Field

# MODOCK ROAD SPRINGS
# SITE INVESTIGATION
# PROJECT WORK PLAN

**Prepared By:**

Frank Sowers
Environmental Engineer 1
New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 8
6274 East-Avon Lima Road
Avon, NY 14414

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## 1.0 SUMMARY OF PROBLEM

- Groundwater contamination with chlorinated compounds extends over one mile (full extent unknown; see Figure A-1 and Figure A-2 in Appendix A), from the discharge point at Modock Road Springs southeast through a rural/residential area in the Town of Victor, Ontario County.
- Total chlorinated compound concentrations range up to 500 ppb; contaminants are trichloroethene (TCE), 1,1,1-trichloroethane (TCA), and minor amounts of 1,1-dichloroethene (1,1-DCE; probable degradation product of TCA).
- Impacts include the former Village of Victor water supply, two private wells and a spring-fed wetland/stream.
- The source is unknown, no disposal areas are evident; landfills, gravel pits, and septic systems are possible sources.

## 2.0 SITE DESCRIPTION

Modock Road Springs are located in the Town of Victor (Ontario County) about two miles west of the Village of Victor. The springs served as part of the drinking water supply for the Village of Victor until 1990 when TCE, TCA, and 1,1-DCE contamination (from an unknown source) was discovered. Other impacts include two residential wells and the spring-fed wetland/stream which forms the headwaters of tributary 30 (class C(T)) of Irondequoit Creek. Maps of the site and surrounding area are provided in Appendix A.

Modock Road Springs are situated along the north slope of a large glacial moraine complex which was deposited over 10,000 years ago by meltwaters of a stagnating continental glacier. Nearby gravel pits expose thick sequences of stratified sands, gravels, and occasional clay layers which underlie the picturesque rolling hills of the area. The highly permeable soils of the moraine complex comprise groundwater recharge areas for regional aquifer systems. Changes in topography (e.g., base of hills) and stratigraphy (e.g., clay layers) can cause groundwater to daylight in places as springs and wetlands. Cool spring-fed streams, which debouch at Modock Road Springs and numerous other springs in the area, form the headwaters of Irondequoit Creek, a significant wild and stocked trout fishery.

Previous investigations (summarized in Appendix B and Appendix C) did not identify the source or full extent of the contamination. This EPA funded Site Investigation (SI) project will serve to further characterize the plume and potentially identify the source.

## 3.0 OBJECTIVES OF THE INVESTIGATION

The objectives of this SI project are:

- Further define the extent of contamination;
- Identify potential sources of contamination; and
- Determine if this site should be listed in the NYS Listing of Inactive Hazardous Waste Disposal Sites. If listed, determine the appropriate classification.

## 4.0 PROJECT ORGANIZATION AND BUDGETS

The work performed on this project will be completed by the following groups: NYSDEC, the consultant (identified in this work plan as the Work Assignment Contractor) and their subcontractors, the NYSDEC certified contract laboratory, and the surveyor. Other parties that will be involved include the property owners and the New York State Department of Health.

The NYSDEC Project Manager, Frank Sowers, has overall responsibility for coordinating activities with all of these groups and ensuring this work plan is properly implemented. The consultant, laboratory, and surveyor will each be contracted directly by NYSDEC. The division of work for each task is discussed in the following section and summarized in Appendix D. Budgets for each group are also presented in Appendix D.

## 5.0 SCOPE OF WORK

The primary focus of this SI project is to evaluate the subsurface and groundwater conditions in the vicinity of previous investigations in an effort to identify the source and extent of chlorinated solvent (TCE, TCA, 1,1-DCE) contamination impacting the Modock Road Springs. In addition, information collected during this SI project will be used to track trends in the groundwater conditions over time.

The overall SI project will include an electromagnetic induction survey, a passive soil vapor survey, specific subsurface soil and groundwater sampling elements as part of a groundwater monitoring well installation program and additional sample collection which may include existing groundwater monitoring wells and selected private wells.

### 5.1 Electromagnetic Induction Survey

A Geonics EM-31 survey will be performed to identify buried metallic objects in the vicinity of potential sources. The equipment is owned by NYSDEC and will be operated by NYSDEC personnel. The location of any objects identified will be recorded for future evaluation.

## 5.2 Passive Soil Vapor Survey

A passive soil vapor survey will be conducted in the vicinity of potential sources. The Work Assignment Contractor will subcontract a supplier to provide the sampling devices (modules) and perform the subsequent analyses. The modules will be analyzed for total halogenated hydrocarbon. Installation of up to 40 modules will be performed by NYSDEC personnel. The NYSDEC project manager will determine the location of the sample grid. Modules will be deployed to an average depth of two to three feet below grade. The minimum exposure time will be two weeks, but a longer exposure time may be required.

The soil vapor survey will be performed in phases. The first phase will be a pilot test in a potential source area. The goals of the pilot test will be to:

- determine the feasibility of an expanded passive soil vapor survey;
- establish the exposure time for future surveys; and
- obtain data to evaluate the potential source area.

Records will include the following for each module: the sampling location, module identification number, date and time of installation, and date and time of removal.

If an expanded survey is determined to be infeasible, the funds for this portion of the investigation may be used to install additional soil borings/monitoring wells.

## 5.3 Soil Borings and Monitoring Well Installation and Sampling

Previous experience at this site proved that direct-push (e.g., Geoprobe) borings are not feasible. Therefore, hollow-stem augering will be used for a minimum of four (4) soil borings, all of which may be completed with monitoring wells, in order to evaluate potential soil and groundwater contamination. Additional wells may be installed based on the results of the passive soil vapor survey pilot test. The locations of the wells will be determined by the NYSDEC representative based on the results of the EM-31 survey, the soil vapor survey, and historic monitoring data. Design and installation of the soil borings/monitoring wells will generally follow the *"Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells"* (Aller et al., 1989, EPA 600/4-89/034) and appropriate ASTM methods.

Prior to mobilization of a drill rig, an Underground Facility Protection Organization (UFPO) underground utility stakeout will be requested by the Work Assignment Contractor to document the position of public utilities prior to initiation of drilling.

### 5.3.1 Soil Borings

5.3.1.1 Decontamination Procedures

Prior to drilling, the drill rig, augers, rods, split spoons, screens and other pertinent equipment will be decontaminated using a high pressure spray. This cleaning procedure will also be used on drilling and sampling tools between each boring. These decontamination activities will be performed in a designated on-site area. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will not be permitted. The decontamination water/waste will be allowed to drain to the surrounding soils. Split spoons will be decontaminated between every sample using a brush and Alconox solution. The drill rig and associated equipment will be cleaned upon completion of the investigation prior to leaving the property.

5.3.1.2 Soil Sampling Procedures

The borings for the monitoring wells will be advanced with 4-1/4-inch I.D. hollow stem augers. The borings extend approximately 10 feet below the water table to a clay layer previously identified at the site (roughly 60-80 feet bgs). One deep boring will be cased into the clay layer and extended 10 feet below the clay in order to monitor deeper groundwater (may require larger HSA). At each boring, continuous split-spoon soil samples will be collected for the first 10 feet and every 5 feet thereafter following ASTM method D1586. The soil samples will be described and logged following ASTM method D2488. At the discretion of the NYSDEC Project Manager, one soil sample from the saturated zone at each well location may be sieve-tested following ASTM D2487. A qualified geologist will oversee and direct all drilling operations.

Each split spoon soil sample will be screened with a PID instrument for the presence of volatile organic vapors. After initial PID screening of the split-spoon samples upon opening, sub-samples will be placed in sealed containers (e.g., "Zip-Lock" bags) and screened with the PID. Soil samples will also be visually inspected for physical indications of contamination such as staining, oils, fill material, etc.

The drill cuttings will be placed on plastic sheeting. If evidence of contamination is observed (elevated PID readings, a detectable odor, or visual contamination) the drill cuttings and decontamination water will be contained and stored on-site in secured 55-gallon drums, pending receipt of analytical data for possible future disposal. If soil contamination is not found, the drill cuttings may be spread on the ground at the site. Procedures for managing drill cuttings need to be discussed with residential property owners before cuttings are spread onto their property. At the property owner's request, all of the drill cuttings will be placed into 55-gallon drums, pending receipt of analytical data for possible future disposal.

5.3.1.3 Soil Sampling and Analysis

Contingent upon elevated PID readings, visual evidence of contaminants and/or odors, soil samples from up to two of the split spoons for each boring may be submitted to an approved NYSDEC

contract laboratory for analysis. For each borehole, samples from the split spoon exhibiting the highest head space reading will be submitted for analysis to quantify maximum contaminant levels in soil. In addition, if elevated head space readings are encountered, a second (and possibly a third) set of samples may be collected below the zone of elevated readings in an attempt to delineate the extent of soil contamination.

Each split spoon selected for sampling will be analyzed for TCL volatile organics. The NYSDEC representative will be responsible for the coordination of all services relative to this NYSDEC contract laboratory (as applicable) during this SI project.

### 5.3.2 Monitoring Well Installation

The soil borings will be subsequently completed as two-inch I.D., schedule 40 PVC monitoring wells following ASTM method D5092. The well screens will be constructed of 10-ft. long, 0.020-inch slot, 2-inch I.D., schedule 40 PVC pipe. Sand packs will be designed to the aquifer interval of interest and will extend six inches below and 24 inches above the well screens. A layer of fine "choke" sand approximately six inches thick will be placed above the coarse sand pack. The sandpacks will be capped with bentonite seals and the remaining annulus will be grouted to surface. Each well will be completed with a locking protective casing or road box. The NYSDEC representative will determine if the wells should be flush mounted based on the well location.

#### 5.3.2.1 Well Development

Following installation, the newly-constructed monitoring wells will be developed. General water quality field parameters (i.e. turbidity, pH, specific conductance, and temperature) will be monitored for stabilization during development. Turbidity will be reduced to maximum extent practicable (50 NTUs maximum). The development water may be returned to the ground in the vicinity of the well.

Following development, the wells will be allowed to stabilize for a suitable time period (at least two weeks) prior to collecting groundwater samples.

#### 5.3.2.2 Groundwater Sampling Procedures

The static water level will be measured with reference to the surveyed location and recorded along with the time and date. Groundwater will then be purged from the installed monitoring point until the pH, specific conductivity, temperature, and turbidity of the extracted water have stabilized (as applicable) -or- a sufficient volume of groundwater has been flushed through the sampling tube (as applicable) at the discretion of the NYSDEC representative. All parameters measured during this process will be recorded along with the time, date, and volume of water extracted. (At a minimum, single measurement of the pH, specific conductivity, temperature, and turbidity of the extracted groundwater will be recorded just prior to actual sample collection along with the time, date, and volume of water extracted.) The purge water may be returned to the ground in the vicinity of the well.

Once the given parameters have stabilized -or- a sufficient volume of groundwater has been purged (at the discretion of the NYSDEC representative), a portion of the groundwater extracted subsequently will be collected for the applicable chemical analysis. Each new well will be sampled by using a new dedicated polyethylene bailer with dedicated nylon (or equivalent) cord.

5.3.2.3 Groundwater Sample Analysis

Up to four (4) monitoring well groundwater samples collected during this portion of the SI project may be submitted to an approved NYSDEC contract laboratory for analysis. Samples will be analyzed for TCL volatile organics. The NYSDEC representative will be responsible for the coordination of all services relative to this NYSDEC contract laboratory (as applicable) during this SI project.

## 5.4 Additional Sampling and Analysis

At the discretion of the NYSDEC project manager, additional samples may be collected. Additional samples may include re-sampling existing monitoring wells, sampling private wells, and sampling surface waters. Groundwater samples from private wells will be collected prior to any treatment systems. Up to 14 locations may be sampled for TCL volatile organics.

## 5.5 Groundwater Well Elevation Survey

Top of riser and ground surface elevations of the monitoring wells will be surveyed to allow for a determination of the predominant groundwater flow direction. The survey will also include a sufficient number of the existing wells to allow comparisons of groundwater levels.

## 5.6 Map Survey

This is an optional task for this SI project and is contingent upon availability of funds at the end of the project.

If performed, a map surveys will be completed at all areas investigated during this SI project and will result in a single map showing the relative location of all monitoring points (groundwater, surface water, recharge wells, etc.) and points of interest associated with this SI project. For the purpose of the SI project, completion of the map survey and generation of the site map do not require the services of a licensed surveyor. All points of interest will be plotted on a base map using field measurements.

## 5.7 Waste Management

The Work Assignment Contractor will be responsible for procuring and delivering drums upon NYSDEC request, and managing miscellaneous wastes generated during this project including

personal protective equipment and disposable sampling equipment.

## 6.0 Quality Assurance/Quality Control (QA/QC)

In addition to the field samples identified above, samples will be collected for QA/QC purposes. QA/QC samples may include trip blanks, matrix spikes and matrix spike duplicates. The contract laboratory will supply the necessary containers for QA/QC samples. The passive soil gas vendor will provide the necessary QA/QC modules. The contract laboratory and soil gas laboratory will also be responsible for following approved analytical QA/QC procedures.

## 7.0 Documentation and Reporting

Detailed documentation of site activities will be maintained during the field work. All data interpretations associated with this program (and its elements) will be conducted using NYSDEC equipment and staff.

### 7.1 Field Documentation

Documentation of the field activities will include the following:

- **Field Notebook-** Field personnel (DEC and contractors) will maintain a field notebook which will document dates, times, and duration of pertinent field occurrences.
- **Project Photographs-** NYSDEC personnel may take photographs of field activities.
- **Calibration Records-** Calibration records for field instrumentation will be maintained in a field notebook.
- **Geologic Logs-** Observations pertaining to site geology and hydrogeology made during subsurface drilling will be recorded in a field notebook. Construction logs of monitoring well installations will also be recorded.
- **Chain-of-Custody Forms-** Sample handling will be recorded on chain-of-custody forms with associated labels and custody seals.

### 7.2 Reporting

The Work Assignment Contractor shall deliver copies of all field documentation and subcontractor work products to the NYSDEC. The final report will be completed by NYSDEC personnel.

## 8.0 SCHEDULE

Field work should begin within 30-days of awarding the work assignment(s).

## 9.0 HEALTH AND SAFETY

A site specific Health and Safety plan will be prepared for this project. The Health and Safety plan will be followed by all DEC personnel on-site. Contractors and consultants (and their subcontractors) are expected to develop and adhere to their own Health and Safety Plan.

# APPENDIX A

## Site Location Maps


**Figure A-1. Site Location (Area Map)**

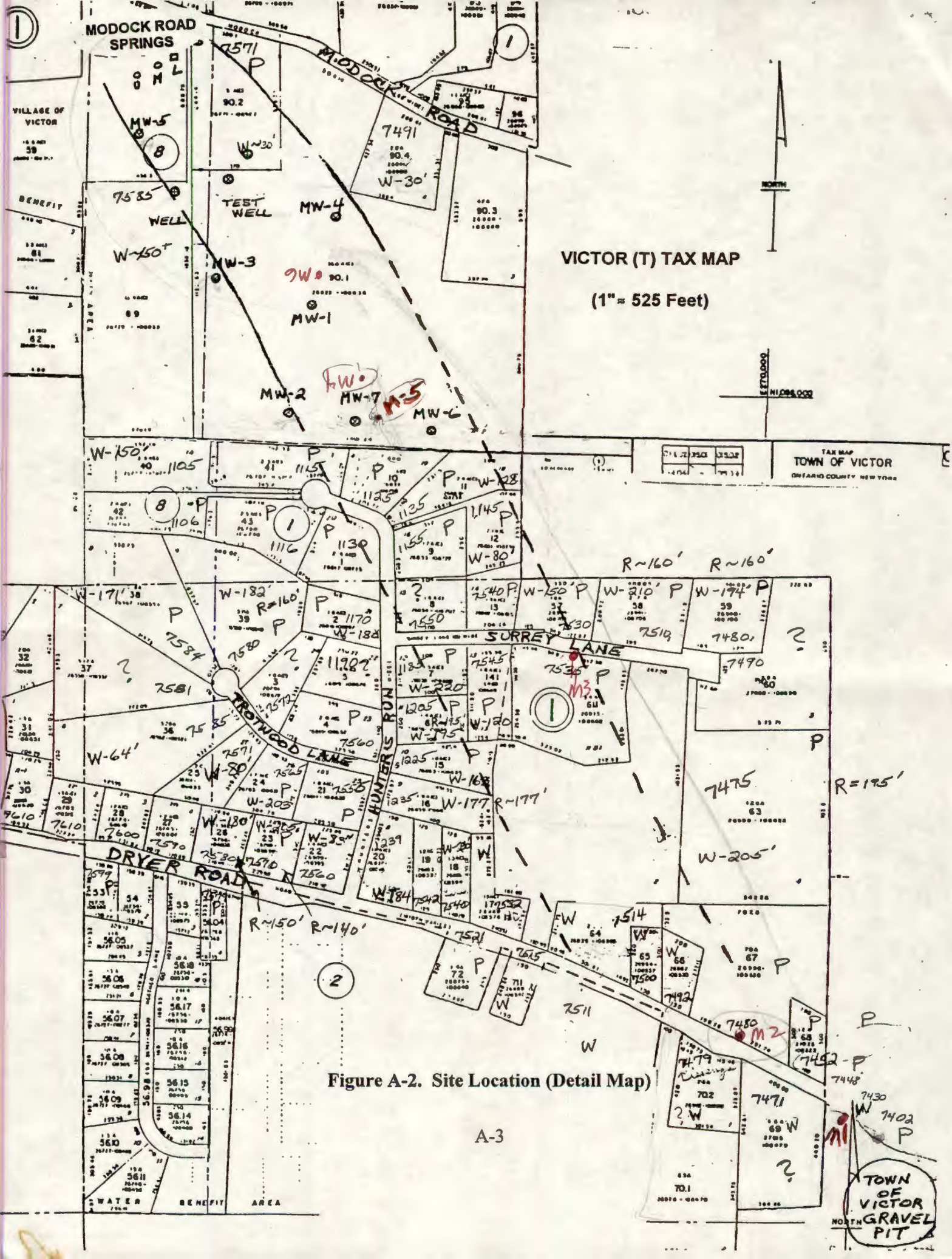


**Figure A-2. Site Location (Detail Map)**

# APPENDIX B

## Summary of Modock Road Springs Sampling Results

**Table B-1. Summary of Residential Well Analytical Results**

| Date | Address | TCE (ppb) | TCA (ppb) | DCE (ppb) |
|---|---|---|---|---|
| 05/03/90 | 7571 Modock Road | 59 | 160 | nd |
| 08/07/90 | 7571 Modock Road | 88 | 170 | nd |
| 04/02/92 | 7571 Modock Road | 70 | 125 | nd |
| 11/03/92 | 7585 Modock Road | nd | nd | nd |
| 11/03/92 | 7571 Modock Road | 250 | 130 | 9 |
| 09/14/93 | 7571 Modock Road | 130 | 99 | 12 |
| 06/08/94 | 7571 Modock Road | 89 | 57 | 13 |
| 04/10/95 | 7571 Modock Road | 140 | 120 | 23 |
| 08/25/95 | 7585 Modock Road | nd | nd | nd |
| 08/07/96 | 7430 Dryer Road | nd | nd | nd |
| 08/07/96 | 7514 Dryer Road | 5.9 | 18 | 1.4 |
| 08/07/96 | 7585 Modock Road | nd | nd | nd |
| 08/07/96 | 7570 Dryer Road | nd | nd | nd |
| 08/07/96 | 7491 Modock Road | nd | nd | nd |
| 08/07/96 | 7532 Dryer Road | nd | nd | nd |
| 08/07/96 | 7571 Modock Road | nd | nd | nd |
| 08/19/96 | 7511 Dryer Road | nd | nd | nd |
| 08/19/96 | 7514 Dryer Road | 6 | 18 | 1.5 |
| 08/19/96 | 7492 Dryer Road | nd | nd | nd |
| 08/19/96 | 7479 Dryer Road | nd | nd | nd |
| 08/19/96 | 7500 Dryer Road | nd | nd | nd |
| 04/24/97 | 1135 Hunter Run | nd | nd | nd |
| 04/24/97 | 7530 Surrey Lane | nd | nd | nd |
| 07/29/97 | 7514 Dryer Road | 9.9 | 11 | nd |
| 07/29/97 | 7571 Modock Road | nd | nd | nd |
| 07/29/97 | 7545 Surrey Lane | nd | nd | nd |
| 07/29/97 | 1135 Hunter Run | nd | nd | nd |
| 07/29/97 | 1145 Hunter Run | nd | nd | nd |
| 07/29/97 | 7530 Surrey Lane | nd | nd | nd |
| 07/29/97 | 7585 Modock Road | nd | nd | nd |
| 04/30/98 | 7514 Dryer Road | 6.9 | 6.9 | 0.5 |
| 04/30/98 | 7491 Modock Road | nd | nd | nd |

# MODOCK ROAD SPRINGS - SAMPLING RESULTS (1990-1998)

(All results in micrograms/liter = parts per billion)

| SAMPLING DATES & ANALYTE | SAMPLING LOCATIONS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Well #1 | Well #2 | Well #3 | Well #4 | Well #5 | Well #6 | Well #7 | T. test well | EASTERN SPRINGS | | | T. well 7571 Modock Rd. | STREAM (branch of trib. 30 of Irondequoit Creek - fed by eastern springs) | | |
| | | | | | | | | | Lower | Middle | Upper | | | | |
| **4/30/98** | | | | | | | | | | | | | | | |
| TCE | 200 | | | 180 | | 73 | 96 | | 160 | | | | | | |
| TCA | 110 | | | 74 | | 40 | 43 | | 80 | | | | | | |
| DCE | 12 | | | 7.4 | | 4.8 | 4.1 | | 9.3 | | | | | | |
| **7/29/97** | | | | | | | | | | | | | Culvert at Modock Rd. | Culvert @ Racoon Run | |
| TCE | 220 | | | 200 | | 42 | 38 | | 150 | | | | 35 | 14 | |
| TCA | 120 | | | 110 | | 69 | 42 | | 92 | | | | 19 | 7 | |
| DCE | 8.1 | | | 7.7 | | 4.9 | 2.8 | | 6.8 | | | | | | |
| **4/24/97** | | | | | | | | | | | | | Culvert at Modock Rd. | 1st Culvert @ Racoon Run | 2nd Culvert @ Racoon Run |
| TCE | 250 | | | 240 | | 24 | 34 | | 160 | | | | 32 | 13 | 4.7 |
| TCA | 130 | | | 140 | | 54 | 31 | | 93 | | | | 17 | 7.3 | 3.0 |
| DCE | | | | 5.6 | | 2.2 | 1.5 | | 3.7 | | | | 0.58 | | |
| **8/7/96** | | | | | | | | | | | | | Culvert at Modock Rd. | N of Modock Rd | 1st Culvert at Racoon Run |
| TCE | 320 | ND | ND | 200 | 38 | 24 | 59 | | 120 | | | | 50 | 37 | 20 |
| TCA | 180 | 2 | ND | 150 | 16 | 27 | 20 | | 81 | | | | 25 | 17 | 9 |
| DCE | 9 | ND | ND | 7 | ND | ND | ND | | 8.9 | | | | ND | ND | ND |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **8/25/95** | | | | | | | | | | | | | Culvert at Modock Rd. | at Lower Spring | South side of Rt. 251 |
| TCE | 210 | ND | ND | 160 | 21 | 26 | 93 | | | | | 200 | 47 | 110 | ND |
| TCA | 100 | 2.1 | ND | 6 | 12 | 26 | 29 | | | | | 110 | 25 | 64 | ND |
| DCE | ND | ND | ND | 5.1 | 0.5 | 1.4 | 1.2 | | | | | 5.5 | 1.1 | ND | ND |
| **8/11/95** | | | | | | | | | | | | | | | |
| TCE | 240 | ND | ND | 160 | 20 | 27 | 92 | | | | | | | | |
| TCA | 120 | 3 | ND | 110 | 17 | 28 | 32 | | | | | | | | |
| DCE | 7.2 | ND | ND | 6.9 | ND | 1.2 | 1.4 | | | | | | | | |
| **8/2/95** | | | | | | | | | | | | | | | |
| TCE | | | | | | | | 80 | 78 | 68 | 60 | | 32 | | |
| TCA | | | | | | | | 16 | 65 | 46 | 35 | | 21 | | |
| DCE | | | | | | | | 17 | 17 | 13 | 7.8 | | 3.8 | | |

| **Total VOCs (Sum of TCE + TCA + DCE)** | | | | | |
|---|---|---|---|---|---|
| **6/8/94** | 200 | | | 159 | |
| **9/14/93** | 172 | | | 311 | |
| **11/3/92** | 191 | | | 389 | |
| **4/2/92** | 110 | | | 195 | |
| **8/7/90** | 125 | | | 258 | |
| **5/3/90** | | | | 219 | |
| **4/16/90** | | | 50.4 | 152 | |

**Note: TCE** = Trichloroethene; **TCA** = 1,1,1-Trichloroethane; **DCE** = 1,1-Dichloroethene; **VOCs** = Volatile Organic Compounds; **ND** = Not Detected

# APPENDIX C

## Modock Road Springs - September 1996 Update

**MEMORANDUM**

**To:** M.J. Peachey
**From:** Jim Craft
**Date:** September 25, 1996

**Re:** **Modock Road Springs - Victor (T), Ontario (C)**
**VOC Investigation - Update**

**Summary**

Modock Road Springs, a former Village of Victor water supply, were shut down in 1990 due to VOC contamination. Recent investigation, utilizing both monitoring and residential wells, has tracked the VOC (predominantly trichloroethene and 1,1,1-trichloroethane with some 1,1-dichloroethene) contaminant plume over one mile southeast of the springs through the Hunter Run subdivision to a residential well on Dryer Road (see Figures 1 & 2). No source (waste disposal) areas are obvious in the rural/suburban area but possibilities include residential septic systems and active gravel pits located south of Dryer Road. Residential water supplies in the area utilize public water and private wells. Of over 50 residences within the potentially contaminated area, 32 are connected to public water. Of those homes on private wells, 12 were recently sampled by NYSDOH. One Dryer Road residence with an overburden well (~100 feet deep) showed impact @ 25 ppb total VOC. Available data indicate that overburden wells (typically <150 feet deep) are at greatest risk; bedrock wells (typically >200 feet deep) have not shown contamination.

Data Needs:

- additional sampling of key private wells
- elevation and water level survey of key private wells
- well/geologic information (driller records/well survey of residents/soil sampling)
- plume and source area delineation (soil gas survey/monitoring well installation/sampling)

To stretch scarce $$$ and provide greater flexibility, recommend that the region contract with a driller directly and use regional, Albany, and NYSDOH staff as much as possible.

**Background**

Modock Road Springs are situated along the north slope of a large glacial moraine complex which was formed over 10,000 years ago by meltwaters of a stagnating continental glacier. Nearby gravel pits expose thick sequences of stratified sands, gravels, and some clay which underlie the picturesque rolling hills of the area. Along Modock Road, topographic and stratigraphic changes cause groundwater to daylight in places as springs, wetlands, and nascent streams which form headwaters of tributary 30 (class C(T)) of Irondequoit Creek, a significant wild and

stocked trout fishery.

The Modock Road Springs consist of an eastern and western collection system of concrete vaults and piping which converge into a spring box and gravity-flow water main leading to the Village of Victor. The springs ceased to be utilized as a water supply after sampling in 1990 discovered VOC contamination, predominantly trichloroethene (TCE) and 1,1,1-trichloroethane (TCA), above standards in the eastern collection system. Changes in NYSDOH regulations, which required periodic sampling of smaller municipal water supplies, uncovered a number of similarly contaminated public-water supplies statewide.

Since 1990, NYSDOH and NYSDEC have provided technical assistance to the Town and Village of Victor in the form of periodic sampling and laboratory analyses of the springs and nearby residences and recommendations for further investigation. Initial investigation found contamination in a residential well at 7571 Modock Road, just east of the springs. The supply was treated with carbon until the Town of Victor extended public water to the residence. Town also used a portion of their EPA wellhead protection grant on engineering services which included a soil gas survey of an area upgradient of the springs but survey results were negative. The lack of additional funds, both local and state, and the availability of water from the Monroe County Water Authority constrained further investigation until 1995.

The region submitted a registry listing package for a "P" site in January 1993. It was not approved; **suggest that the package be updated (with this memo) and re-evaluated**. Whereas a source area must exist for a VOC plume of such duration and extent; it has not yet been located and hazardous waste disposal, while apparent, has not been documented.

**Recent Investigations**

In 1995, IIWA funding became available and a contract was let to Engineering-Science to conduct a groundwater investigation. After a Geoprobe rig failed to penetrate cobbly soil layers, a conventional driller installed seven "temporary" wells (six on private property and one on Village property) SE of the springs. Two sampling events of the well network and nearby locations were conducted in August 1995 (see Table 1). Michael Turner, son of the property owner, has indicated that he may subdivide and develop this property next Spring and some of the wells may have to be "decommissioned".

During 1996, additional work has included:

- elevation survey of the monitoring well network using regional staff;
- sampling of monitoring wells, main spring, surface water, sediment and some residential wells along Dryer Road (>one mile from springs) using BHSC, regional, and DOH staff;
- pilot soil gas survey using trial (free with contingence to buy more) GORESORBER® modules;
- search of Town files (the Town graciously provided tax maps, addresses, public water users, and 1986 residential well survey data); and
- review of existing groundwater studies such as, *Geohydrology of the Irondequoit Creek Basin near Rochester, New York:* USGS Water Resources Investigation Report #84-4259 (Yager et al., 1984) and *Ground Water Resources in the Town of Victor* (Young, 1987).

**Results/Interpretations**

- The elevation survey confirmed the NW groundwater flow direction indicated by the VOC plume. The USGS report (Yager et al.,1984) shows a northward groundwater flow direction and the Irondequoit Creek basin drainage divide which partially follows the crest of the glacial moraine south of Dryer Road. The

search for potential source area(s) and plume chasing is restricted to the area north of the basin groundwater divide. However, in this area, the surface water and groundwater drainage divides are not coincident and the divide breakpoints are not obvious. The high ground (>750 feet) just north of Dryer Road may constitute an intermediate divide or the actual basin groundwater divide. If a source area is located at a groundwater divide, it is possible for a plume to diverge in different directions. The large gravel pit (Syracusa Sand & Gravel, Inc.) to the south and the Town of Victor gravel pit to the southeast are possible source areas; however, these pits are in close proximity to or south of the mapped groundwater divide (if south of divide, then part of the Oswego River basin).

- Monitoring well results showed an apparent 30-40% increase of total VOCs in MW-1 (360→ 500 ppb), MW-4 (270→ 350 ppb), and MW-5 (37→ 54 ppb) over 1995 results. Conversely, MW-7 showed a 35% decrease (125→ 79 ppb) with fringe wells MW-2, 6, and 3 essentially unchanged. MW-7, 6 and 2 are the furthest existing upgradient monitoring wells (on Turner property @ north edge of Hunter's Run subdivision) but show lower levels than MW-1 and MW-4. Likewise, the impacted residence on Dryer Road over one mile from the springs showed a relatively low 25 ppb total VOCs.

- Residential well sampling occurred in August, focussing on a section of Dryer Road where the known plume axis, if extended southeast, would intercept it. On 8/7/96, 7 residential wells (5 on Dryer Road - 2 on Modock Road) were sampled by Dave Napier and me. One well (Shoots residence @7514 Dryer Road) was found to be contaminated @ 25 ppb total VOCs with 18 ppb of 1,1,1-TCA. On 8/19/96, Dave Napier resampled the Shoots well and four nearby wells; verbal results indicate only the Shoots well is contaminated and at levels comparable to the previous sampling.

- Surface water sampling of tributary 30, which receives the contaminated discharge of Modock Road Springs, have shown levels which diminish from double-digit ppb levels at the Modock Road culvert to non-detect on the south side of Rt. 251 (about 4000 feet north). However, double-digit ppb levels persist to at least the first culvert at Rabbit Run (subdivision access road NW of Modock Springs) as the small (<3 feet wide) stream winds past several residential properties. Human, domestic pet, and wildlife exposure is possible.
- The trial passive soil gas (GORESORBER®) survey had only one "hit"; whereas at least three hits were expected. The considerable depth to groundwater (>60 feet) and a diffuse plume may be limiting factors. However, given the residential neighborhood under which the plume appears to migrate, a limited additional soil gas survey may provide useful information to help optimize well locations with minimal disturbance and to assess the potential for vapor migration into basements.

**Preliminary Conclusions**

While the plume has not yet been adequately defined and a source area is not evident, the anomalous (slug-like; highest levels in mid-plume) concentration trends suggest the following possible hypotheses:

- sampling locations have not intercepted the core of the plume toward the source area;
- the source area/plume is diminishing with time (source area is nearly exhausted);
- the source area is located at the crest of a groundwater divide and the groundwater contamination diverges (e.g., the high ground just north of Dryer Road may be a groundwater divide); and/or
- multiple source areas.

The first hypothesis seems more likely, given:

- that the other hypotheses require a less likely, more haphazard set of circumstances;

- the typical persistence and mobility of aqueous and non-aqueous phase chlorinated VOCs;
- the incomplete monitoring network coupled with an apparently lengthy plume; and
- that variations in well screen location and in geology can cause variations in contaminant concentrations.

For example, residential well sampling data is subject to interpretative difficulties/uncertainties because well screen intervals vary from well to well and may only by chance intercept zones of maximum contamination. If a well screen happens to be located near the fringe, laterally or vertically, of a contaminant plume, sampling would likely not detect the highest contaminant concentrations and may be affected by the duration of pumping (household usage) prior to sampling.

Furthermore, boring logs from the monitoring wells show a clay-rich till layer about 10 feet below the water table. The extent and thickness of the till layer is presently unknown but, if extensive, it may impede downward migration of the contaminant plume. Whereas the existing monitoring wells screen the upper 10 feet of the water table, overburden residential wells reportedly vary from 30 feet to nearly 180 feet in depth; typical well casings/screens are set some depth below the water table to allow for storage and seasonal fluctuations. Therefore, the monitored zones vary as do the subsurface soils and their respective hydraulic properties. Additional subsurface information is sorely needed.

The small contaminated stream slowly loses VOCs through volatilization but double-digit ppb levels are present adjacent to at least three residential properties; exposure is possible.

The apparent ineffectiveness of the trial soil gas survey suggests a low potential for migration of significant concentrations of contaminant vapors into basements, at least in the area tested.

Additional investigation should help resolve these issues.

**Recommendations**

In view of the widespread and persistent VOC contamination that poses potential health risks to those exposed to contaminated groundwater and surface water, recommend that funding be made available and utilized in a cost-efficient manner (e.g., direct contracting). Tasks include:

- *helicopter/photo reconnaissance of the area* (completed in September - may return in October);
- *sample additional private wells and surface water* (will implement immediately with DOH);
- *survey casing elevations and water levels of key private wells* (can implement with regional staff within a month);
- *gather well/geologic information* (survey drillers and residents for data; will implement immediately);
- *re-evaluate Registry listing package* (Albany can implement immediately);

NEED CONTRACT $$$ FOR NEXT ITEMS, PLEASE HELP:

- *delineate plume and source area* (soil gas survey - 10 to 20 GORESORBER® or equivalent; monitoring well cluster installation - 8 to 10 wells up to 100 feet deep; and soil sampling at source area);
- *refine subsurface stratigraphy* (soil sampling during monitoring well installation); and

- *utilize digitized taxmaps, topo maps, and/or similar GIS format to plot site data* (an integrated hydrogeologic software package to display surface and subsurface information is on the wish list; imagine what a useful tool a region-wide hydrogeologic database in a GIS format would be - any ideas, suggestions, and/or software, particularly you Albany folks?).

c: D. Napier, NYSDOH R. Marino/T. Koch/W. Shaw, BHSC F. Ricotta

# APPENDIX D

**Distribution of Work And Budgets**

# Table D-1. Modock Road Springs: Division of Work

| TASK | ITEM | NYSDEC | Work Assignment Contractor |
|---|---|---|---|
| **Electromagnetic Induction Survey** | Electromagnetic Induction Survey | x | |
| **Passive Soil Vapor Survey** | Establish sub-contract with passive soil vapor vendor | | x |
| | Identify soil vapor sampling locations | x | |
| | Install/collect soil vapor modules in field | x | |
| | Sample analysis | | x (soil vapor vendor) |
| **Soil Boring and Monitoring Well Installation** | Drill Rig Procurement/Well Installation and Development | | x |
| | UFPO stakeout | | x |
| | Soil Sample Collection | x | |
| | Geologist Support/Soil Characterization | x | |
| | Completion of Monitoring Well Installation Logs | x (unless this is a standard service of the drilling company) | |
| | Sample Analysis | x (NYSDEC contract laboratory) | |
| | Drum Procurement and Delivery (if necessary) | | x |
| | Waste Disposal (if necessary) | | x |
| **Groundwater Elevation Survey** | Groundwater elevation survey | x | |
| **Map Survey (optional)** | Map preparation | x | |
| **Sampling New Wells** | Water Level Measurements | x | |
| | Sample Collection | x | |
| | Sampling Equipment Procurement | x | x (rental equipment if necessary) |
| | Sample Analysis | x | |
| **Additional Sampling** | Water Level Measurements | x | |
| | Sample Collection | x | |
| | Sampling Equipment Procurement | x | x (rental equipment if necessary) |
| | Sample Analysis | x (NYSDEC contract laboratory) | |

## Table D-2. Modock Road Springs: Cost Estimate Summary

| | |
|---|---|
| **Work Assignment Contractor (includes subcontracts for passive soil gas vendor, driller, and waste disposal)** | $45,230 |
| **Equipment** | $200 |
| **Analytical** | $4,570 |
| **Total** | **$50,000** |