

JAN 21 1994

**REPORT ON INVESTIGATIONS IN NOYESVILLE
WALDEN, VERMONT:**

**The Hooker Residence (Site #93-1314);
The Walden General Store (Site #88-0271); and
The Walden Town Garage (Site #88-0168)**

December 1993

Prepared for:

SITES MANAGEMENT SECTION

103 South Main Street
Waterbury, Vermont 05676

Prepared by:

THE JOHNSON COMPANY, INC.

5 State Street
Montpelier, Vermont 05602
(802) 229-4600

THE JOHNSON COMPANY, INC.

Environmental Sciences and Engineering

Maurice, Katherine, & Roger K. Hooker
Route 15
RFD West Danville, Vermont 05873

January 19, 1994

Re: Report on Investigations in Noyesville - Walden, Vermont
JCO # 1-0838-1 (042)

Dear Maurice, Katherine, & Roger:

Enclosed is a copy of the report on the investigations conducted recently at the request of the State of Vermont at your property, at the Walden Town Garage and at the Walden General Store.

The results of the investigations indicate that your property has the remains of petroleum contamination from the former Underground Storage Tanks (USTs), however, the residual contamination does not appear to affect your drinking water supply. The direction of the flow of groundwater appears to be such that your home is not at risk of contamination by the "volatilization" (or evaporation) of petroleum constituents from the groundwater into the air in your cellar.

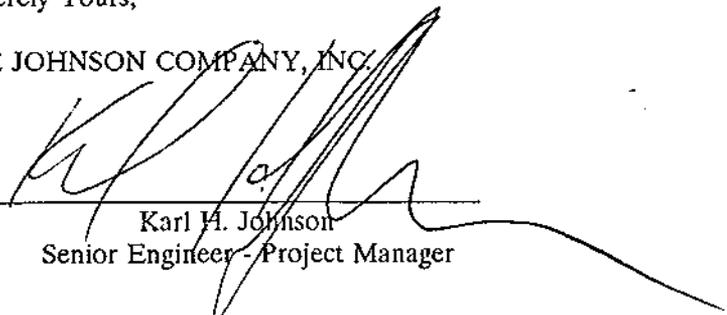
The investigations also indicate that it is unlikely that the condition of your property is influenced by any release(s) on adjacent or nearby property. Similarly, the results of this work also indicate that it is unlikely that the conditions on your property impact any receptors off of your property.

It is our recommendation that your property have one more round of samples taken in the Spring. If the State agrees with our recommendations, we will also map the water table and the groundwater flow direction again at the same time that the samples are taken. This will serve to confirm that your cellar is not at risk, and hopefully allow us to petition the State to close the file on your property and remove it from their list of "Active Sites".

I hope that this brief explanation of our findings is helpful to you. Please don't hesitate to call me (collect) if you have any questions about this report, the investigations, or where things will go from here. (I've taken the liberty of sending Joe a copy of this letter with a copy of the report.)

Sincerely Yours,

THE JOHNSON COMPANY, INC.

By: 

Karl H. Johnson
Senior Engineer - Project Manager

cc: Lynda Wedderspoon, Site Manager w/o Enclosure
Joseph P. McEntyre, Esq. w/ Enclosure

Reviewed by: BAW
J:\PROJECTS\1-0620-4\HOOKER01.LTR April 12, 1993 14:29 khj

HARDWICK GAZETTE

Fuel Tank Is A-OK

12/1/93

by Betty Hatch

WALDEN — The Select Board received good news when it met last week and was told there were no leaks in the underground diesel fuel tank at the town garage.

Northern Petroleum Company made the inspection.

The board also prepared a bill for R.C. contractors for work done on the culvert on Town Highway 5. In addition, the board reviewed and discussed the 1992 Crime Report and the 1993 VLTC Municipal Salary Survey.

The next meeting is scheduled for Monday, Dec. 6 at 7 p.m. in the town clerk's office. The meeting is open to the public.



State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
Natural Resources Conservation Council

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Hazardous Materials Management Division
103 South Main Street / West Building
Waterbury, VT 05671-0404
802-244-8702

March 4, 1993

Joseph P. McEntyre
P.O. Box 154
High Street & Towne Ave.
Plainfield, VT 05667

RE: The Hooker Residence; Site #92-1314

Dear Mr. McEntyre:

Attached please find a copy of the letter dated January 14, 1993 addressed to you from myself regarding the Hooker Residence. Unfortunately, it appears from your letter dated March 1, 1993 that you never received this letter. Please review the letter and respond to the Sites Management Section (SMS) at your earliest convenience.

Please feel free to call with any questions you may have.

Sincerely,


Lynda Wedderspoon, Site Manager
Sites Management Section

cc: Maurice Hooker
Linda Wilson, VHFA

COPY

JOSEPH P. McENTYRE

ATTORNEY AT LAW
P.O. BOX 154
HIGH STREET & TOWNE AVENUE
PLAINFIELD, VERMONT 05667
(802) 454-7825 OR 454-7780

December 24th, 1992

Charles B. Schwer, Supervisor
Sights Management Section
Agency of Natural Resources
103 S. Main Street- West Building
Waterbury, VT 05671

RE: *Petroleum Contamination at Hooker residence in Walden, VT (sight No. 92-1314)*

Dear Mr. Schwer:

Your letter of November 16th, 1992 to Maurice Hooker has been turned over to me for response. I have been representing the Hookers for over a year now in an attempt to assist them in getting help with removal of old fuel tanks located on their premises. With the assistance of the Vermont Housing Finance Agency my clients were able to borrow up to \$25,000 for the expense of removing those tanks and other legal matters they were involved in. The tank removal service was provided by Jet-Line Services, Inc. situated at 320 Amsterdam Road on Route 5 in Glenville, NY. Our contact at Jet-Line was Paul Conners (local phone number 879-5000). Jet-Line removed the tanks on October 8th, 1992. As indicated in your November 16th, 1992 letter some contamination was apparently found on site. Consequently, it is my understanding that some test wells will be drilled and monitored for additional soil contamination.

I further understand that your agency is now interested in assisting my clients in removing the contaminated soil and testing for any further contamination. It would appear that my clients might also be eligible for reimbursement for the costs they have incurred to date, will incur in the future, and legal fees. I suggest and I am sure my clients would be satisfied with Jet-Line as a qualified consultant to perform the work set forth in your November 16th, 1992 letter. It is my understanding that Jet-Line has been purchased by another company but the individuals who did the work originally are still doing that type of work and presumably are qualified to continue to do so.

I further understand there is some question regarding my clients eligibility for reimbursement under the state's petroleum clean-up fund, which relates to their failure to report the existence of the fuel tanks at their site and to pay an annual permit fee in connection with the same. However, I do not think those restrictions apply to my clients. Firstly, when they purchased the property the tanks had long since been abandoned, were not being used, and remained unused during my clients' property ownership. The tanks had originally been used by a service station, owned many years prior to my clients acquiring the property. Responsibility for registering the tanks was with the prior owners, who never notified the state that they were abandoning the use of the same. When I first became involved with this case I made diligent efforts to locate the parties responsible for registering the tanks with the state and notifying the state

regarding their abandonment. I located the parties in Florida. However, they were totally uncooperative. In any event, I do not feel that my clients have violated the law in any way, and, in fact, have made every reasonable personal effort to take care of the fuel tank problem, including notifying the state through me much earlier in the year. I exchanged considerable correspondence and phone calls with Paul VanHollebke in 1991 respecting the status of these tanks and our efforts to locate the prior owners. I also attempted to enlist the assistance of your agency in dealing with this problem. However, my request was turned down.

In view of the above I submit that my clients are entitled to reimbursement from the state petroleum clean-up fund and encourage you to take the same position in respect to that assumption. Kindly let us know if the state will reimburse my client for the expenses connected with removal of the tanks and contamination clean-up and whether the people who did the work to date at the site would be acceptable as consultants to perform the work required under your letter of November 16th, 1992.

Sincerely yours,

Joseph P. McEntyre, Esq.

*cc to: Conners
Jet-Line*

JPM:sb

MAR 3 1993

JOSEPH P. McENTYRE

ATTORNEY AT LAW
P.O. BOX 154
HIGH STREET & TOWNE AVENUE
PLAINFIELD, VERMONT 05667
(802) 454-7825 OR 454-7780

March 1, 1993

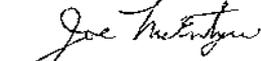
Charles B. Schwer, Supervisor
Sites Management Section
Agency of Natural Resources
103 S. Main Street - West Building
Waterbury, VT 05671

RE: *Hooker Residence in Walden, VT site no. 92-1314*

Dear Schwer:

Over two months have passed now since my letter of December 24th, 1992 respecting the above captioned matter, a copy of which is attached hereto. Please be good enough to call or write to give me some indication as to where my clients stand in respect to this matter.

Sincerely yours,



Joseph P. McEntyre, Esq.

Enclosures

cc to: Hooker

JPM:sb

THE JOHNSON COMPANY, INC.

Environmental Sciences and Engineering

January 19, 1994

Lynda Wedderspoon, Site Manager
Hazardous Materials Management Division
Sites Management Section
103 South Main Street/West Building
Waterbury, Vermont 05671-0404

Re: Report on Investigations in Noyesville - Walden, Vermont
JCO # 1-0838-1 (042)

Dear Lynda:

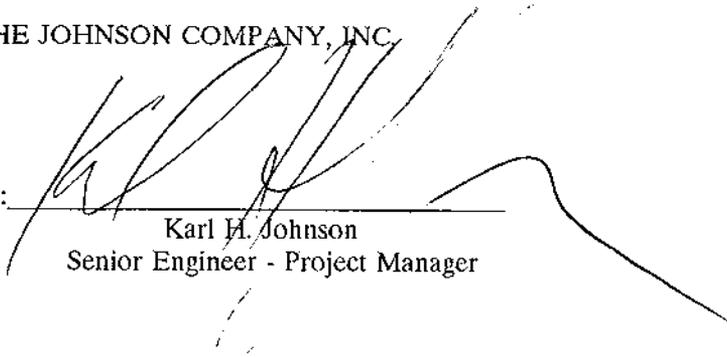
We are writing to transmit the results of the additional investigations requested by the State of Vermont at the Hooker Residence, the Town Garage and the General Store in Walden, Vermont.

Enclosed please find a copy of our report: "Petroleum Contamination in Noyesville - Walden, Vermont". I have also included a copy of our letter of transmittal to the Hookers, and a recent newspaper article from the Hardwick Gazette for your information.

Please call with any questions that arise.

Sincerely Yours,

THE JOHNSON COMPANY, INC.

By: 

Karl H. Johnson
Senior Engineer - Project Manager

Reviewed by: BAW
I:\PROJECTS\1-0838-1\STATE2.LTR January 19, 1994 15:23pm

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
1.0 INTRODUCTION	1
2.0 BACKGROUND	1
3.0 SCOPE OF WORK	4
3.1 SOIL BORING AND GROUNDWATER MONITORING WELL CONSTRUCTION	4
3.2 SOIL SAMPLING	4
3.3 GROUNDWATER AND DRINKING WATER SUPPLY SAMPLING	6
3.4 GROUNDWATER FLOW DIRECTION	7
4.0 CONCLUSIONS	8
5.0 LIMITATIONS	10
6.0 RECOMMENDATIONS	10

LIST OF FIGURES

Figure 1	Site Location Map
Figure 2	Area Map
Figure 3	Monitoring Well Locations
Figure 4	Groundwater Contour Map

LIST OF ATTACHMENTS

Attachment 1	SMS Letter Dated November 2, 1993
Attachment 2	Letter to Lynda Wedderspoon Dated October 1, 1993
Attachment 3	Drilling Logs
Attachment 4	Laboratory Reports

EXECUTIVE SUMMARY

Additional investigations were requested by the Sites Management Section (SMS) at the Hooker residence (Site #93-1314), at the Walden Town Garage (Site #88-0168), and at the Walden General Store (Site #88-0271). Four soil borings were advanced on the Hooker property, and groundwater monitoring wells were constructed after encountering the groundwater in each boring. Monitoring wells were surveyed to a relative elevation. The monitoring wells at the Town Garage were also located and surveyed under the scope of this work.

Groundwater samples were obtained from the monitoring wells on the Hooker property and at the Town Garage. No monitoring wells located at the Walden General Store. The Hooker drinking water supply and the Walden General Store drinking water supply were both sampled under this scope. All groundwater samples were submitted to the Department of Environmental Conservation Laboratory for analysis by EPA Method 8240.

Results of the laboratory analysis indicate that the drinking water supply at the Walden General Store is contaminated with hydrocarbons.

The results of laboratory analysis indicate that the groundwater at the Town Garage is contaminated with hydrocarbons to levels which indicate a residual source of contaminants.

The results of laboratory analysis indicate that the Hooker drinking water supply (North of the residence) was not contaminated with hydrocarbons, but that the groundwater East and South of the Hooker residence is contaminated. A limited amount of soil above the water table on the Hooker property is contaminated at levels indicated by a photoionization detector (PID) that may require remediation under existing state guidelines.

Groundwater flow directions were determined on the Hooker property and at the Town Garage. The predominant groundwater flow direction at both sites is towards Joe's Brook. No other sensitive receptors appear to be at risk from the contamination present at the Hooker's or the Town Garage.

Additional work is recommended to delineate the degree and extent and contamination at the Town Garage and at the Walden General Store. Confirmation of the degree and extent of contamination at the Hooker property, as well as the groundwater flow direction, is warranted prior to closure of the Hooker residence (Site #93-1314).

1.0 INTRODUCTION

The Johnson Company was contacted by Joseph P. McEntyre, Esq., Attorney for Maurice, Katherine and Roger Hooker of Walden, Vermont in late March 1993, and subsequently retained by the Hookers to complete various site assessment tasks requested by the Vermont Department of Environmental Conservation Sites Management Section (SMS).

This report details the findings of investigations at the Hooker's property (Site #92-1314), at the Walden Town Garage, and at the Walden General Store (Site #88-0271) previously described in a work plan transmitted to the SMS by letter dated November 2, 1993. See Attachment 1.

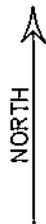
2.0 BACKGROUND

The Hookers bought the subject property on February 4, 1983. Two abandoned and unused underground storage tanks (USTs) formerly used for the storage of petroleum product(s) were located between the southern half of the Hooker residence and Route 15 in Walden, Vermont. A Site Location Map is included as Figure 1.

The Walden Town Garage and the Walden Public Library are directly north across Route 15 from the Hookers home. What appeared to be two monitoring wells and an apparent recovery well were observed next to the library building. There is at least one UST in use currently for the storage of petroleum product at the Town Garage located near the library building. The Walden General Store is approximately 1200 feet south (downstream on Joe's Brook) of the Hooker's, and on the opposite side of the Route 15. No USTs or monitoring wells were observed at the General Store. Please see Figure 2 for an Area Map.

The two abandoned USTs were subsequently removed by Jetline Services on October 8, 1992 to facilitate real estate re-financing by the Hookers. Product released from the tanks and/or piping system(s) was discovered during the tank removal to have contaminated soil and groundwater. Additional investigations were requested by the SMS in a letter to Maurice Hooker dated November 16, 1992 as a result of the information contained in the Tank Pull form submitted to the Vermont Underground Storage Tank Program by Jetline Services.

In late March 1993, The Johnson Company received a copy of the March 15, 1993 letter from Lynda Wedderspoon of the SMS to Joseph P. McEntyre, Esq. reiterating requests made in the November 16th letter of the previous year. The Johnson Company performed an initial site visit to determine the potential for



CONTOUR INTERVAL 20 FEET

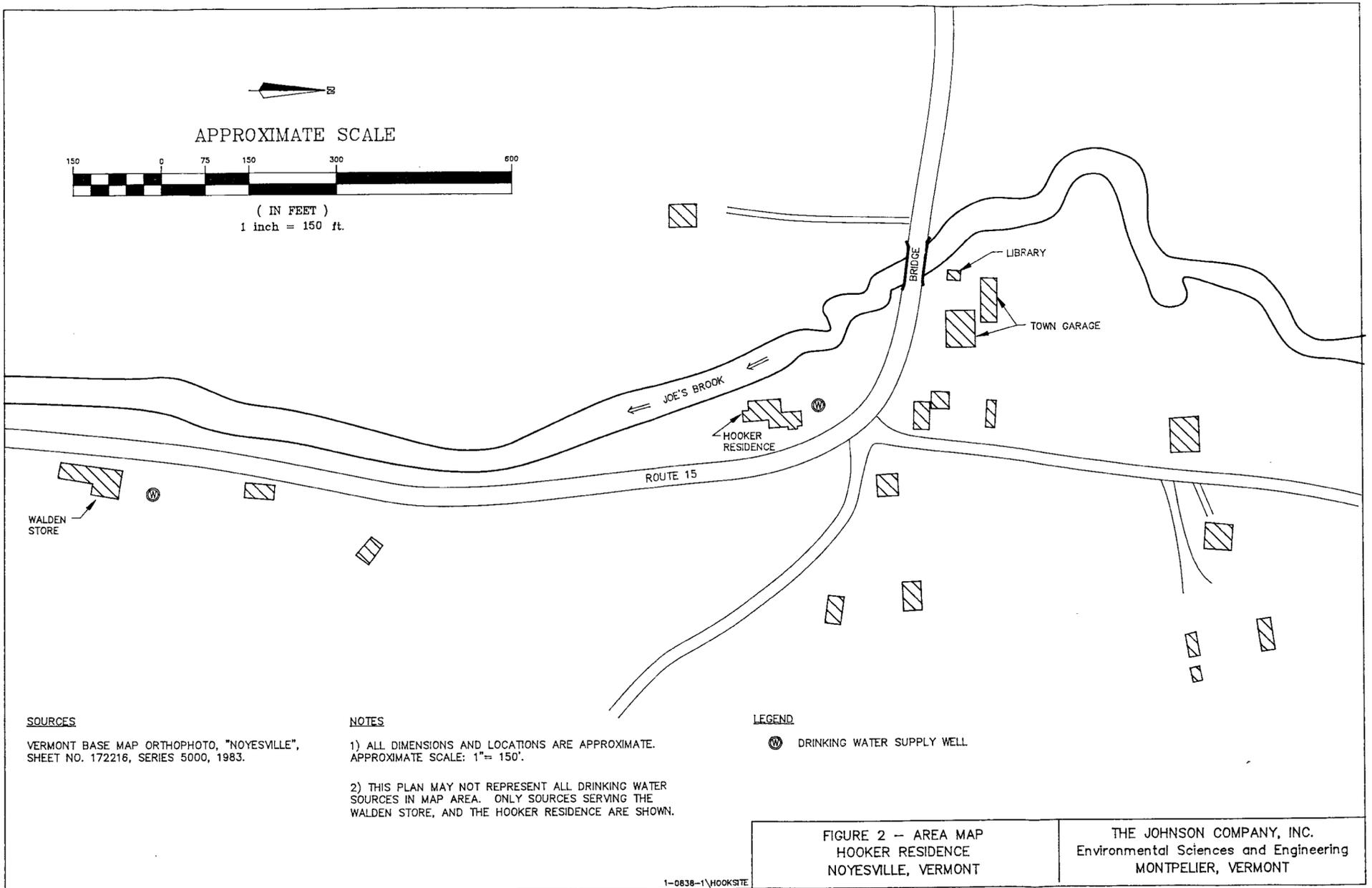


MAP LOCATION

BASE MAP : USGS 15 Minute Topographic Quadrangle; St. Johnsbury, VT-NH.

FIGURE 1 : Site Location Map
 Hooker Residence
 Noyesville, Vermont

THE JOHNSON COMPANY
 Environmental Sciences and Engineering
 MONTPELIER, VERMONT



SOURCES

VERMONT BASE MAP ORTHOPHOTO, "NOYESVILLE", SHEET NO. 172216, SERIES 5000, 1983.

NOTES

- 1) ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE. APPROXIMATE SCALE: 1" = 150'.
- 2) THIS PLAN MAY NOT REPRESENT ALL DRINKING WATER SOURCES IN MAP AREA. ONLY SOURCES SERVING THE WALDEN STORE, AND THE HOOKER RESIDENCE ARE SHOWN.

LEGEND

- ⊙ DRINKING WATER SUPPLY WELL

FIGURE 2 -- AREA MAP
HOOKER RESIDENCE
NOYESVILLE, VERMONT

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
MONTPELIER, VERMONT

1-0838-1\HOOKSITE

contamination to impact sensitive receptors in the area, and to plan for soil boring and groundwater monitoring well installations. The observations made during that initial site visit are contained in a letter dated October 1, 1993 to Lynda Wedderspoon, Site Manager, and a copy is included here as Attachment 2.

By letter dated October 18, 1993 to Maurice Hooker, the SMS requested additional investigations at the Hooker residence, the Walden Town Garage, and the Walden General Store. The results of those investigations are documented in the balance of this report.

3.0 SCOPE OF WORK

The tasks reported on here include the installation of 4 soil borings/groundwater monitoring wells at the Hooker property; locating and surveying the elevations of the monitoring wells installed on the Hooker property and those found on the Town Garage site; monitoring well development and groundwater sampling; preparation of a groundwater contour map using the wells on the Hooker property and near the Walden Town Garage; and sampling the drinking water supplies of the Hooker residence and the Walden General Store. Figure 3 shows monitoring well locations in addition to various other site features.

3.1 SOIL BORING AND GROUNDWATER MONITORING WELL CONSTRUCTION

On November 15, 1993, four soil borings were advanced on the Hooker property in the vicinity of the former UST location. Borings were made using hollow stem augers, and soil sampling was completed during the advancement of the boring with split-spoon samplers. Two-inch diameter Schedule 40 flush-coupled PVC monitoring wells were installed in each boring after encountering groundwater using 0.02 inch factory-slotted well screen installed to attempt to straddle the water table (at the time of well completion). An 8.4 foot screen was used on MW-1 because refusal was encountered at approximately twelve feet below grade: well construction requirements dictated the use of a shorter screen in order to allow for adequate depth for the bentonite seal. Screen sections ten (10) feet in length were used in the construction of wells MW-2, MW-3, and MW-4. Well recovery was substantial following installation and static levels are currently above the top of the well screens in all of the groundwater monitoring wells installed on the Hooker's property, except the most down-gradient well, MW-4. Drilling logs for all soil borings/groundwater monitoring well installations are presented as Attachment 3 and include well construction details and pertinent observations.

3.2 SOIL SAMPLING

Soil samples were obtained from split-spoon samplers at approximately 5 foot intervals during the advancement of each soil boring. Soil samples were assayed using a calibrated Photoionization Detector (PID) and field headspace techniques as specified under the August 3, 1992 AGENCY GUIDELINES FOR

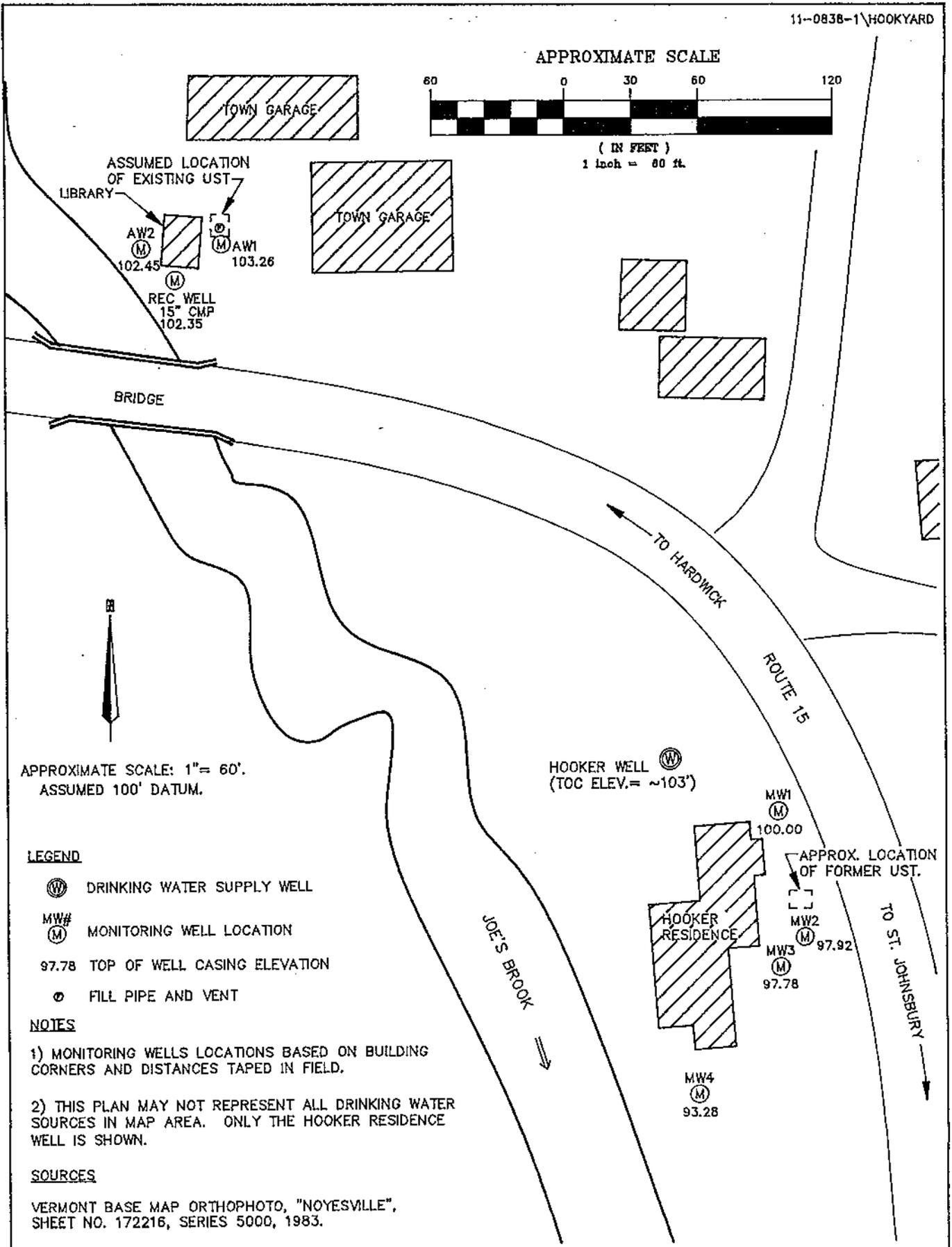


FIGURE 3 -- MONITORING WELL LOCATIONS
 HOOKER RESIDENCE
 NOYESVILLE, VERMONT

THE JOHNSON COMPANY, INC.
 Environmental Sciences and Engineering
 MONTPELIER, VERMONT

PETROLEUM CONTAMINATED SOIL CARBON MEDIA, Section II "Guidelines for sampling".

PID readings from soils obtained at MW-2 and MW-3 averaged over 120 parts per million (ppm) from a total of five soil samples assayed from these two locations. MW-4, the down gradient well, had a high of 7.6 ppm from a sample obtained from an interval corresponding to the surface of the water table. All significant PID readings are reported on the drilling logs included in Attachment 3.

3.3 GROUNDWATER AND DRINKING WATER SUPPLY SAMPLING

The sampling completed as part of these investigations was conducted on November 24, 1993. Each of the four wells at the Hooker residence, and three wells {two apparent monitoring wells (designated AW-1 and AW-2 for this report) and an apparent recovery well (corrugated metal pipe)} at the Town Garage were all sampled for analysis of volatile organic chemical content. The Hooker water supply and the water supply from the Walden General Store were also sampled under this scope of work.

All groundwater and drinking water samples were submitted to the Department of Environmental Conservation Laboratory for analysis by EPA Method 8240 for volatile organic chemicals in water. Copies of the laboratory reports are included in Attachment 4.

Table 1 summarizes all of the reported concentrations from the samples obtained and analyzed as part of these investigations, and includes the Vermont Groundwater Protection Rule and Strategy's Enforcement Standard and Preventative Action Limit for those parameters.

TABLE 1 - LABORATORY REPORTED COMPOUNDS AND ANALYTES IN GROUNDWATER MONITORING WELLS: DECEMBER 1993, NOYESVILLE - WALDEN, VERMONT				
Location	Parameter	Reported Concentration	Enforcement Standard	Preventative Action Limit
Hooker (Site #92-1314)				
MW-2	MTBE	11	N/A	N/A
	Ethylbenzene	8	680	340
	Xylenes	68	400	200
	TVH	3,030	N/A	N/A
MW-3	Chloroform	7	N/A	N/A
MW-4	TVH	903		
Town Garage (Site #88-0168)				
AW-1	Ethylbenzene	7	680	340
	TVH	16,800	N/A	N/A
AW-2	TVH	87,200	N/A	N/A
Recovery Well	TVH	6,230	N/A	N/A
Walden General Store (Site #88-0271)				
Water Supply	TVH	1,590	N/A	N/A
N/A - Not Applicable TVH - Total Volatile Hydrocarbons (ug/l unless otherwise indicated)				

None of the method analytes were detected in the trip blank, in the Hooker water supply, or in MW-1 on the Hooker property.

3.4 GROUNDWATER FLOW DIRECTION

The top of the monitoring well casings at the Hooker property and the Town Garage were surveyed by The Johnson Company personnel on November 23, 1993. The top of the casing of MW-1 on the Hooker property was assumed to have a relative elevation of 100.00 feet. The 4 monitoring wells on the Hooker property in addition to the 2 monitoring wells and the recovery well on Town Garage site were all monitored

to determine the depth to water. Using this information, contours of the groundwater surface were produced. Figure 4 shows the groundwater contours obtained at the Hooker property and at the Town Garage.

Although not used in developing the groundwater contours, the Hooker's drinking water supply well is approximately 265 feet deep, yields 25 to 30 gallons a minute, and encounters "ledge" at approximately 18 feet below the ground surface, according to the owner. This well is reported to be artesian, and springs are evident in the Hooker cellar (see Attachment 2).

4.0 CONCLUSIONS

The water supply for the Walden General Store contained a reported concentration of 1,590 parts per billion (ppb) of total volatile hydrocarbons (TVH), and has apparently been contaminated by petroleum product(s). The lack of detectable levels of other method analytes may indicate a weathered release or a contaminant source of heavier hydrocarbons.

PID results from soil samples obtained during the installation of soil borings and groundwater monitoring wells on the Hooker property indicate an area of soil contaminated above the Soil Guideline Concentrations as described in the Agency Guidelines for Petroleum Contaminated Soil and Carbon Media, Section III. A.1. However, the proximity of the water table to the ground surface limits the actual contaminated soil volume that is unsaturated and above the capillary fringe.

Reported concentrations of chloroform (7 ppb) in MW-3, and MTBE (11 ppb) in MW-2 cannot be immediately explained based on the results of these investigations. The results of the soil and groundwater analyses at MW-4 (the most down-gradient well on Hooker property) do not indicate the migration of contaminants from the area of the former USTs on the Hooker property at concentrations that are above the Groundwater Protection Rule and Strategy's Enforcement Standards, or the Soil Guideline Concentrations.

Groundwater flow directions on the Town Garage site and on the Hooker property do not indicate a connection between the two sites, nor a threat to any sensitive receptor other than Joe's Brook.

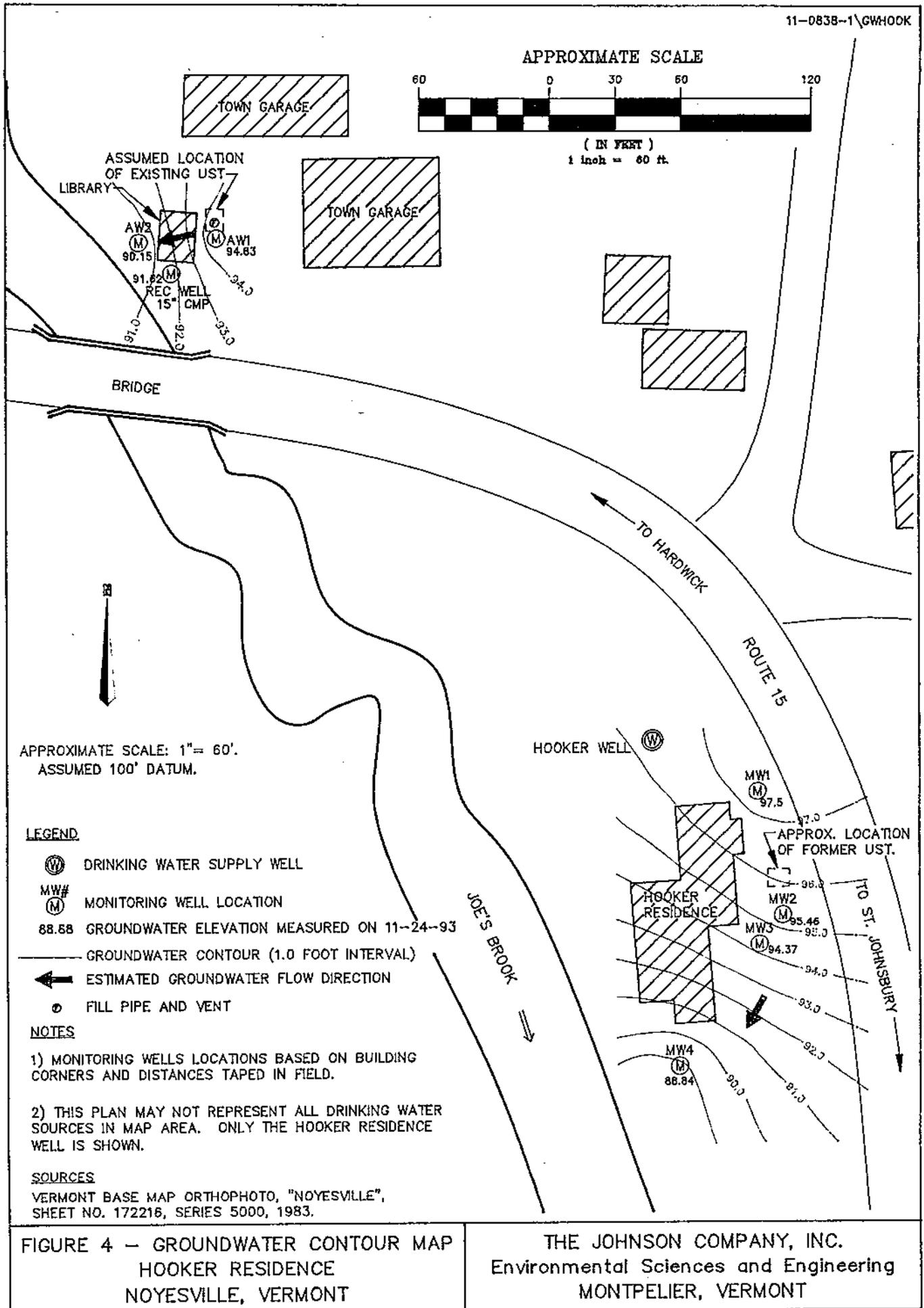


FIGURE 4 - GROUNDWATER CONTOUR MAP
 HOOKER RESIDENCE
 NOYESVILLE, VERMONT

THE JOHNSON COMPANY, INC.
 Environmental Sciences and Engineering
 MONTPELIER, VERMONT

There is no apparent connection between the Hooker property and the environmental conditions at the Walden General Store. There were no tanks or wells evident at the Walden General Store.

5.0 LIMITATIONS

The conclusions presented here are arrived at through consideration of the findings of this investigation as presented herein. Consideration was given to the information gathered during the initial site visit, the field screening results of environmental samples, the groundwater flow direction(s) determined, and through interpretation of laboratory analytical data. A diligent effort was made to identify areas of concern that may have been indicated from the conditions described above.

This investigation was based on sound scientific investigative techniques and experience with similar investigations. However, the conclusions of this investigation are limited by the sources of data, as stated above, and the conclusions and recommendations must be considered within this context. The status of the site may change, and additional information may become available in the future which will require modification or updating of the conclusions and recommendations presented here. If conditions are found to vary from those presented here, supplemental conclusions and recommendations may be warranted.

6.0 RECOMMENDATIONS

Based on the results and findings of the investigations reported herein, The Johnson Company recommends that:

- A. A further analysis of the contamination to the Walden General Store drinking water supply should be undertaken. The water supply may need to be remediated, replaced (temporarily or permanently) by bottled water, or relocated. Further investigations are warranted to delineate the degree, nature, extent and source(s) of the contamination on this site, and to ascertain if remediation of soils and/or groundwater is warranted.

- B. The nature and extent of contamination at the Town Garage warrants further investigation. Soil borings and soil sampling should be initiated to determine the degree and extent of petroleum contamination to subsurface soils above the capillary fringe, in order to ascertain if soil removal or in situ treatment is warranted. Additional groundwater samples should be

analyzed by EPA 8015, or other appropriate method(s) to determine the content of the "total volatile hydrocarbon" contamination.

- C. The groundwater on the Hooker property is contaminated by petroleum hydrocarbons at, and down gradient of, the former UST location. The Hooker drinking water supply well is reported to be artisan, and laboratory results do not indicate any contamination is present. A round of confirmation sampling and analysis by EPA Method 8240 is warranted. Groundwater flow direction should be determined under different groundwater flow regimes in order to ascertain potential risk due to seasonal fluctuations in groundwater levels and flow direction. Pending satisfactory results of a confirmation round of groundwater sampling and analyses, The Johnson Company recommends closure of the Hooker Residence (Site #93-1314).

ATTACHMENT 1

SMS Letter dated November 2, 1993

THE JOHNSON COMPANY, INC.

Environmental Sciences and Engineering

November 2, 1993

Lynda Wedderspoon, Site Manager
Hazardous Materials Management Division
Sites Management Section
103 South Main Street/West Building
Waterbury, Vermont 05671-0404

Re: Hooker Residence (Site #92-1314)
JCO # 1-0838-1 (042)

Dear Lynda:

The following work plan is designed to fulfill the requirements set forth in your letter of October 18, 1993 to Maurice Hooker regarding Site #92-1314 and generally follows the format of the above referenced letter.

A. Proposed Scope of Work

Following is the proposed scope of work for the investigation to be conducted at the Hooker residence in Walden, VT.

1. *"Define the degree and extent of any contamination to the groundwater by installing a sufficient number of monitoring wells. These wells should be installed in locations which will accurately determine the extent of contamination resulting from the USTs which were removed from your property, as well as an upgradient well which will determine if contamination is migrating onto your property from offsite sources. Existing monitoring wells are present at the Walden Town Garage, and may be present at the Walden General Store. These wells should also be sampled during the sampling of the Hooker Residence wells in order to obtain complete groundwater data of the area. Samples should be analyzed by EPA Method 8240."*

We are proposing to install a total of 4 soil borings in the vicinity of the underground storage tank (UST) removal in order to better assess the degree and extent of contamination. We believe that 4 groundwater monitoring wells are necessary in order to assess the degree and extent of contamination to groundwater. The location of these 4 proposed soil borings/groundwater monitoring wells is shown on the attached site plan. We also plan to measure the static level in the Hooker's drinking water well in order to better characterize the magnitude of the upward gradient in the vicinity of the home. We recommend that we collect and submit samples of the Hookers drinking water as part of the sampling in the area.

We propose to screen the soils from the split spoon samplers taken in "downgradient" locations on as continuous a basis as possible, given field conditions. We believe that this is necessary in order to better distinguish between areas which may have soils contaminated by volatilization from a product plume on the water table, and those soils which have been directly contacted by free phase liquid.

This work plan assumes that each boring will be 15 feet deep, for a total of 60 feet of soil boring and monitoring well installation. Prior to the initiation of soil boring, a site specific Health and Safety Plan (HASP) will be prepared which complies with the requirements of 29 CFR 1910.120 for intrusive activities on recognized hazardous sites.

Dig Safe will be contacted at least 48 hours prior to the commencement of soil boring. We will work with the Hookers and the Town of Walden with regard to any additional subsurface structures and utilities in the immediate vicinity of the soil borings.

All groundwater monitoring wells will be installed using 2" PVC schedule 80 riser pipe and screen. The length of the well screen for each installation will be determined in the field following assessment of geological conditions at the site. A sand pack will be installed from below the bottom of each screen to minimum 1 foot above the top of the screen. A 6-12 inch thick bentonite plug will be installed above the sand pack, and native backfill will be placed above the plug. If the well is deep enough to accommodate it, a second bentonite plug will be installed above native backfill and below the cement plug. A locking cap and a roadbox will be installed at each well. All cuttings resulting from the well installation will remain on-site if possible.

Samples of soils collected from these split spoons will be sealed in plastic bags and allowed to equilibrate at room temperature for approximately 5 minutes. A calibrated PID will then be used to assess the headspace within the plastic bag, and the reading will be recorded in the field notes for the project.

All groundwater samples collected will be submitted to the State Laboratory in Waterbury to be analyzed using EPA Method 8240. We will contact the laboratory once the drilling has been scheduled in order to obtain the appropriate number of sample containers. Each monitoring well location will be surveyed and the elevation of the top of the casing of each well will be determined in order to allow the preparation of a groundwater contour map.

2. *"Determine the need for a long term treatment and/or monitoring plan at this site. The need for such a plan should be based on results of the above investigations."*

This task will be addressed upon receipt of the sample results and included in our report on these investigations under recommendations.

3. *"Submit to the SMS a summary report outlining work performed as well as providing conclusions and recommendations. Included should be detailed well logs, analytical data, site map, area map, and groundwater contour map."*

A summary report will be prepared following the conduct of the above-described investigations, for submission to the SMS. The Johnson Company routinely prepares reports of investigations and site characterizations.

These reports typically include the following sections:

- Executive Summary
- Table of Contents
- Introduction
- Methodology and Accomplishments of Investigation
- Results, Conclusions and Interpretation
- Remediation or Additional Investigation Recommendations
- Tables of Chemical and Physical Data Including Water Levels
- Figures; Including Graphs, Maps, Water Elevations, Potentiometric Surfaces and Contamination, etc.
- Appendices of Field Data, Soil Boring and Monitoring Well Logs and Completion Data, and Calculations

A site map will be prepared for this report that includes: a contour map of relative water elevations, site buildings and relevant features, potential contaminant source(s), and as accurate a delineation of the contaminant plume as possible.

B. Project Schedule

The development of the health and safety plan and field investigation (items 1 and 2) are projected to be completed within 3 weeks of the approval of this work plan by the SMS. The final report and recommendations (item 3) will be completed by The Johnson Company within approximately 1 week of receipt of the laboratory analytical results.

C. Estimated Total Probable Cost

The cost of this investigation will be billed to the Hookers on a time-and-materials basis. The total Estimated Probable Cost of the investigation as detailed above is \$5830. The Johnson Company will provide all necessary work descriptions, direction and scheduling to the drilling subcontractor, and will review their invoices for accuracy.

The costs presented in this proposal do not include disposal of contaminated soil, water, or petroleum product. An itemized breakdown of these costs is as follows:

Johnson Company	\$3,712
Drilling Subcontractor	\$1,950
Total Probable Cost	\$5,662

Lynda Wedderspoon
Hazardous Materials Management Division
Waterbury, VT

November 2, 1993
Page 4

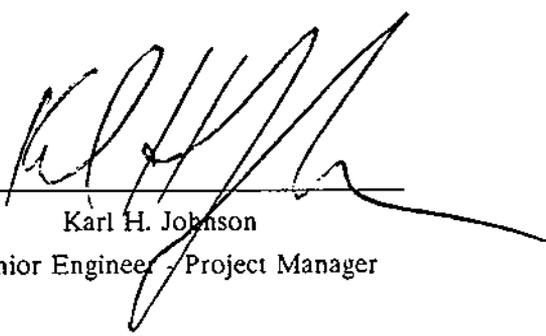
We would be glad to include the wells on adjacent site(s) in our sampling and groundwater monitoring efforts. If you would like us to involve these wells in our work, please contact us with the particulars.

Please call with any questions that arise. Thank you.

Sincerely Yours,

THE JOHNSON COMPANY, INC.

By: _____

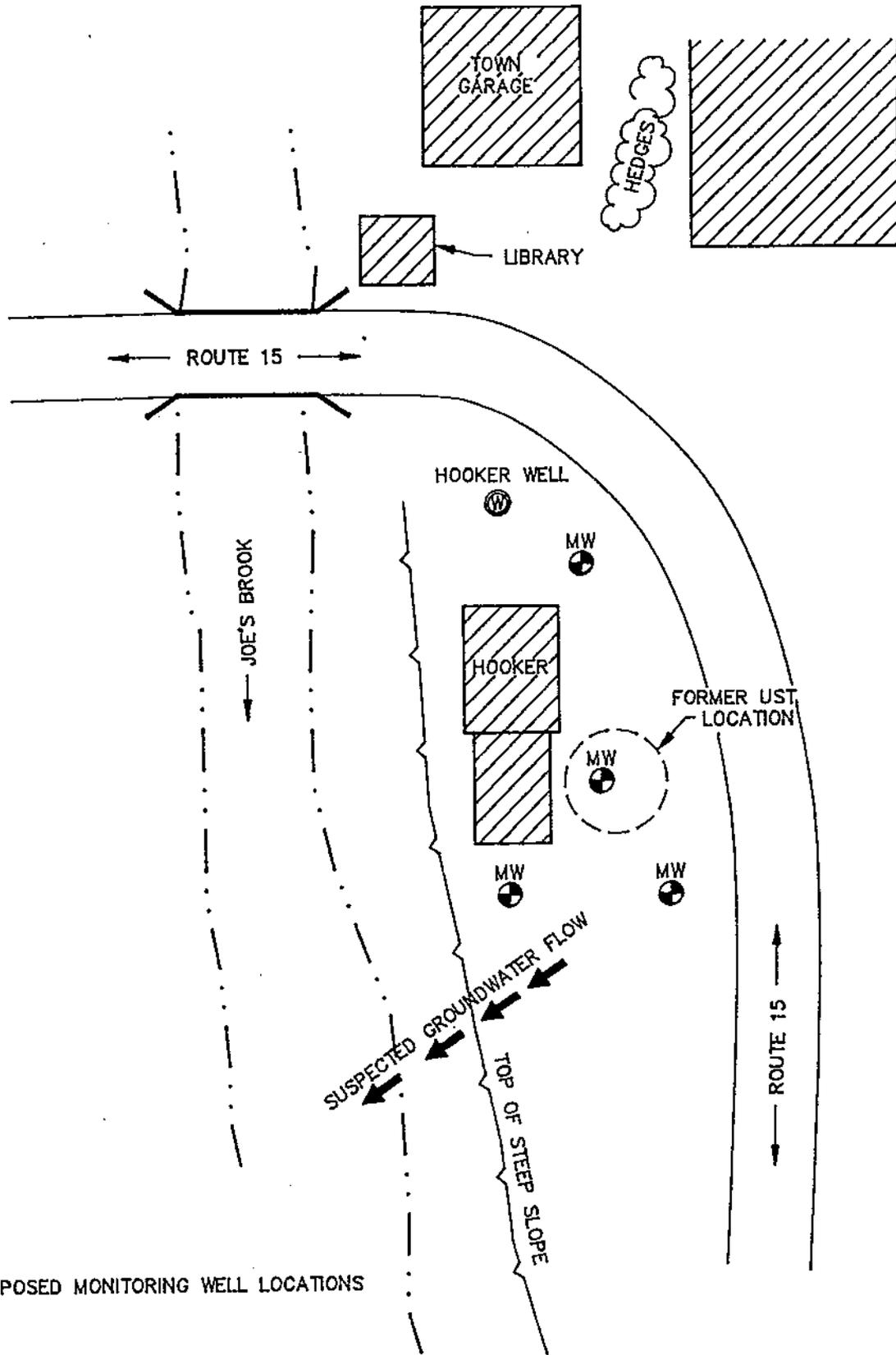

Karl H. Johnson

Senior Engineer - Project Manager

cc: Maurice, Katherine, & Roger Hooker
Joseph McEntyre, Esq.

Reviewed by: TMF

I:\PROJECTS\1-0838-1\WCRKPLAN.DOC November 1, 1993 13:43pm hch/khj



LEGEND

MW  PROPOSED MONITORING WELL LOCATIONS

NOTE

ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT TO SCALE.

SITE SKETCH - PROPOSED MONITORING WELLS
HOOKER RESIDENCE
WALDEN, VERMONT

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
MONTPELIER, VERMONT

ATTACHMENT 2

Letter to Lynda Wedderspoon dated October 1, 1993

THE JOHNSON COMPANY, INC.

Environmental Sciences and Engineering

October 1, 1993

Ms Lynda Wedderspoon, Site Manager
Hazardous Materials Management Division
103 South Main Street
Waterbury, Vermont 05671-0404

Re: Hooker Residence
JCO# 1-0838-1

Dear Linda:

This letter documents the observations made during our visit to the Hooker residence in Walden, Vermont on April 26, 1993 to investigate potential impact(s) from the former USTs at this site, which we have previously discussed by telephone several times. A number of photographs were taken during our visit, and copies of these are included with this letter.

The Hooker residence is located adjacent to Route 15 in Walden, Vermont. Route 15 turns 90° from north-south to east-west directly in front of the Hooker's house. There is a stream immediately to the west of the Hooker's house (Joe's Brook) which drains Coles Pond southward to Joe's Pond in West Danville. There are several buildings directly across Route 15 to the east of the Hooker's house which now serve as homes, but which, according to the Hookers, at one time also served as "general stores" similar to their own property.

The Hookers believe that one or more underground storage tanks, (USTs) may exist, or may have existed, on these adjacent properties. Also, the Walden Public Library and Town Garage are immediately to the northwest and across Route 15 from the Hooker residence. There is apparently an underground storage tank in use at the Town Garage (located immediately adjacent to the Walden Public Library). The Hooker's reported that they have observed a sheen on the brook during the summer months, and that there is even an absorbent boom which is placed in the stream (by parties unknown) in an effort to collect the petroleum. Due to spring runoff, the boom was not present in the stream during our site visit.

The Hookers report that their drinking water well (located immediately to the north of the house) is "artesian" and that the driller reported to the Hookers that "two well caps were installed" in order to contain the water pressure in the well casing and prevent it from overflowing. Upon inspection of the basement of the Hooker's residence, several seeps were observed entering the cellar along the walls on the north and northeast corner of the cellar. Maurice Hooker stated that a spring in the cellar of the house fed a bathtub which was used for the storage of bait fish during the time that there was a general store operating in the building, before the Hooker's purchased the property. The upward gradient of the groundwater in the vicinity of the Hooker's is evident from the artesian pressure on their drinking water well, and the springs entering the basement.

The underground storage tanks that were removed from the Hooker property apparently occupied a position to the south and east of the house foundation. There is no cellar underneath the portion of the building which is immediately adjacent to the former location of the underground storage tanks on the Hooker property (the portion of the building with steps leading to a red door in Plate 1, Attachment 1). The physical location of the former UST location relative to the Hooker basement seems to preclude the migration of petroleum contaminants into the cellar in either the air or the groundwater. Any potential impact to the air quality in the basement of the Hooker residence would be difficult to separate from the indigenous sources which were observed during our site visit (note heating oil fill pipes also shown in Plate 1).

Lynda Wedderspoon
Department of Environmental Conservation
Waterbury, Vermont

October 1, 1993
Page 2 of 2

Your letter to Joseph P. MacIntyre, Esq. of March 15, 1993 references a stock pile of petroleum-contaminated soil. None of the Hooker family were aware of any pile of soil from the tank excavation, and believed that the soil initially removed was subsequently returned to the excavation.

In summary, there is apparently no stock pile of petroleum contaminated soil, there is an upward gradient evident in the groundwater flow in the immediate vicinity of the Hooker residence, and the Hooker's cellar and drinking water well both appear to be up-gradient of the former USTs. No other drinking water supply well is apparently at risk from the site, as they are located both at some distance and in what would appear to be an up-gradient direction. Therefore, we conclude that a release from the former USTs at the Hooker residence would not pose a potential risk to the Hookers or any other drinking water well, based on the observations noted herein.

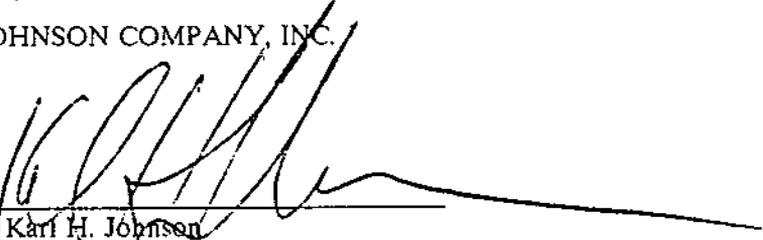
Additional sources of petroleum contamination in the immediately vicinity of the Hooker's may include the Town Garage and its associated underground storage tank(s) which apparently were compromised at some point as evidenced by the appearance of a sheen on the stream during certain seasons of the year, and potentially, one or more of the properties directly across Route 15 may have (or have had) underground storage tanks installations.

Please call with any comments or questions that arise.

Sincerely Yours,

THE JOHNSON COMPANY, INC.

By:


Karl H. Johnson

Senior Engineer - Project Manager

cc: Maurice, Katherine, & Roger K. Hooker
Joseph P. MacIntyre, Esq.

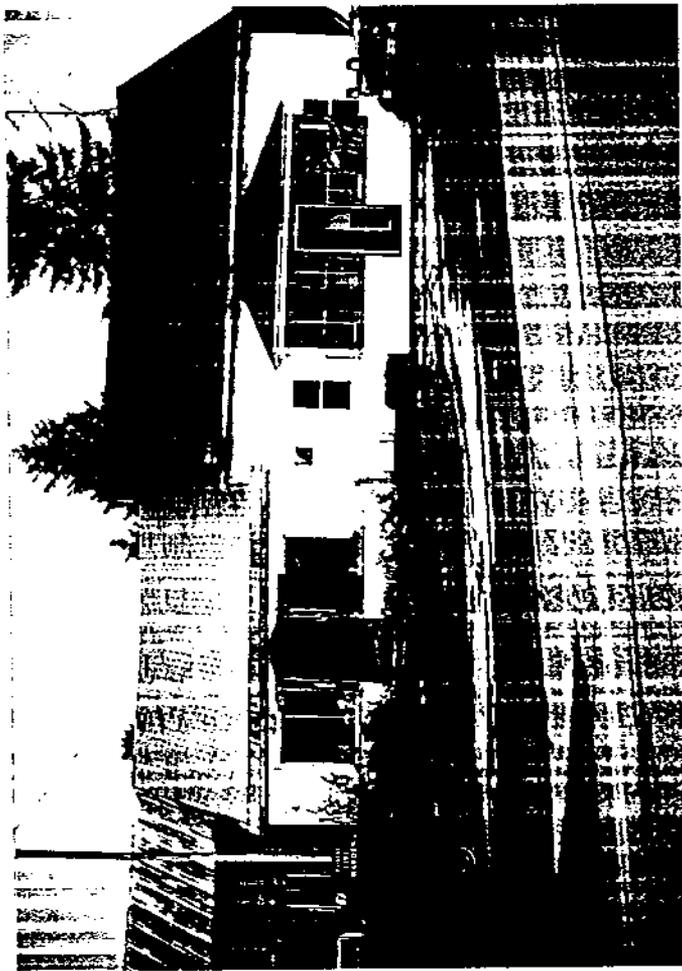
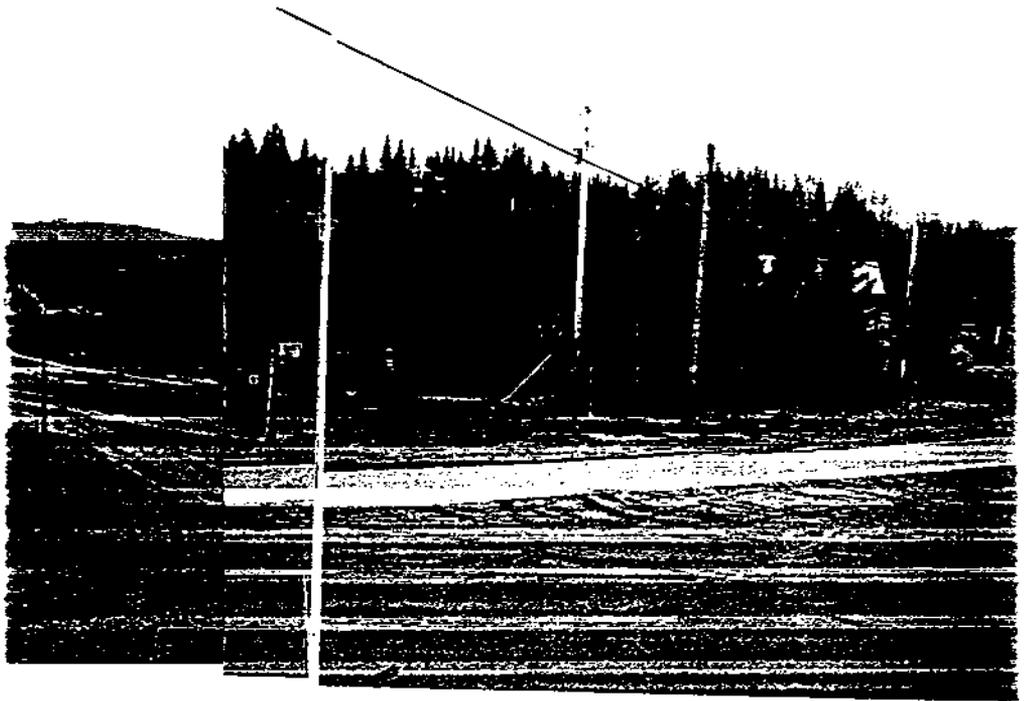


PLATE 1: This is the front of the Hooker residence and this photograph was taken from the east side of Route 15 looking west towards the east side of the house. Please note the bare ground surface (lack of asphalt paving) in the center of the photograph just to the right of the red door and light blue windows which indicates the former UST's location.



PL.

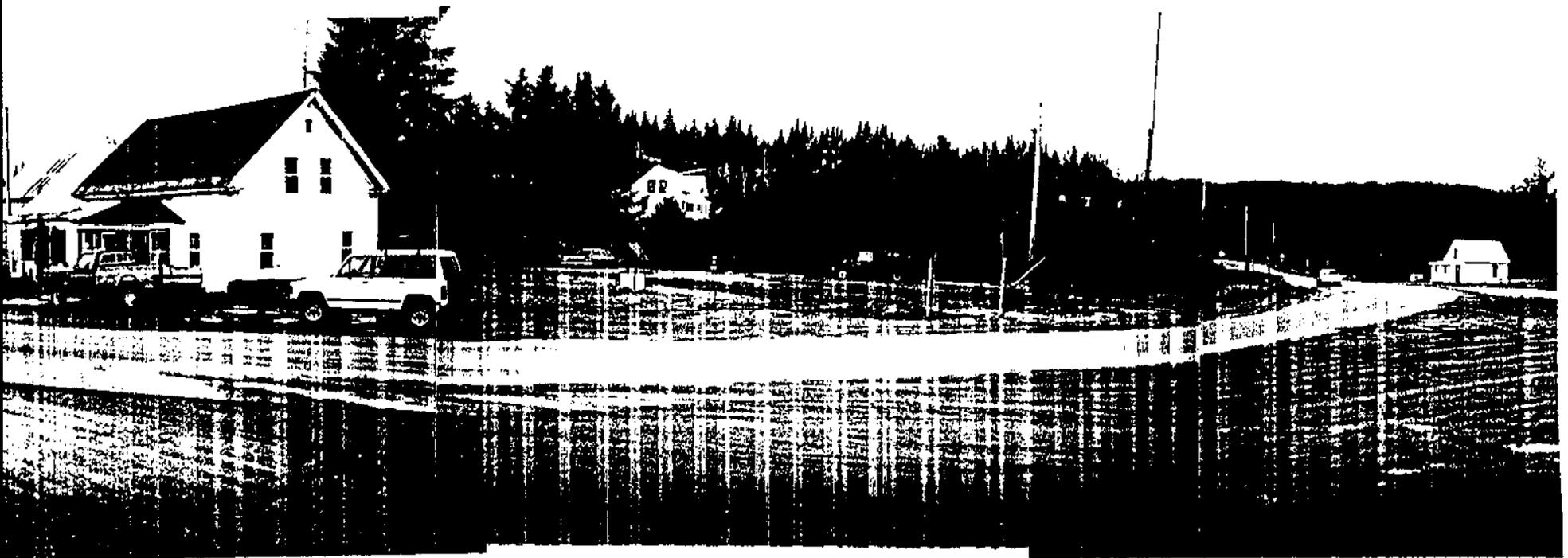


PLATE 2B: The Hooker's residence is evident in the left-hand photograph, the Hooker's well is located in the center photograph and the Town of Walden Public Library is in the center of the right-hand photograph with the roof of the Town Garage just visible to the right of the library through the trees. Note the bridge over Joe's Brook immediately to the left of the Public Library.

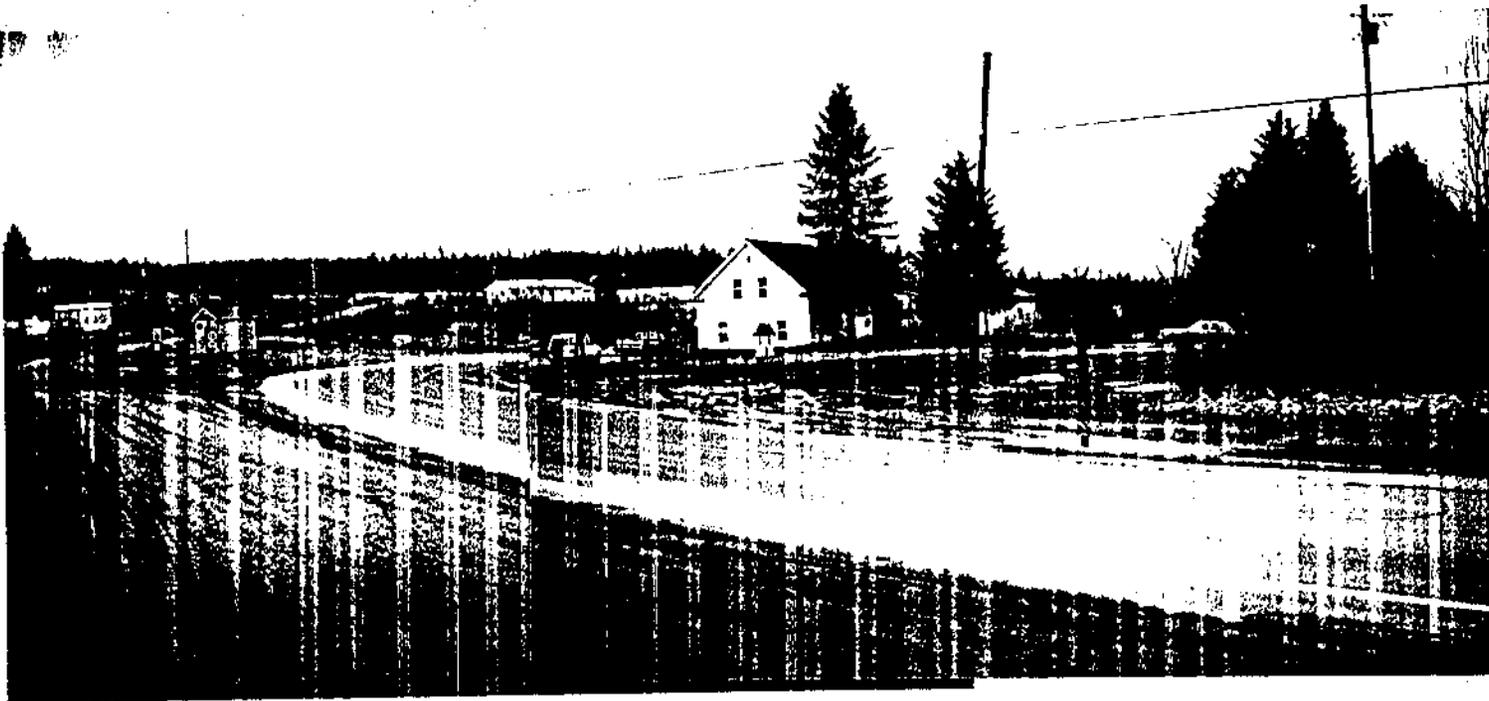


PLATE 3 This photograph was taken from the north side of Route 15 just before the road turns 90° to the south. This photograph shows that there are no residences immediately across the street to the east of the Hooker's which would be potentially located cross gradient from the former UST location on the Hooker's property.



PLATE 4 The left-hand photograph in this plate is looking almost due west, and Joe's Brook is evident in the center of this photograph. The right-hand photograph in this plate looks almost due north. Note the "general store-type" structure on the opposite side of Route 15 from the Hooker's. This building is both east and north of the Hooker residence.



PLATE 5 This photograph was taken facing north on the north side of Route 15 immediately across the street from the Hooker property. The Town of Walden Public Library is evident in the center of the photograph, and Joe's Brook is evident on the lefthand side. The Town Garage is located on the righthand side of this photograph. Please note the white pipe, the metal drum, and the vent pipe (silhouetted in front of the Town Garage) just to the right of the Public Library.

ATTACHMENT 3

Drilling Logs

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
 WELL # MW-1

Project: Hooker Residence
 Location: Walden, Vermont
 Job # 1-0838-1
 Logged By: T. Fortier
 Date Drilled: 11/15/93
 Driller: Cushing & Sons
 Drill Method: HSA

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 3.3 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 8.4 ft.
 Slot Size: 20

Total Pipe: 11.7 ft.
 Stick Up: -0.3 ft.
 Total Hole Depth: 11.9 ft.
 Well Guard Length: 0.0 ft.
 Initial Water Level: 2.5 ft.
 Surface Elevation: -
 T.O.C. Elevation: -

■ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1	Backfill			1.6 ppm	14,9,5,4 0.5 - 1.2 dk gray silty sand, damp, friable. 1.2 - 1.4 light gray crushed stone and sand.
2	Bentonite				1.4 - 1.6 dk gray silty sand, damp friable, few stones. 1.6 - 2.0 orange/brown medium sand many pebbles, moist, friable.
3					
4					
5				1.6 ppm	2,3,2,3 0.65 ft recovery 5.85 - 6.25 maroon/brn topsoil, spongy organic material, wet, friable.
6					6.25 - 6.5 medium sand, many pebbles, damp, friable.
7	Sand Pack				
8					
9	Screen				
10					
11					
12					8,16,15,20 1.1 ft recovery 10.4 - 10.65 brn, pebbly gravelly sand, some organic material, saturated, friable. 10.65 - 11.05 med. gray silt, wet, friable. 11.05 - 11.5 brn silty sand, some stones and pebbles, wet, friable.
13					
14					
15					
16					
17					

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-2

Project: Hooker Residence
 Location: Walden, VT
 Job # 1-0838-1
 Logged By: T. Fortier
 Date Drilled: 11/15/93
 Driller: Cushing & Sons
 Drill Method: HSA

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 3.1 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 10.0 ft.
 Slot Size: 20

Total Pipe: 13.1 ft.
 Stick Up: -0.4 ft.
 Total Hole Depth: 13.5 ft.
 Well Guard Length: 0.0 ft.
 Initial Water Level: 2.5 ft.
 Surface Elevation:
 T.O.C. Elevation:

■ = Sampled Interval

Sheet 0 of 0

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1	Backfill			47.5 ppm	14,9,7,7 1.2 ft recovery 0.8 - 1.55
2	Bentonite				brn gravelly sand, moist, friable.
3					1.55 - 2.0 gray silty fine sand, damp, friable.
4					
5				276 ppm	4,3,3,3 0.75 ft recovery 5.75 - 6
6					gravelly sand, 6 - 6.5 gray silty fine sand, few pebbles, streaks of black, petroleum odor.
7					
8	Sand Pack				
9					
10	Screen			11.2 ppm	3,13,17,21 gray med to fine sand, some silt, some pebbles, saturated, friable.
11					
12					
13					
14					
15					
16					
17					

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-3

Project: Haaker Residence
 Location: Walden, Vermont
 Job # 1-0838-1
 Logged By: T. Fortier
 Date Drilled: 11/15/93
 Driller: Cushing & Sons
 Drill Method: HSA

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 4.7 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 10.0 ft.
 Slot Size: 20

Total Pipe: 14.1 ft.
 Stick Up: -0.4 ft.
 Total Hole Depth: 15.1 ft.
 Well Guard Length: 0.0 ft.
 Initial Water Level: 3.4 ft.
 Surface Elevation:
 T.O.C. Elevation:

█ = Sampled Interval

Sheet 0 of 0

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1	Backfill			1.2 ppm	12,8,9,7 0.65 ft recovery brn gravelly sand, moist to damp, friable.
2					
3					
4	Bentonite				
5				22.5	3,4,6,6 0.75 ft recovery 5.75 - 6.1 black, silty sand. 6.1 - 6.5 gray silty sand with black streaks, wet, friable.
6					
7					
8					
9					
10	Sand Pack			452 ppm	5,15,20,24 2" recovery silty fine sand, some pebbles, saturated, friable.
11	Screen				
12					
13					
14					
15				9.2 ppm	14,30 0.85 ft recovery 14.7 - 15.2 brn fine sand, saturated, friable. 15.2 - 15.5 med gray pebbly sand, some silt, saturated, friable.
16					
17					

The Johnson Company, Inc.
 Environmental Sciences and Engineering
 5 State Street
 Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-4

Project: Hooker Residence
 Location: Walden, Vermont
 Job # 1-0838-1
 Logged By: T. Fortier
 Date Drilled: 11/15/93
 Driller: Cushing & Sons
 Drill Method: HSA

Casing Type: PVC
 Casing Diameter: 2.0 in.
 Casing Length: 2.4 ft.
 Screen Type: Factory slotted
 Screen Diameter: 2.0 in.
 Screen Length: 10.0 ft.
 Slot Size: 20

Total Pipe: 12.4 ft.
 Stick Up: -0.5 ft.
 Total Hole Depth: 12.9 ft.
 Well Guard Length: 0.0 ft.
 Initial Water Level: 4.4 ft.
 Surface Elevation: -
 T.O.C. Elevation: -

█ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1	Backfill			1.6 ppm	3,2,3,5 0.65 ft recovery 1.35 - 1.5 brn topsoil, damp, friable. 1.5 - 2 gravelly sand.
2	Bentonite				
3					
4		▽			
5				7.6 ppm	17,25,23,26 gravelly sand, few stones, moist to damp, friable.
6					
7					
8	Sand Pack				
9	Screen				
10				1.2 ppm	11,5,43,53 0.75 ft recovery 10.75 - 11.3 brn, gravelly sand, damp, friable. 11.3 - 11.5 brn silty fine sand.
11					
12					
13					
14					
15					
16					
17					

ATTACHMENT 4
Laboratory Reports

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6085 Report To: Tammy Fortier
Location: Hooker Water Supply

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes:

Date Analyzed: 12/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.		0	Y	92
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.		2	Y	100
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.		2	Y	96
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.		0	Y	104
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.		0	Y	106
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

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

1,2-Dichloroethane-D4 114% D8-Toluene 96% 4-Bromofluorobenzene . 96%

Notes: Capillary column used with EPA approval.

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

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6087 Report To: Tammy Fortier
Location: Hooker AW-1

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes: *A well*

Date Analyzed: 12/08/93 Over hold? No Dilution factor: 10

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Vinyl chloride	100	N.D.				
Chloromethane	100	N.D.				
Bromomethane	100	N.D.				
Chloroethane	100	N.D.				
Trichlorofluoromethane	100	N.D.				
Acetone	1000	N.D.				
1,1-Dichloroethene	50	N.D.				
Carbon disulfide	1000	N.D.				
Methylene chloride	50	N.D.				
Methyl-t-butylether (MTBE)	100	N.D.				
1,2-Dichloroethene	50	N.D.				
1,1-Dichloroethane	50	N.D.				
Vinyl acetate	500	N.D.				
2-Butanone	1000	N.D.				
Chloroform	50	N.D.				
1,1,1-Trichloroethane	50	N.D.				
Carbon tetrachloride	50	N.D.				
Benzene	50	N.D.				
1,2-Dichloroethane	50	N.D.				
Trichloroethene	50	N.D.				
1,2-Dichloropropane	50	N.D.				
Bromodichloromethane	50	N.D.				
4-Methyl-2-pentanone	500	N.D.				
cis-1,2-Dichloropropene	50	N.D.				
Toluene	50	N.D.				
trans-1,3-Dichloropropene	50	N.D.				
1,1,2-Trichloroethane	50	N.D.				
2-Hexanone	500	N.D.				
Tetrachloroethene	50	N.D.				
Dibromochloromethane	50	N.D.				
Chlorobenzene	50	N.D.				
Ethylbenzene	50	N.D.				
Xylenes	50	N.D.				
Styrene	50	N.D.				
Bromoform	50	N.D.				
1,1,2,2-Tetrachloroethane	50	N.D.				
Total Volatile Hydrocarbons	1000	87200	E			

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

1,2-Dichloroethane-D4 108% D8-Toluene 98% 4-Bromofluorobenzene . 100%

Notes: Capillary column used with EPA approval. Sample contains C3 and C4 alkyl benzenes and naphthalenes.

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

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6088 Report To: Tammy Fortier
Location: Hooker AW-2

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes:

-Date Analyzed: 12/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	7				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	16800	E			

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

1,2-Dichloroethane-D4 102% D8-Toluene 100% 4-Bromofluorobenzene . 104%

Notes: Capillary column used with EPA approval. Sample contained C3 and C4 alkyl benzenes and naphthalenes.

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

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6086 Report To: Tammy Fortier
Location: Hooker Town Raw Water

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes:

*R.W. "RAW"
↓ Recovery Well.*

Date Analyzed: 12/08/93 ~~Over hold?~~ No Dilution factor: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	6230	E			

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

1,2-Dichloroethane-D4 116% D8-Toluene 92% 4-Bromofluorobenzene . 96%

Notes: Capillary column used with EPA approval. Sample contains C4 alkyl benzenes and naphthalenes.

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

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6089 Report To: Tammy Fortier
Location: Hooker General Store

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes:

Date Analyzed: 12/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	1590	E			

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

1,2-Dichloroethane-D4 98% D8-Toluene 104% 4-Bromofluorobenzene . 100%

Notes: Capillary column used with EPA approval. Sample contains traces of C3 and C4 alkyl benzenes and naphthalenes.

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

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6081 Report To: Tammy Fortier
Location: Hooker MW#1

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes:

Date Analyzed: 12/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l PQL	Result	Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

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

1,2-Dichloroethane-D4 116% D8-Toluene 94% 4-Bromofluorobenzene . 96%

Notes: Capillary column used with EPA approval.

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

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6082 Report To: Tammy Fortier
Location: Hooker MW#2

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes:

Date Analyzed: 12/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	11	E			
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	8				
Xylenes	5	68				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	3030	E			

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

1,2-Dichloroethane-D4 118% D8-Toluene 92% 4-Bromofluorobenzene . 100%

Notes: Capillary column used with EPA approval.

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

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6083 Report To: Tammy Fortier
Location: Hooker MW#3

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes:

Date Analyzed: 12/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	7				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

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

1,2-Dichloroethane-D4 118% D8-Toluene 96% 4-Bromofluorobenzene . 96%

Notes: Capillary column used with EPA approval.

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

12/17/93

Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water

GJD

Lab Id: 6084 Report To: Tammy Fortier
Location: Hooker MW#4

Phone: 229-4600 Date Collected: 11/24/93
Program: 41 1314 Chain of Custody? No

Notes:

Date Analyzed: 12/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l		Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
	PQL	Result				
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	903	E			

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

1,2-Dichloroethane-D4 118% D8-Toluene 94% 4-Bromofluorobenzene . 96%

Notes: Capillary column used with EPA approval. Sample contains traces of C3 and C4 alkyl benzenes.

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