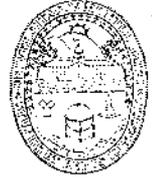


The University of Vermont

DEPARTMENT OF RISK MANAGEMENT
ENVIRONMENTAL SAFETY FACILITY
655D SPEAR STREET
BURLINGTON, VT 05405-0570
802/656-5400
FAX # 802/656-5407



January 29, 1996⁷

Chuck Schwer
Vermont Agency of Natural Resources
Waste Management Division
103 South Main Street/West Office
Waterbury, VT 05671-0404

JAN 30 10 58 AM '97

RE: Site Investigation Report
Entomology Laboratory
SMS Site #96-2035

Dear Chuck:

Enclosed is a copy of our report on the site investigation associated with the former heating-oil UST used at the Entomology Laboratory. Please give me a call if you have any questions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Milly Archer".

Milly Archer
Environmental Compliance Manager

JAN 23 10 53 AM '97

SITE INVESTIGATION REPORT

UVM ENTOMOLOGY LABORATORY
BURLINGTON, VERMONT
SMS Site # 96-2035

January 1997

Prepared for:

Milly Archer
Environmental Safety Facility
University of Vermont
P.O. Box 50570
Burlington, Vermont 05405
(802) 656-5400

Prepared by:

Hoffer & Associates
Consulting Hydrogeologists
RR # 4, Box 2286
Montpelier, Vermont 05602
(802) 229-1113

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EXECUTIVE SUMMARY

Hoffer & Associates completed a site investigation at the UVM Entomology Laboratory in Burlington, Vermont, during November of 1996. Limited soil contamination had been documented at the site during the closure of a 1000 gallon heating oil underground storage tank (UST) in July of 1996.

This site investigation included the installation of three groundwater monitoring wells. An existing well (MW-1) had been installed in the tank excavation during closure activities. Photoionization detector (PID) screening of soil and groundwater during the installation of the three additional wells found no evidence of petroleum contamination. No evidence of free product was detected during the site investigation other than a slight sheen on the purge water of MW-1. Groundwater sampling of the four wells indicated only a minor impact to groundwater. Low concentrations of BTEX compounds were found in MW-1. Benzene was detected in MW-1 at 4 ug/L, which is below the Vermont Groundwater Enforcement Standard of 5 ug/L, yet above the Vermont Health Advisory of 1 ug/L. No BTEX compounds were found in any of the three recently installed wells other than toluene, which was detected at concentrations well below the Vermont Groundwater Enforcement Standard. It is believed this toluene was introduced during drilling activities and is not associated with the former UST.

Groundwater flow direction across the site is south-southeasterly under a gradient of 0.025 and at an estimated flow rate of between one and 13 feet per year. An unnamed tributary to Potash Brook is the likely discharge zone for shallow groundwater at the site. This tributary to Potash Brook is approximately 500 feet downgradient from the former tank location.

There are no sensitive receptors at risk from the limited amount of petroleum contamination present at this site.

Based on the findings of this site investigation it is recommended that the four site monitoring wells be sampled again in the spring of 1997. The need for additional monitoring will be evaluated after this sampling event.

1.0 INTRODUCTION

This report presents the procedures and results of a site investigation completed in November of 1996 at the University of Vermont (UVM) Entomology Laboratory located at 655 Spear Street in Burlington, Vermont. During closure of a 1000 gallon heating oil UST in July of 1996, petroleum contaminated soil was detected in and adjacent to the tank excavation, and a hole was discovered in the bottom of the tank. The site investigation is being coordinated by personnel at the UVM Environmental Safety Facility (ESF), the university's waste management facility which is located within the same cluster of university buildings as the Entomology Laboratory.

Hoffer & Associates (H&A) initiated a site investigation to evaluate the degree and extent of petroleum contamination in the vicinity of the Entomology Laboratory. Site investigation activities centered on the installation of three additional monitoring wells near the former UST location, water level measurements and sampling of these three new wells and one existing site well, and water level measurements in six existing wells associated with the ESF. Additional objectives of this site investigation included the identification of potential receptors, an evaluation of the potential effects of petroleum contamination on any receptors, and recommendations concerning the need for further investigation of the site.

All protocols and procedures followed during this site investigation adhere to the proposed scope of work, which was presented in the following letter.

Proposal for Site Investigation, Entomology Laboratory, UVM, SMS Site #96-2035, Letter to Milly Archer, UVM ESF, dated October 21, 1996, from Jefferson P. Hoffer, Hoffer & Associates, Montpelier, Vermont.

2.0 SITE DESCRIPTION

2.1 Site Location and History

The UVM Entomology Laboratory is located within a cluster of university buildings, barns and sheds, on an access road approximately 1000 feet west of Spear Street in Burlington, Vermont. This university complex is positioned just south of and adjacent to the Burlington Country Club golf course, and approximately 2000 feet north of Route 189. The site is situated just north of the east-west border between the cities of Burlington and South Burlington. A site location map is presented as Figure 1. Excepting the university facilities, the area immediately surrounding this site is generally undeveloped consisting of agricultural fields, woodlands and the golf course. The university buildings in the complex are used for research, experimentation, and storage.

The former UST was positioned within a few feet east of the Entomology Laboratory building next to an attached greenhouse (see Figure 2). This 1000 gallon tank was used to store No. 2 heating oil used to heat the Entomology Laboratory building and greenhouse. A recent switch to propane heat precipitated the closure of this tank, which was removed from the ground on July 3, 1996.

The ESF building is positioned approximately 300 feet west of the Entomology Laboratory. A site vicinity map is included as Figure 2. This facility was recently constructed to accept, store, and ready for transport and disposal chemicals and hazardous wastes generated throughout the university's various departments, laboratories and research facilities. Groundwater monitoring of the ESF property has been ongoing since a baseline hydrogeologic evaluation of this site was completed in June of 1990. H&A continues to monitor the six monitoring well clusters installed around the ESF building.

2.2 Environmental Setting

The UVM Entomology Laboratory site is positioned on the southern flank of a broad, flat-topped hill, and is approximately 200 feet above and one mile east of Lake Champlain. The elevation of the site is approximately 305 feet above sea level. Surface topography is relatively flat, sloping only very slightly south-southeastward toward an unnamed tributary of Potash Brook (see Figure 1). This tributary, the closest surface water feature, passes to the southeast of the property within 500 feet. It enters Potash Brook approximately one-half mile south of the site, and then flows west to enter Lake Champlain at the northeast shore of Shelburne Bay.

According to the Soil Survey of Chittenden County, Vermont, soils at the site belong to the Hinesburg soil series. This series includes fine to very fine sandy

loam textures underlain by lacustrine (silt) materials. The sandy loams are rated as well drained with rapid permeability, however, the silty materials are somewhat poorly drained with moderately slow permeability. According to the Surficial Geologic Map of Vermont (Stewart & MacClintock, 1970), three unconsolidated deposits are mapped in the vicinity of the site: pebbly marine sands, marine clay, and till. These descriptions are consistent with observations of surficial materials during the baseline hydrogeologic investigation of the neighboring ESF property, where sands, marine clay and till were all encountered. The sequence of these materials extended from sands at the surface, through marine clay to till, which overlies bedrock.

Bedrock at the site has been mapped by Doll (1961) as the Winooski Dolomite, a light gray to buff crystalline dolomite of Cambrian age subjected to extensive folding and fracturing. Bedrock has not been observed at the site and depth to bedrock has yet to be determined. A well drilled for the Burlington Country Club approximately 1000 feet west of the site encountered bedrock at a depth of 50 feet.

2.3 Potential Receptors

Potential sensitive receptors may include water supply wells located within close proximity to the site, indoor air quality of neighboring buildings, and surface water downgradient from the source area.

The nearest well to this site is associated with the Bioresearch Laboratory east of the Entomology Laboratory. This well is reportedly no longer in use. Other than the Country Club well mentioned above, no other known wells are located within one-half mile of the site.

The unnamed tributary of Potash Brook passes the site within approximately 500 feet of the Entomology Laboratory building at its closest point.

3.0 SITE CHARACTERIZATION ACTIVITIES

3.1 Soil Boring/Monitoring Well Installation

Three monitoring wells were installed at the Entomology Laboratory on November 15, 1996. One of these wells was positioned north of the former UST as an upgradient well, and the remaining wells were installed south of this area under the assumption that groundwater flow is southerly or southeasterly. The new wells (MW-100 series) were added to an existing well (MW-1) installed directly in the tank excavation during the UST closure. As such a current total of four groundwater monitoring points exist at the Entomology Laboratory site (see Figure 2).

Adams Engineering of Underhill, Vermont, installed the monitoring wells under the direction of H&A personnel. A hollow barrel sampling tube (2.375-inch diameter) was advanced below the ground in five-foot increments. This technique allows for continuous sampling down to the terminal depth of the boring. After each sampling run, the sampling tube was retracted from the borehole and the soil sample was pulled (or vibrated) from the tube. Soil samples were characterized for texture (USDA/SCS), color, moisture, and were screened with a photoionization detector (PID) to evaluate relative levels of contamination. Samples were placed in plastic ziplock bags for headspace analysis. The PID (Photovac MicroTIP HL-2000) was calibrated and set to respond to isobutylene prior to use. Soil sample descriptions and PID screening results are included on the Soil Boring / Monitoring Well Logs in Appendix A.

After drilling to the target depth of approximately five feet below the water-table, the drilling tools were retracted and 1.5-inch diameter PVC monitoring wells were inserted into the boreholes. In some cases the boreholes had collapsed and the wells had to be pushed through the slumped materials to the desired depth. The wells were equipped with 10 feet of factory-slotted (0.010 inch) screen, and solid PVC riser to the ground surface. Well screens were positioned so the screened interval straddled the water table to allow for groundwater fluctuations, and to enable monitoring for potential floating free product. A commercially-sorted sand was placed into the annular space between the well screen and the borehole, extending to at least one-half foot above the top of the screen. Bentonite powder was installed from the top of the sandpack to a few inches below the ground surface. All wells were completed with steel manways that were cemented in place flush with the ground surface. Well development was accomplished with a peristaltic pump operating for at least one hour and evacuating approximately 10 gallons of groundwater from each location. Monitoring well construction details are included on the well logs in Appendix A.

Horizontal and vertical control of site monitoring wells were surveyed following installation by Adams Engineering. Elevations were measured at the top of the PVC lip and at the ground surface at each well and were surveyed relative the elevations of the existing ESF wells.

3.1.1 Soil Sample Descriptions

The general soil stratigraphy encountered at the Entomology Laboratory site was similar at all three locations investigated (MW-101, MW-102, and MW-103), and reasonably similar to the materials observed during the UST closure. Below an organic layer (topsoil), the soil profile consisted of silty fine to medium sand (predominantly fine) down to eight feet below the ground surface (BGS). Below this depth a sequence of gray fine sandy silt to mostly silt extended down to at least 13.0 feet BGS, the deepest point investigated at each location. The water table was encountered approximately three to four feet below grade at all boring locations. Iron staining was observed in the fine sands at 4.5 and 6.0 feet in MW-101 and MW-103 respectively.

3.1.2 PID Screening of Soil Samples

PID screening results for soil samples are included on the logs in Appendix A. No readings were recorded above 0.8 part per million (ppm) at MW-101. At MW-102, all soil samples were below 2.7 ppm while at MW-103 the highest reading was 1.7 ppm. Based on the high sensitivity of the PID used (Photovac MicroTIP HL-2000), none of these readings are believed to be indicative of petroleum contamination.

3.2 Groundwater Elevations

Site groundwater levels were measured three days following monitoring well installation. This round of measurements was associated with groundwater sampling performed on November 18, 1996. Measurements were obtained from the wells using an electric water level probe. Depths to water were recorded relative to the top of the PVC risers and were converted to groundwater elevations. Water levels were also obtained on November 18 from the six shallow wells associated with the ESF. All of this data is presented on Table 1.

Water levels ranged from 3.2 to 6.29 feet below grade. Groundwater elevations range from 299.58 feet at MW-101 to 297.34 feet at MW-103, a range of 2.24 feet. A water table contour map for the November 18, 1996 measurements is provided as Figure 3. Groundwater flow direction at the Entomology Laboratory follows a south-southeasterly route towards the unnamed tributary of Potash Brook, the probable discharge zone for shallow groundwater flowing beneath the site.

Figure 4 presents another water table map for November 18 which includes data from the ESF wells. This more extensive picture of the university building complex indicates a groundwater mound with associated radial flow just to the northeast of the ESF building. This flow pattern is consistent with previous data from this area. UVM personnel indicated a very high water table exists in the vicinity of the Entomology Laboratory during springtime, in some cases at the ground surface.

3.3 Groundwater Sampling and Analysis

All site monitoring wells were sampled on November 18, 1996. Purging and sampling of monitoring wells and the use of quality assurance/quality control (QA/QC) samples at this site were completed in accordance with the sampling protocols outlined in the site investigation proposal. The blind duplicate sample was collected at well MW-102. Groundwater samples were submitted to Scitest Laboratory Services, in Randolph, Vermont, and were analyzed for BTEX and MTBE using EPA Method 8020. Copies of the laboratory report, chain-of-custody and sampling data sheet are provided in Appendix B.

The analytical results of groundwater sampling completed on November 18 are presented on Table 2. Only low concentrations of BTEX compounds were detected in site groundwater. MW-1 exhibited low concentrations of the BTEX compounds (less than 20 ug/L), all of which were below Vermont Groundwater Enforcement Standards (VT GES). However, 4 ug/L of benzene was found in MW-1, which is above the Vermont Health Advisory level of 1 ug/L. All BTEX compounds except toluene were below the laboratory detection limit of 1.0 microgram per liter (ug/L) in the three recently installed monitoring wells. The concentrations of toluene found in these wells were below regulatory thresholds.

Both QA/QC blank samples (field and trip blanks) were below detection limits for all compounds analyzed. The results of the blind duplicate sample filled at MW-102 were similar to those obtained directly from this well for all compounds analyzed.

The low concentrations of toluene detected in the three recently installed wells appear to have been introduced during the monitoring well installation effort. MW-101, where the most toluene was detected, is upgradient from the former UST source area (see Figure 3) and therefore is very unlikely to have been impacted by releases from the heating-oil UST. The fact that toluene alone was found in these wells suggests that a heating-oil source is not likely as other BTEX constituents would have also been detected. H&A has experienced similar problems with toluene in the past with wells installed by Adams Engineering. Recent communications with both Adams Engineering and the manufacturer of the PVC well screen materials used for the wells (TIMCO) indicate the PVC is the likely source of this toluene. Both Adams Engineering and TIMCO have taken

steps to prevent future occurrences. A letter from Adams Engineering explaining this situation is included in Appendix C. Regardless of the source of this contamination, the toluene concentrations detected in these wells are far below the VT GES for this compound.

4.0 DISCUSSION OF RESULTS

4.1 Site Hydrogeology

The Entomology Laboratory site is positioned on relatively flat terrain with a very slight topographic slope south-southeastwards towards a small unnamed tributary of Potash Brook. Groundwater flow direction across the site is toward this drainage feature which is the likely discharge zone for shallow groundwater in the area. A groundwater ridge apparently exists just to the west and/or northwest of the Entomology Laboratory (see Figure 4). The water table is located within a sequence of silty fine sands at a depth of between three to five feet BGS. An average horizontal hydraulic gradient beneath the site has been measured at 0.025.

Based on published literature values (Freeze and Cherry, 1979, and Fetter, 1988) and our experience at sites with similar materials, we estimate the hydraulic conductivity (K) in the shallow groundwater zone is in the range of 0.028 - 0.28 ft/day (1×10^{-5} to 1×10^{-4} cm/sec). An average hydraulic gradient (I) across the site has been measured at 0.025. Using these values and an assumed effective porosity (n_e) range of 0.20 to 0.30, the average linear velocity (V_x) can be estimated from the equation $V_x = KI/n_e$, which yields a groundwater flow rate which ranges between one and 13 feet per year.

A high water table, occasionally above the ground surface, sometimes characterizes springtime conditions in the area around the Entomology Laboratory. This may be evidence of the water-table reaching the ground surface, or simply ponding on frozen ground. Groundwater flow rates through the underlying silts are likely at least an order of magnitude lower than the one to 13 ft/year range estimated for the silty fine sands overlying these silts. Horizontal flow likely predominates in the silty fine sands where the water table is located. As such vertical migration of dissolved contaminants through the underlying silts is very unlikely.

4.2 Extent of Contamination

Observation of underlying soils and the condition of the UST during tank closure activities indicated heating oil had been released at this site. Soil contamination appears to be confined to the area of the tank excavation, and/or directly adjacent to it, and therefore is relatively limited in extent. No free product was detected at this site during the UST closure, boring program, or groundwater sampling, although a slight sheen was visible on the purge water at MW-1.

The only well exhibiting positive evidence of dissolved petroleum contamination is MW-1, installed directly within the tank excavation. The toluene found in the three outlying wells appears to have been introduced at these locations and therefore is not evidence of contamination associated with the former UST. Apart from the toluene, no other dissolved constituents were detected in these wells despite two of the wells being relatively close to, and directly downgradient from, the source area. As such, the extent of dissolved contamination at this site is also relatively limited.

4.3 Potential Receptors

The Entomology Laboratory and adjacent Bioresearch Laboratory building are built on concrete slabs and therefore do not have basements. There is likely little threat to indoor air quality from petroleum contaminated vapors seeping in from below ground in these buildings, especially given the low concentrations found at this site and the low volatility of heating oil. All other structures in the vicinity of the Entomology Laboratory are storage sheds, barns and garages.

The university complex in the vicinity of the Entomology Laboratory site is served by the Champlain Water District. There are no known water supply wells in use within one-half mile of the site. According to personnel who work in this complex there is a well associated with the Bioresearch Laboratory approximately 120 feet east of the former UST. This well has reportedly been unused for many years. The Country Club well located 1000 feet west of the site is also unused.

The unnamed tributary to Potash Brook located approximately 500 feet to the southeast of the site is the presumed discharge point for shallow groundwater flowing beneath the site. Given the distance to this stream, the slow groundwater flow rates associated with observed surficial materials, and the low concentrations of dissolved contamination at this site, this stream is not at risk.

5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Summary and Conclusions

A site investigation was completed at the UVM Entomology Laboratory in Burlington, Vermont, to determine the degree and extent of soil and groundwater contamination associated with a former heating-oil UST. Releases from this UST have resulted in only minor impact to soil and groundwater. Groundwater sampling results indicate both the degree and extent of contamination at this site are limited. The levels of dissolved BTEX contamination found in the existing well installed directly in the tank excavation (MW-1) were below VT GES. Samples obtained from three recently installed wells detected toluene but at concentrations well below VT GES. The toluene in these new wells is believed to have been introduced during monitoring well installation activities.

Based on one round of water level measurement, groundwater flow direction was determined to be south-southeasterly towards a tributary of Potash Brook. The hydraulic gradient across this site was measured at 0.025, and the groundwater flow rate was estimated to be between one and 13 feet per year.

No sensitive receptors appear to be impacted or at risk from the contamination documented at this site

5.2 Recommendations

It is recommended that the four site monitoring wells be sampled once again during the spring of 1997. This will provide data on seasonal fluctuation of water levels, flow direction and dissolved contaminant concentrations. Based on the results of this sampling event an assessment will be made regarding the need for additional monitoring at the site. The costs associated with this sampling event are given on Table 3.

REFERENCES

Doll, C.G., Cady, W.M., Thompson, J.B. Jr., and Billings, M.P., 1961, Centennial Geologic Map of Vermont, Vermont Geological Survey.

Stewart, D.P., and MacClintock, P., 1970, Surficial Geologic Map of Vermont, Vermont Geological Survey.

Freeze, R. A., and Cherry, J. A., 1979, Groundwater, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 604 pp.

Fetter, C.W., 1988, Applied Hydrogeology, Second Edition, Merrill Publishing Company, Columbus, Ohio, 592 pp.

TABLE 1

Groundwater elevation measurements,
UVM Entomology Laboratory Site Investigation, SMS Site #96-2035.

DEPTH TO WATER MEASUREMENTS (feet below TOC)

WELL ID	Elev. of TOC (feet)	11/18/96
MW-1	305.09	6.29
MW-101	302.15	2.57
MW-102	301.83	3.20
MW-103	302.07	4.73
P-1S	302.73	3.37
P-2S	307.07	7.00
P-3S	304.61	4.96
P-4S	300.22	3.90
P-5S	308.53	8.91
P-6S	299.55	6.88

GROUNDWATER ELEVATIONS (feet above mean sea level)

WELL ID	Elev. of TOC (feet)	11/18/96
MW-1	305.09	298.80
MW-101	302.15	299.58
MW-102	301.83	298.63
MW-103	302.07	297.34
P-1S	302.73	299.36
P-2S	307.07	300.07
P-3S	304.61	299.65
P-4S	300.22	296.32
P-5S	308.53	299.62
P-6S	299.55	292.67

Notes:

TOC = top of casing (pvc)

TABLE 2

Analytical results for groundwater sampling performed on November 18, 1996,
UVM Entomology Laboratory Site Investigation, SMS Site #96-2035.

ANALYTICAL RESULTS (ug/L)

WELL ID	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-1	4	3	11	19	< 1
MW-101	< 1	76	< 1	< 1	< 1
MW-102/dupl.	< 1	14 / 9	< 1	< 1	< 1
MW-103	< 1	6	< 1	< 1	< 1
Field Blank	< 1	< 1	< 1	< 1	< 1
Trip Blank	< 1	< 1	< 1	< 1	< 1

Notes:

< 1 = below a detection level of 1

< 1 / < 1 = sample result / field duplicate result

dupl. = duplicate sample collected from MW-102 submitted as "MW-A"

REGULATORY THRESHOLDS (ug/L)

Standard	Benzene	Toluene	Ethylbenzene	Xylenes	MBTE
VT GES	5	2420	680	400	-
VT PAL	0.5	1210	340	200	-
VHA	1	-	-	-	40
MCL	5	1000	700	10000	-

Notes:

VT GES = Vermont Groundwater Enforcement Standard

VT PAL = Vermont Preventative Action Limit

VHA = Vermont Health Advisory

MCL = Maximum Contaminant Level

TABLE 3

Cost estimate for additional monitoring and reporting,
UVM Entomology Laboratory, Burlington, Vermont, SMS Site # 96-2035.

LABOR

TASK	Staff	Hours	Rate	Amount
Groundwater Sampling	SCF	6.0	\$45.00	\$270.00
Data Entry, Figures, Tables	SCF	2.0	\$45.00	\$90.00
Report Preparation	SCF	6.0	\$45.00	\$270.00
Report Review	JPH	0.5	\$50.00	\$27.00
<i>SUB-TOTAL LABOR</i>				\$657.00

EXPENSES

ITEM	Quantity	Rate	Mark Up	Amount
Mileage - groundwater sampling	95	\$0.28	\$0.00	\$26.60
SCITEST LABORATORY SERVICES				
8020 analyses for BTEX/MTBE (4 wells, 3 QA/QC)	7	\$65.00	\$0.00	\$455.00
<i>SUB-TOTAL EXPENSES</i>				\$481.60

TOTAL ESTIMATE COST \$1,138.60

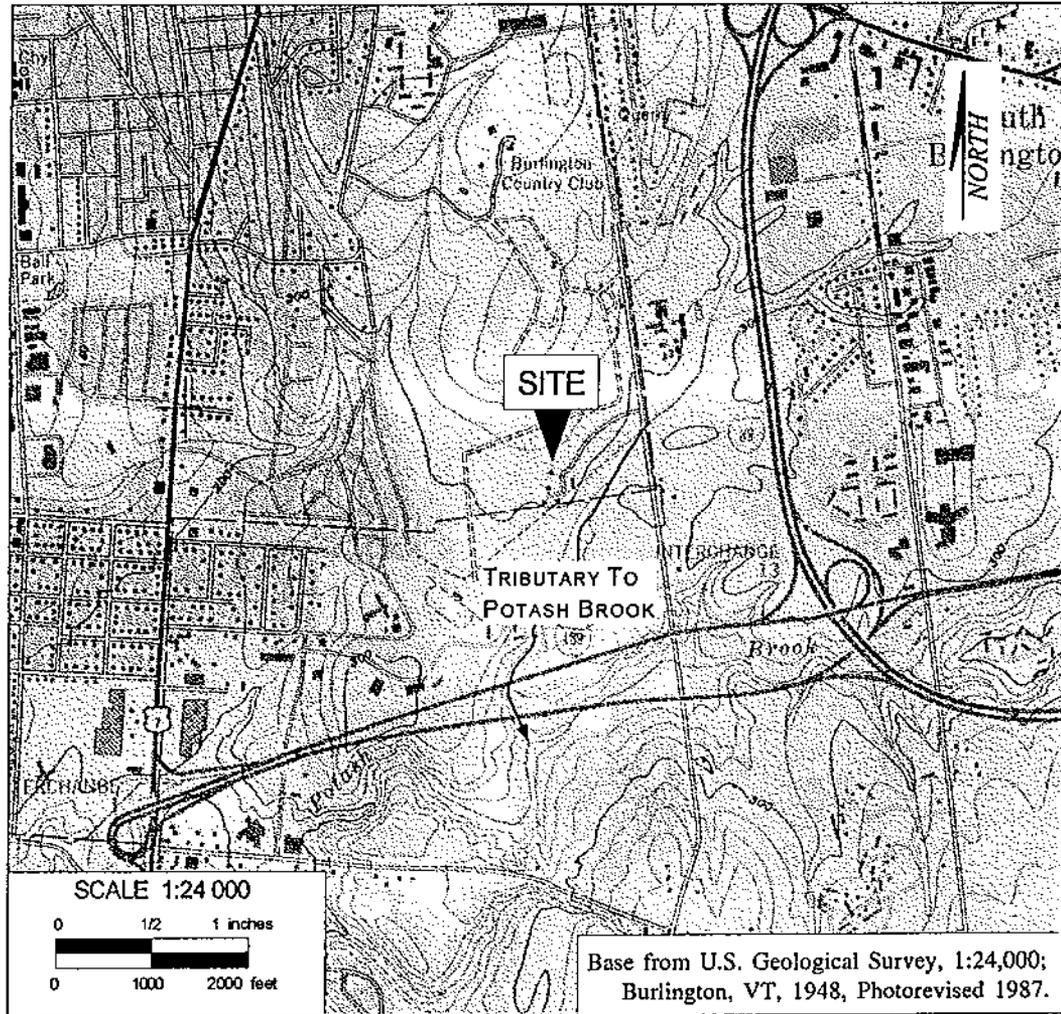
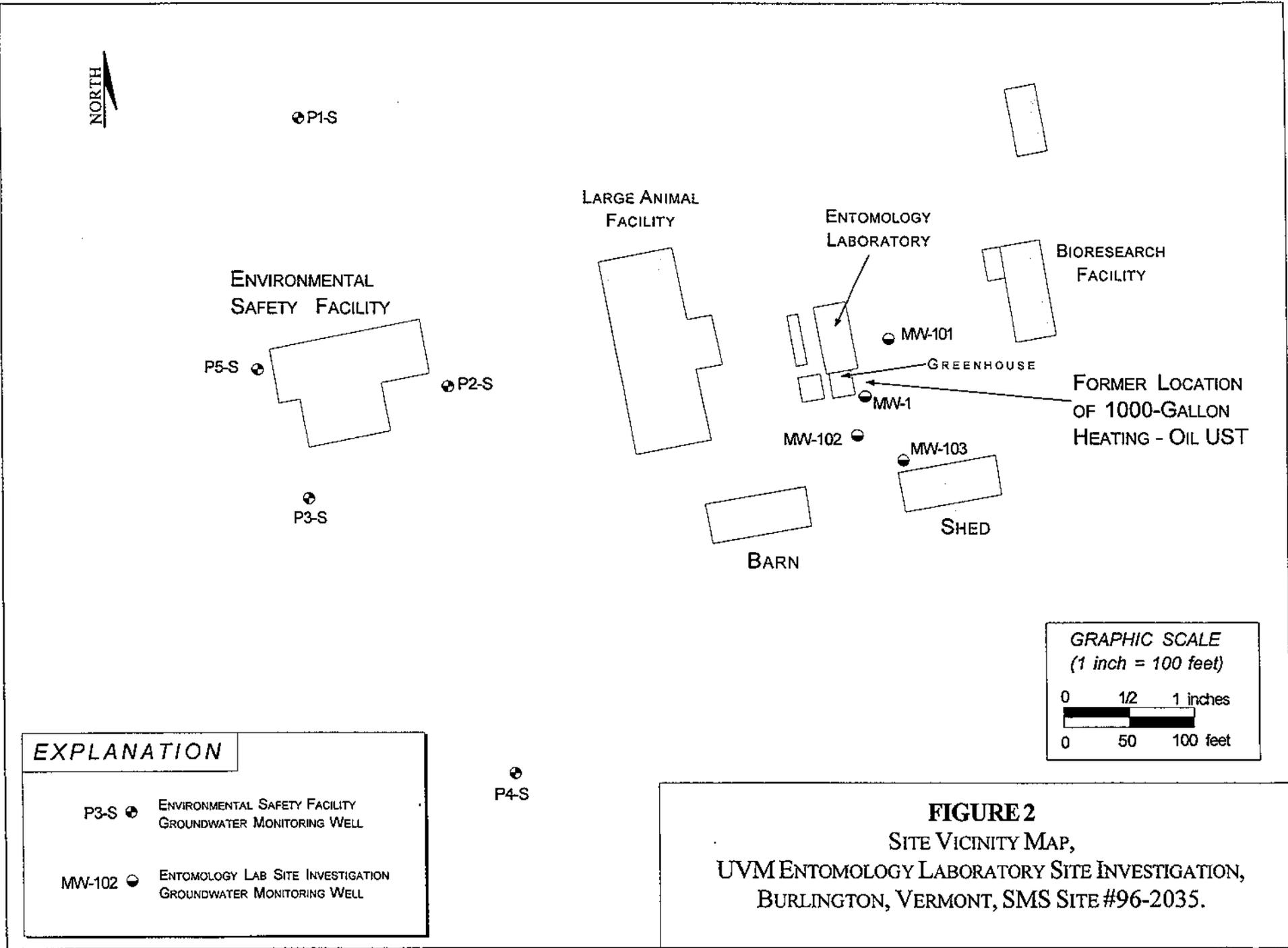


FIGURE 1
SITE LOCATION MAP,
UVM ENTOMOLOGY LABORATORY SITE INVESTIGATION,
BURLINGTON, VERMONT, SMS SITE #96-2035.



EXPLANATION	
P3-S ●	ENVIRONMENTAL SAFETY FACILITY GROUNDWATER MONITORING WELL
MW-102 ●	ENTOMOLOGY LAB SITE INVESTIGATION GROUNDWATER MONITORING WELL

FIGURE 2
 SITE VICINITY MAP,
 UVM ENTOMOLOGY LABORATORY SITE INVESTIGATION,
 BURLINGTON, VERMONT, SMS SITE #96-2035.

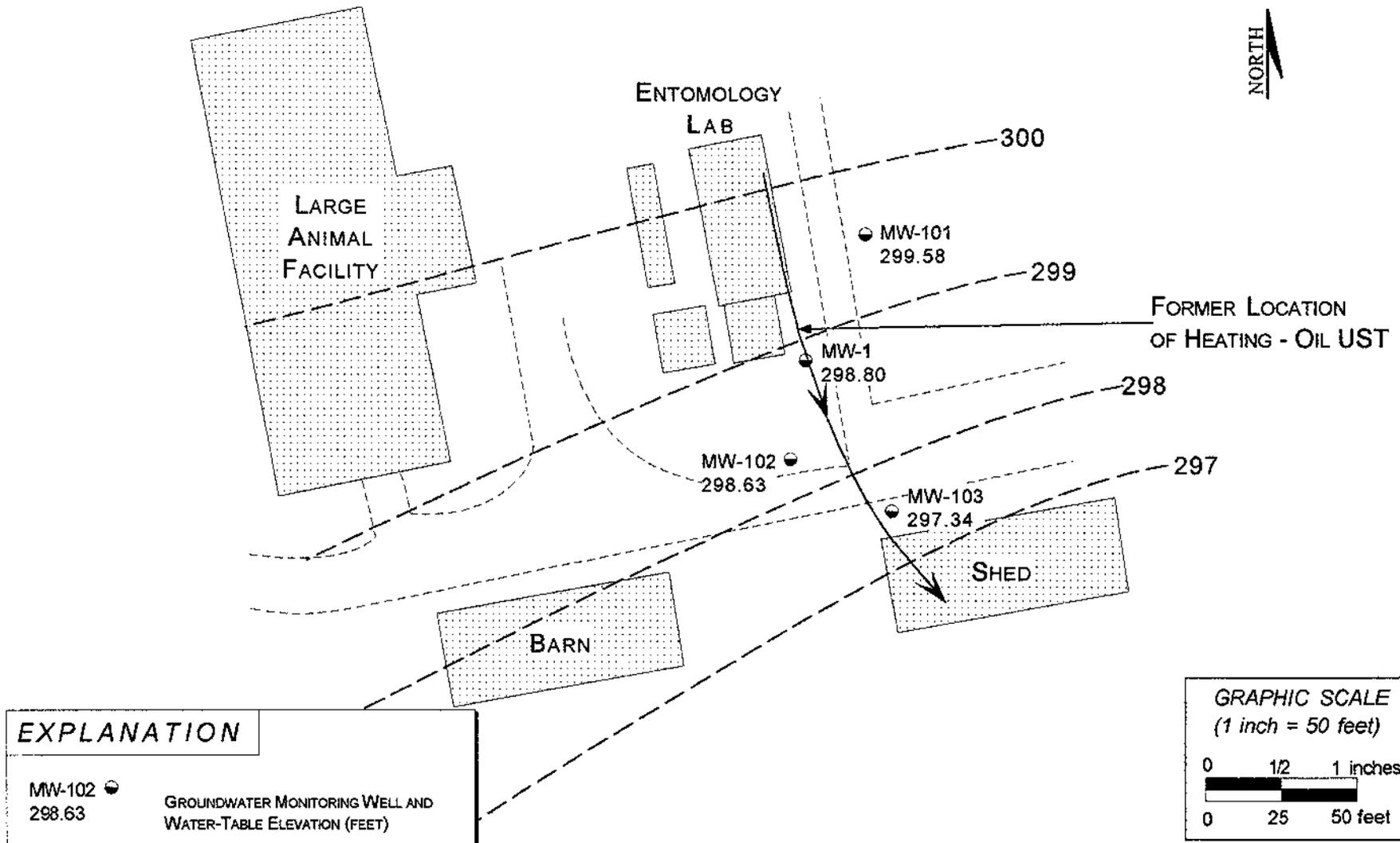
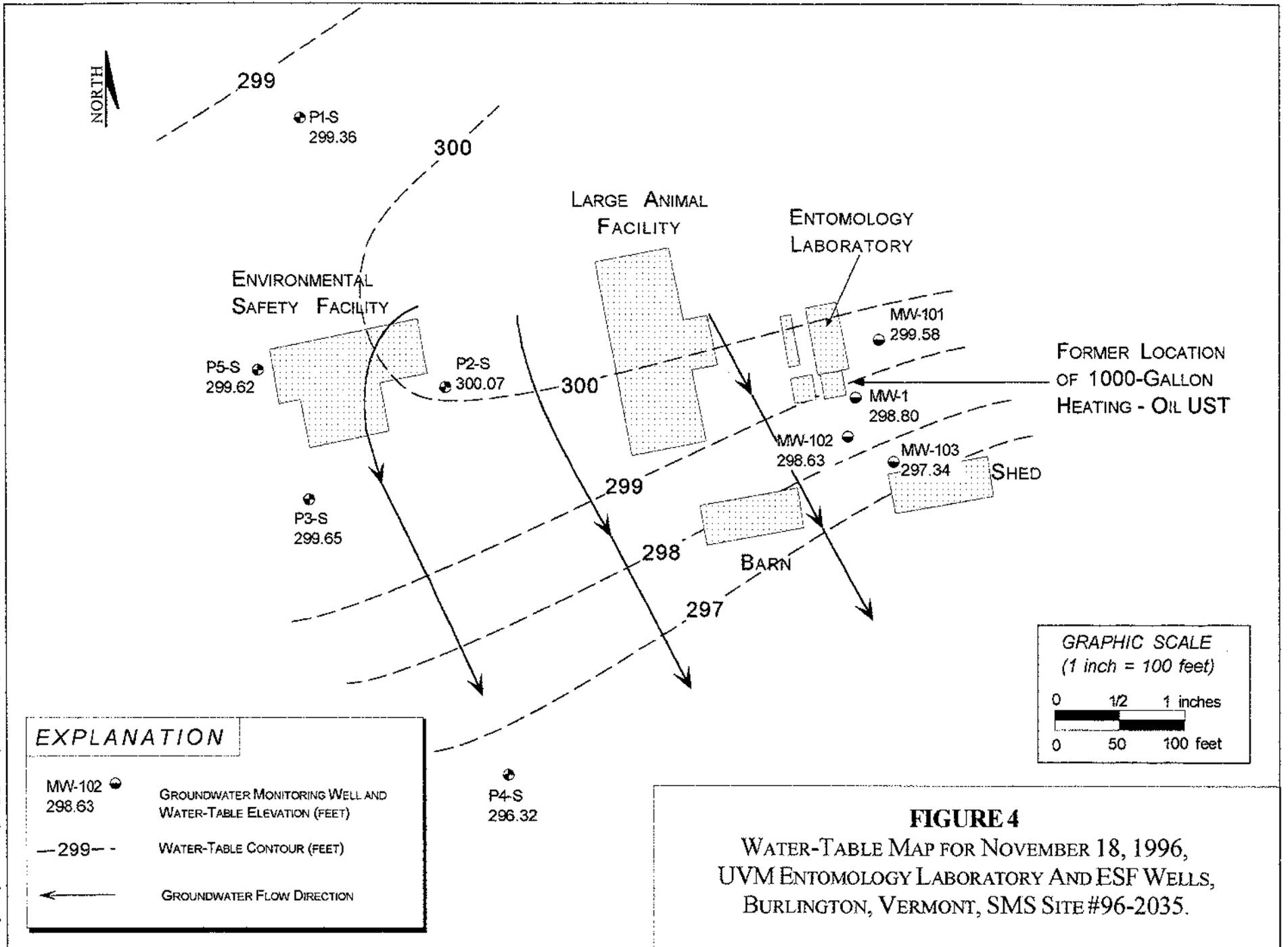


FIGURE 3
 WATER-TABLE MAP FOR NOVEMBER 18, 1996,
 UVM ENTOMOLOGY LABORATORY SITE INVESTIGATION,
 BURLINGTON, VERMONT, SMS SITE #96-2035.



SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-101

Client / Site:	UVM, Environmental Safety Facility/Bug UST
Location:	655 Spear Street, Burlington
Project Number:	34 - 02
Driller:	Gerry Adams - Adams Engineering
Drilling Method:	2 3/4" Vibratory spoon
Geologist:	Stratton French
Sampling Method:	2 3/8" Vibratory spoon (5')
Date:	11/15/96
Weather:	cold (teens), light snow
Boring Location:	Just east (30') of Entomology Lab front door

Well Construction Information	
Total Depth Drilled:	13.0 BGS
Screen Type/Interval:	1.5" sch. 40, 10-slot PVC / 12.0' - 2.0' BGS
Riser Type/Interval:	1.5" sch. 40 PVC / 2.0' - 0.3' BGS
Sandpack Type/Interval:	#1 sand & natural pack/ 12.0' - 1.5' BGS
Seal Type/Interval:	Powdered Bentonite / 1.5' - 1.0' BGS
DTW/Water Level/Date:	2.57' / 299.58' / 11/18/96
Elevation Ground:	302.50'
Elevation TOC:	302.15'
Other:	Developed with peristaltic pump

Sample Interval (feet BGS)	Total Driven / Recovery (feet)	Recovered Interval (feet)	Approximate Interval (feet BGS)	Sample Description	USDA / SCS Soil Classification	PID Reading* (ppm)
2.0 - 5.0	3.0 / 3.0	0.0 - 0.4	2.0 - 2.5	Dark brown, moist silty fine-med. sand with pebbles to 4 cm and organic matter, pebbles rounded	sandy loam	0.5
		0.4 - 1.1	2.5 - 3.0	Yellowish brown, moist, silty fine - medium sand	sandy loam	0.6
		1.1 - 3.0	3.0 - 5.0	Yellowish brown, moist, silty fine sand, mottled at bottom	sandy loam	0.8
5.0 - 10.0	5.0 / 5.0	0.0 - 2.9	5.0 - 8.0	As above with short, reddish oxidation sections, wet	sandy loam	0.7
		2.9 - 5.0	8.0 - 10.0	Gray, wet, fine sandy silt, sand content diminishing with depth, (15 - 25% at top, 5 - 10% at bottom)	silt loam	0.5
10.0 - 13.0	3.0 / 3.0	0.0 - 3.0	10.0 - 13.0	As above but mostly silt which gets darker (almost black) with depth	silt	0.4

Generalized Geologic Log and Other Observations:

0.0' - 8.0': Yellowish brown, silty fine to medium (mostly fine) sands, mottling present approximately 4.5 feet BGS

8.0 - 13.0: Gray, wet, fine sandy silt to mostly silt which becomes darker with depth

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, calibrated to isobutylene

BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-102

Client / Site:	UVM ESF / Entomology UST
Location:	655 Spear Street, Burlington
Project Number:	34 - 02
Driller:	Gerry Adams - Adams Engineering
Drilling Method:	2 3/4" Vibratory spoon
Geologist:	Stratton French
Sampling Method:	2 3/8" Vibratory spoon (5')
Date:	11/15/96
Weather:	Cold (teens), light snow
Boring Location:	35' South of Entomology Lab/UST excavation

Well Construction Information	
Total Depth Drilled:	13.0 BGS
Screen Type/Interval:	1.5" sch. 40, 10-slot PVC / 12.0' - 2.0' BGS
Riser Type/Interval:	1.5" sch. 40 PVC / 2.0' - 0.3' BGS
Sandpack Type/Interval:	#1 sand & natural pack/ 12.0' - 1.5' BGS
Seal Type/Interval:	Powdered Bentonite / 1.5' - 1.0' BGS
DTW/Water Level/Date:	3.20' / 298.63' / 11/18/96
Elevation Ground:	302.07'
Elevation TOC:	301.83'
Other:	Developed with peristaltic pump

Sample Interval (feet BGS)	Total Driven / Recovery (feet)	Recovered Interval (feet)	Approximate Interval (feet BGS)	Sample Description	USDA / SCS Soil Classification	PID Reading* (ppm)
2.0 - 5.0	3.0 / 1.0	0.0 - 1.0	2.5 - 3.5	Yellowish brown, moist, angular gravel, silt, fill, geofabric, etc. with organic matter at top containing rounded pebbles	fill materials	0.9
5.0 - 10.0	5.0 / 2.5	0.0 - 0.9	6.0 - 7.0	Yellowish brown, wet silty fine sand (caved materials)	sandy loam	0.1
		0.9 - 2.1	7.0 - 8.5	Wet angular crushed stone to 5 cm (caved materials)	gravel	1.5
		2.1 - 2.5	8.5 - 10.0	Gray, wet, fine sandy silt	silt loam	2.6
10.0 - 13.0	3.0 / 2.5	0.0 - 2.2	10.0 - 12.0	Yellowish brown, very wet, silty fine sand containing lenses of very fine sandy silt and pure silt (caved materials)	sandy loam	0.6
		2.2 - 2.5	12.0 - 13.0	Gray, greasy and wet, silt with trace (5%) very fine sand in some sections	silt	0.5

Generalized Geologic Log and Other Observations:

An accurate general log at this location is complicated by poor recovery and caved materials, however, it is likely very similar to that indicated at location MW-101

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, calibrated to isobutylene
 BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-103

Client / Site:	UVM, Environmental Safety Facility/Bug UST
Location:	655 Spear Street, Burlington
Project Number:	34 - 02
Driller:	Gerry Adams - Adams Engineering
Drilling Method:	2 3/4" Vibratory spoon
Geologist:	Stratton French
Sampling Method:	2 3/8" Vibratory spoon (5')
Date:	11/15/96
Weather:	cold (teens), light snow
Boring Location:	NW corner of barn across road from MW-102

Well Construction Information	
Total Depth Drilled:	13.0 BGS
Screen Type/Interval:	1.5" sch. 40, 10-slot PVC / 12.0' - 2.0' BGS
Riser Type/Interval:	1.5" sch. 40 PVC / 2.0' - 0.3' BGS
Sandpack Type/Interval:	#1 sand & natural pack/ 12.0' - 1.5' BGS
Seal Type/Interval:	Powdered Bentonite / 1.5' - 1.0' BGS
DTW/Water Level/Date:	4.73' / 297.34' / 11/18/96
Elevation Ground:	302.30'
Elevation TOC:	302.07'
Other:	Developed with peristaltic pump

Sample Interval (feet BGS)	Total Driven / Recovery (feet)	Recovered Interval (feet)	Approximate Interval (feet BGS)	Sample Description	USDA / SCS Soil Classification	PID Reading* (ppm)
2.0 - 5.0	3.0 / 3.0	0.0 - 1.1	2.0 - 3.0	Reddish yellow, dry, silty medium sand with rounded pebbles and angular gravel to 4 cm	sandy loam	0.9
		1.1 - 3.0	3.0 - 5.0	Yellowish brown, moist, silty fine sand, becoming moister with depth, wet at bottom of sequence	sandy loam	1.3
5.0 - 10.0	5.0 / 5.0	0.0 - 2.6	5.0 - 7.5	As above but reddish brown, mottling at 6.0 BGS	sandy loam	1.4
		2.6 - 5.0	7.5 - 10.0	As above but with a gradual color transition from reddish brn to grayish green	sandy loam	1.7
10.0 - 13.0	3.0 / 3.0	0.0 - 2.5	10.0 - 12.5	As above but very wet and sloppy (caved materials)	sandy loam	1.0
		2.5 - 3.0	12.5 - 13.0	Gray, wet silt with trace very fine sand (this material "flows")	silt	0.3

Generalized Geologic Log and Other Observations:

0.0' - 10.0': Yellowish and reddish brown, silty fine to medium (mostly fine) sands, mottling present approximately 6.0 feet BGS

10.0 - 13.0: Gray, wet, very fine sandy silt to mostly silt

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, calibrated to isobutylene

BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

ADAMS ENGINEERING
Gerard Adams
RD #1, Box #3700, Underhill, VT 05489
(802)-899-4945

November 18, 1996

Mr. Tony French
Hoffer & Assoc.

Well logs: UVM Entomoly Bld.

Nine inch auger hole for manway drilled to -1', with 4" pilot to -2'. Soils sampled in open borehole with 2 3/5" OD X 2 3/8" ID X 5' NQ sampler lined with a polyethylene bag, the sampler brought to the surface, and the sample contained in the PE bag vibrated out for examination. Monitor well with a slip cap at the bottom, cap is larger in OD than well screen to create an annulus, is placed in the open borehole left by sampling down to top of "collapsed native soils", the borehole annulus partially filled with pack sand, the well with pack sand vibrated to depth creating a partial sand pack enhancing natural development, the open annulus refilled with sand pack above well screen "complete sand pack", a bentonite slurry seal is then placed in the open annulus, and a 7" manway cemented in place. Well developed with peristaltic pump using dedicated polyethylene suction tubing.

11/15/96 MW #101

SOIL WELL

- G Manway cemented in place.
 - .3' Top well 1.5" solid riser.
 - 1' Top of bentonite slurry.
 - 1.5' Bottom bentonite - top complete sand pack placed in open annulus.
 - 2 > 5.0' Medium & fine sand.
 - 2.0' Top well screen 2-5' X 1.5" X .010" slot Hi Flo, typ*.
 - 5' Bottom complete sand pack-top native collapse partial sand pack & natural development.
 - 5 > 10.0' Saturated gray silty fine sand// silt.
 - 10 > 13' Gray silt // (over) silty fine sand.
 - 12.0 Bottom well screen, slip cap.
- Well developed: Good flow, clean.

MW #102

- G Manway cemented in place.
 - .3' Top well 1.5" solid riser.
 - 1' Top of bentonite slurry.
 - 1.5' Bottom bentonite - top complete sand pack placed in open annulus.
 - 2 > 5.0' Crushed stone & construction fabric.
 - 2.0' Top well screen 2-5' *.
 - 5' Bottom complete sand pack-top native collapse partial sand pack & natural development.
 - 5 > 10.0' Saturated gray silty fine sand// silt.
 - 10 > 13' Gray silt.
 - 12.0 Bottom well screen, slip cap.
- Well developed: Good flow, clean.

MW #103

- G Manway cemented in place.
-.3' Top well 1.5" solid riser.
-1' Top of bentonite slurry.
-1.3' Bottom bentonite - top complete sand pack placed in open annulus.
-2 > 5.0' Medium & fine sand.
-2.0' Top well screen 2-5' .
-5.5' Bottom complete sand pack-top native collapse partial sand pack & natural development.
-5 > 10.0' Same saturated gray silty fine sand.
-10 > 13' Gray silt // (over) silty fine sand.
-12.0 Bottom well screen, point.
Well developed: Good flow, clean
* Well vibrated into place using EW rods inside well..

G. Adams

J. Adams



ANALYTICAL REPORT

P.O. Box 339
 Randolph, Vermont 05060-0339
 (802) 728-6313

Jefferson Hoffer & Associates
 RR 4 Box 2286
 Montpelier VT, VT 05602

Jeff Hoffer

Work Order No.: 9611-03809

Project Name: UVM Entomology Lab UST
 Customer Nos.: 070249

Date Received: 11/18/96
 Date Reported: 11/22/96

Sample Desc.: MW-A

Sample Date: 11/18/96

Sample Nos: 1

Collection Time: 13:00

Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/21/96
Methyl Tertiary Butyl Ether	EPA 8020	BPQL	ug/L	JPM	11/21/96
Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Toluene	EPA 602/8020	9	ug/L	JPM	11/21/96
Ethyl Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Total Xylenes	EPA 8020	BPQL	ug/L	JPM	11/21/96
Chlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,2-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,3-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,4-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Surrogate: 8020				JPM	11/21/96
***Bromofluorobenzene-8020		89	% Recovery	JPM	11/21/96

Sample Desc.: Trip Blank

Sample Date: 11/18/96

Sample Nos: 2

Collection Time: 13:35

Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/21/96
Methyl Tertiary Butyl Ether	EPA 8020	BPQL	ug/L	JPM	11/21/96
Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/21/96
Ethyl Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Total Xylenes	EPA 8020	BPQL	ug/L	JPM	11/21/96
Chlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,2-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,3-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,4-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Surrogate: 8020				JPM	11/21/96
***Bromofluorobenzene-8020		89	% Recovery	JPM	11/21/96

ANALYTICAL REPORT

Project Name: UVM Entomology Lab UST
 Project No.: 070249

Work Order No.: 9611-03809

Sample Desc.: MW-101				Sample Date: 11/18/96	
Sample Nos: 3				Collection Time: 13:55	
Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/21/96
Methyl Tertiary Butyl Ether	EPA 8020	BPQL	ug/L	JPM	11/21/96
Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Toluene	EPA 602/8020	76	ug/L	JPM	11/21/96
Ethyl Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Total Xylenes	EPA 8020	BPQL	ug/L	JPM	11/21/96
Chlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,2-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,3-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,4-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Surrogate: 8020				JPM	11/21/96
***Bromofluorobenzene-8020		90	% Recovery	JPM	11/21/96

Sample Desc.: MW-103				Sample Date: 11/18/96	
Sample Nos: 4				Collection Time: 14:10	
Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/21/96
Methyl Tertiary Butyl Ether	EPA 8020	BPQL	ug/L	JPM	11/21/96
Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Toluene	EPA 602/8020	6	ug/L	JPM	11/21/96
Ethyl Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Total Xylenes	EPA 8020	BPQL	ug/L	JPM	11/21/96
Chlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,2-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,3-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,4-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Surrogate: 8020				JPM	11/21/96
***Bromofluorobenzene-8020		91	% Recovery	JPM	11/21/96

Sample Desc.: MW-102				Sample Date: 11/18/96	
Sample Nos: 5				Collection Time: 14:25	
Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/21/96
Methyl Tertiary Butyl Ether	EPA 8020	BPQL	ug/L	JPM	11/21/96
Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96

ANALYTICAL REPORT

Project Name: UVM Entomology Lab UST
Project No.: 070249

Work Order No.: 9611-03809

Sample Desc.: MW-102				Sample Date: 11/18/96	
Sample Nos: 5				Collection Time: 14:25	
Test Performed	Method	Results	Units	Analyst	Analysis Date
Toluene	EPA 602/8020	14	ug/L	JPM	11/21/96
Ethyl Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Total Xylenes	EPA 8020	BPQL	ug/L	JPM	11/21/96
Chlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,2-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,3-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,4-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Surrogate: 8020				JPM	11/21/96
***Bromofluorobenzene-8020		88	% Recovery	JPM	11/21/96

Sample Desc.: MW-1				Sample Date: 11/18/96	
Sample Nos: 6				Collection Time: 14:45	
Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/21/96
Methyl Tertiary Butyl Ether	EPA 8020	BPQL	ug/L	JPM	11/21/96
Benzene	EPA 8020	4	ug/L	JPM	11/21/96
Toluene	EPA 602/8020	3	ug/L	JPM	11/21/96
Ethyl Benzene	EPA 8020	11	ug/L	JPM	11/21/96
Total Xylenes	EPA 8020	19	ug/L	JPM	11/21/96
Chlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,2-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,3-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,4-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Surrogate: 8020				JPM	11/21/96
***Bromofluorobenzene-8020		110	% Recovery	JPM	11/21/96

Sample Desc.: FB-01				Sample Date: 11/18/96	
Sample Nos: 7				Collection Time: 15:00	
Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/21/96
Methyl Tertiary Butyl Ether	EPA 8020	BPQL	ug/L	JPM	11/21/96
Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/21/96
Ethyl Benzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Total Xylenes	EPA 8020	BPQL	ug/L	JPM	11/21/96

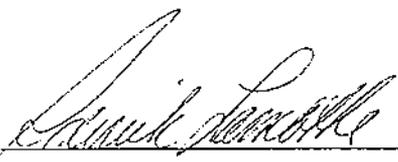
ANALYTICAL REPORT

Project Name: UVM Entomology Lab UST
Project No.: 070249

Work Order No.: 9611-03809

Sample Desc.: FB-01				Sample Date:	11/18/96
Sample Nos: 7				Collection Time:	15:00
Test Performed	Method	Results	Units	Analyst	Analysis Date
Chlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,2-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,3-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
1,4-Dichlorobenzene	EPA 8020	BPQL	ug/L	JPM	11/21/96
Surrogate: 8020				JPM	11/21/96
***Bromofluorobenzene-8020		89	% Recovery	JPM	11/21/96

BPQL = Below Practical Quantitation Limit; 1 ug/L

Authorized by: 

GROUNDWATER SAMPLING DATA SHEET

LOCATION: Wm - Etomology Lab USF
 DATE: 11/18/96

SAMPLE METHOD: Raw & Fil
 SAMPLING TEAM: FRENCH

WELL ID	PID Head Space (ppm)	Depth to Water (ft)	Total Well Depth (ft)	Water Column (ft)	3 Well Volumes* (gals)	Total Purged (gals)	Sample Time	Sample Type	Chain-of-Custody Number	Time	Remarks
TB-01	NA						13:35	BLANK	TB-01	13:35	TRIP BLANK
MW-101	6.0	2.57	12.0	9.0	2.4	1.80	13:55	S	MW-101	13:55	SILT, LOW RECHARGES
MW-103	2.9	4.73	12.0	7.0	1.8	1.6	14:10	S	MW-103	14:10	SILT, Good Recharge
MW-102	3.0	3.20	12.0	8.5	2.2	2.5	14:25	S	MW-102	14:25	SILT, A FEW COLORED ^{purple water}
"	"	"	"	"	"	"	14:25	DUP	MW-A	13:00	"
MW-1	2.3	6.29	8.0	4.0	1.9	1.75	14:45	S	MW-1	14:45	SHEEN!, SILTY, THIS
TB-01	NA						15:00	BLANK	TB-01	15:00	BLANK, FIELD location very on the off well. due to starting

* (1.5" = 0.092 gals/ft, 2" = 0.16 gals/ft, 4" = 0.65 gals/ft, 6" = 1.5 gals/ft)

REMARKS: BACKGROUNDP 317 = 1.7 ppm

Scitests, Inc.

P.O. Box 339
 Route 66 Professional Center, Randolph, VT 05060
 Phone: (802)728-6313 Fax: (802)728-6044
 Client: Jefferson P. Hoffer & Associates
 Address RR 4 Box 2286, Camstock Road
 Montpelier, VT 05602

Sample Logged in By: _____
 Anomaly Sheet: Y ___ N ___
 Contact: Jeff Hoffer T. Flennick
 Customer Nos: 90048
 Project: _____
 Job Template: _____
 Phone No: _____

Preservative Check:
 Temperature Check:

UVM - EXTREMODOLOGY
 LAB USA

Date requested:
 Date shipped:
 Date scheduled:

CHAIN OF CUSTODY

Sampled by:*	STRATTON FRENCH	Date	11/14/96	Time	16:45	Print Name Here:*	STRATTON FRENCH	Date	11/18/96	Time	16:45
Relinquished by:	<i>[Signature]</i>					Accepted by:	<i>[Signature]</i>				
Relinquished by:	<i>[Signature]</i>					Received by Scitest:	<i>[Signature]</i>				

Item Nos	Client ID or Description	Sample Date	Sample Time	Matrix	Preservative	Container Material	Container Volume	Containers per Sample	Parameters
1	MW - A	11/18/96	13:00	GW	HCl	Glass	40 mL	2	EPA 8020
2	TB - 01		13:35	GW P.F.	HCl	Glass	40 mL	2	EPA 8020
3	MW - 101		13:55	GW	HCl	Glass	40 mL	2	EPA 8020
4	MW - 103		14:10	GW	HCl	Glass	40 mL	2	EPA 8020
5	MW - 102		14:25	GW	HCl	Glass	40 mL	2	EPA 8020
6	MW - 1		14:45	GW	HCl	Glass	40 mL	2	EPA 8020
7	FB - 01		15:00	GW	HCl	Glass	40 mL	2	EPA 8020
8				GW	HCl	Glass	40 mL	2	EPA 8020
9				GW	HCl	Glass	40 mL	2	EPA 8020
10	Trip Blank			GW	HCl	Glass	40 mL	2	EPA 8020

SAMPLES MUST REACH THE LAB within _____ of sampling time to meet all holding times. Parameters are correct as listed. Client Initial: _____ * Scitest Work Order: _____
 Please fill in ALL areas marked with an asterisk (*). Thank you.
 Additional instruction if applicable are attached.

ADAMS ENGINEERING
Gerard Adams
RD #1, Box #3700, Underhill, VT. 05490
(802) 899-4945

December 19, 1996

Mr. Jeff Hoffer & Tony French
Hoffer & Associates
Re: Toluene

1. BACKGROUND. Unexplainable levels of toluene were found in 1.5" wells in the fall of 1994. I looked into my decon water as my truck water/decon tank was painted inside with paint that probably contained toluene as a thinner, the water in the tank had been very hot during some of the suspect well installations. After several analyses of heated decon water 2.5 PPB were found. Dedicated peristaltic pump well development tubing was also analyzed to no avail.

November 11/25/96 an unexplainable 76 PPB were found in another 1.5" well. A sample of heated decon water and anti freeze (windshield washer fluid - methanal, water & detergent) used in my power washer were submitted for analysis 11/27/96. 12/2-3/96 Several Stainless Steel wells were checked with a field GC and no unexplainable toluene found. All of the preceding used preheated decon water with residual windshield washer fluid, as did most of the suspect wells. Noted was that all of the suspect wells were 1.5", but so are most of the wells that I instal. The analyses of the decon water and windshield washer fluid came back 12/14/96 with nothing detected per EPA 8020 at .5 and 1 ug/L respectively.

I contacted Mark O'Donnell director of marketing at Timco about 12/6/96, my sole supplier of suspect pipe, who informed me that there was a problem with toluene that was "corrected two weeks ago" (about 11/18/96). I had well screens air freighted in such that everything is now post 12/10/96.

2. I contacted Mark O'Donnell 12/17/96 to effect exchange of my existing 1.5 & 2" screens with several calls and conversations the gist of which I gleaned: The letters to Jeff Hoffer and Chris Ward are still "forthcoming". Toluene was found in acetone used to clean screens and riser and was replaced with a citrus base solvent/cleaner around 11/18/96, but the acetone with toluene was not removed from the factory until 12/10/96. Samples of screens and/or riser produced during the interim (11/18 > 12/10/96) were tested with no toluene detected. Bailers, caps, plugs, and ny solid PVC points are produced in another facility. Conversations with Ground Water of Vermont indicated no problem which I attribute to using 2" wells almost exclusively.

My guess is that a cheaper technical grade acetone was used for 1.5" screens and riser which are not widely used, and that might explain why the problem persisted for so long with only one other occurrence.

Should you have further questions call me or Mark O'Donnell at Timco 1-800-236-8534.

Sincerely

G. Adams

