeologist -	1	hr(s) @	\$85.00	per hour	\$	85.00
Hydrogeologist/Site Manager -	2	hr(s) @	\$65.00	per hour	\$	130.00
Geologist -	6	hr(s) @	\$50.00	per hour	\$	300.00
Computer/CAD Technician -	4	hr(s) @	\$45.00	per hour	\$	180.00
Administrative Assistant -	3	hr(s) @	\$35.00	per hour	\$	105.00
Subtotal						\$ 800.00

Grand Total >>> \$ 4,806.84