

**SOIL GAS SURVEY  
Former CAMAROTA CLEANERS, INC.  
Mechanicville, New York**

**Prepared for:**

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## 1.0 INTRODUCTION

Specialized Environmental Monitoring (SEM-Wilton, New York) was retained by Adirondack Environmental Investigations, Inc., Cambridge, New York to perform a soil gas survey (SGS) to evaluate subsurface conditions on the property of Camarota Cleaners, Inc., Mechanicville, New York.

The purpose of this report is to document the activities that were performed during the soil gas survey and to identify and quantify the presence of compounds beneath the paved or soil surface of the property.

This survey was limited to ten volatile organic compounds (VOC's) comprising of chlorinated (alkenyl halide) compounds and petroleum-based compounds.

This soil gas survey was performed on July 16, 1991

## 2.0 SITE DESCRIPTION

Camarota Cleaners, Inc. is located on the south-east corner of Park Avenue and Second Street in the town of Mechanicville, Saratoga County, New York.

The property is situated in a relatively dense residential neighborhood a short distance (couple blocks) from the downtown business area.

A large two story house borders (within approximately 10 feet) the south end of the property and a second two story house borders (within 25 feet) the east side of the property.

## 3.0 PURPOSE

This soil gas survey was conducted to identify potential sub-surface soil contamination from past dry cleaning activities and/or underground fuel tank leakage.

The survey provides a grab sample screen of the shallow vadose (unsaturated) zone to be used as an indicator to determine the necessity for more intensive investigation.

#### 4.0 SITE PREPARATION

Eight sampling points were measured with a measuring tape and oriented to fixed lines and corners of the building.

Each point was marked by painting a circle on asphalt or the ground surface. These locations are shown on Figure 1

#### 5.0 METHODOLOGY

##### 5.1 Soil Gas Sampling

One sample location had to be pre-drilled with a drill hammer and auger to allow access beneath asphalt.

Sampling locations were then prepared by using a "slam bar" to drive a 5/8-inch solid steel rod to a maximum depth of four feet, removing it and inserting a 1/2-inch diameter hollow aluminum tube into the hole to maintain the opening in the shallow-vadose zone. Care was taken to ensure that the tube was not plugged or inserted into any high moisture laded material or groundwater. Following placement of the aluminum tube, surface soil and a bentonite slurry seal were packed into the annular space around the tube at the top of the probe hole to prevent potential infiltration of surface air during sampling.

Soil gas samples were collected with a 125 milliliter gas sampling bulb. The sampling bulb consists of a wide glass tube with Teflon stopcock valves at either end and a septa in the center of the glass wall to allow for sample withdrawal. The top of the aluminum tube in the probe hole was connected with dedicated 1/2-inch polyethylene tubing to one of the valves of the gas sampling bulb. The other bulb valve was connected with tubing to a laboratory bench vacuum pump. The vacuum pump withdrew soil gas up through the subsurface probe and glass bulb until approximately 2 liters (6 sampling train volumes) was purged from each probe hole. Soil gas was contained in the glass bulb by closing the valve nearest the pump first, then stopping the pump. The other valve was left open to the soil gas source for approximately 30 seconds to allow the system to come to equilibrium pressure. Following this, the second valve was closed and the sample was removed for analysis.

The dedicated polyethylene tubing was discarded and replaced for each new sampling location. All samples were performed within 30 minutes of collection. A needle was inserted through the septa of the sampling bulb and a sample was withdrawn using a 500 microliter syringe for injection into the gas chromatograph (GC).

## 5.2 Analytical Methodology

A Photo Vac 10S70 gas chromatograph, mobilized on-site by SEM, was equipped with a photoionization detector (PID) and an on board computer which was programmed to analyze samples for target volatile organic compounds (TCE) trichloroethylene, (Perc) tetrachloroethylene, benzene, toluene, ethyl benzene, and xylenes.

The Photo Vac GC analyses gaseous samples and is capable of generating quantitative data specific to each compound. After injection into the instrument, the gaseous sample passes through a chromatographic column prior to the PID. The various VOCs pass through this column at different rates and thus reach the detector at different times after injection. A strip-chart record of detector response versus time is obtained during each analysis and the presence of VOCs in the sample is manifested by peaks on this strip-chart record.

The portable GC measures two parameters for each peak observed during an analysis. First, the length of time is measured between the initial injection of the sample and the detection of the peak. This time is known as the retention time and each VOC has a characteristic retention time relative to those of other compounds. For example, the retention time of Perc is greater than that for toluene. Retention times allow the identification of VOCs in the sample. Second, the portable GC integrates the detector response to measure the area under the peak. The area is measured in millivolt seconds (mv-s) and is proportional to the concentration of the compound in the sample.

Prior to the start of field activities, the instrument was calibrated to recognize retention times and convert peak areas into concentrations for the target VOCs. Standards were prepared by injecting a measured volume of headspace over a pure compound into a one liter glass bulb that had been thoroughly flushed with organic free (ultra zero grade) air. The concentration of the standard was calculated using the ambient temperature, the vapor pressure of the compound at that temperature, the noble gas law and other related equations.

A library was programmed into the instrument by sequentially analyzing each standard. A syringe was used to withdraw 250 microliters (ul) of the headspace gas and inject the vapor into the instrument for analysis. A peak was detected for the standard and recognized, but not identified or quantitated by the instrument; the peak is simply recognized as having a certain retention time and peak area. The analyst enters both the identity and concentration of the standard and repeats this process for each of the remaining target VOCs. At the end of the initial calibration, the portable GC can identify and quantitate the peaks associated with the target VOC. Other peaks which are recognized during the analysis remain unidentified and a retention time and peak area are reported rather than a compound and concentration.

The retention time and detector response are influenced by other conditions such as the internal temperature of the instrument and the rate of gas flow through the column. Although regulated, some variations in these conditions occur and act to shift the retention times and response factors of the target VOCs. Thus continuing calibration must be routinely performed.

The continuing calibration is performed by injecting a standard, such as Perc, into the portable GC for analysis. Using a keyboard command, the analyst instructs the instrument to recalibrate the library. After the peak is detected, the analyst enters both the identity and concentration. The retention times and response factors for all of the target VOCs in the library are then linearly adjusted relative to that calibration standard.

At a minimum, a continuing calibration was performed during field work. However, since the field conditions tended to be warm in the morning hours and significantly warmer as the day progressed, the instrument was recalibrated throughout the day. The analyst monitored the retention time for the shifts (caused by the temperature fluctuations) in excess of approximately 5%. Retention time shifts of this magnitude or greater would result in the inability of the instrument to identify and quantitate peaks which were detected.

The PID is coupled to a 10.6 electron-volt ultraviolet lamp which is capable of ionizing all of the VOC target analytes during the survey. However, the detector's sensitivity for these compounds may vary. Sample analyses were conducted by injecting with a syringe, 250 ul aliquots of sample vapors into the GC; comparisons of sample instrument responses were made to that of calibration standards previously into the GC memory. Documenting the analysis, the GC prepared a strip-chart record detailing the concentration of recognized compounds and the raw instrument response of "unknown" compounds detected in the sample. In the event that sample results were above the linear range of the instrument calibration, a smaller aliquot was injected and the sample results were corrected for the "dilution factor".

## 6.0 QUALITY ASSURANCE/QUALITY CONTROL

A background, on-site air sample was collected and analyzed at the end of the days field activities. This sample consisted of ambient air collected into the glass sampling bulb which effectively served as a field blank. This background sample did indicate low levels of carry over contamination from previous samples. A syringe blank was also injected into the GC and this sample did not indicate any cross contamination potential.

Decontamination of the 5/8-inch steel rod was performed following the preparation of each sample location. The rod was rinsed with distilled water, washed with detergent, and final rinsed with distilled water. Each aluminum tube was cleaned prior to mobilization and was dedicated to only one soil sampling location; therefore, field decontamination was not required. The polyethylene tubing which connected the aluminum probe to the glass sampling bulb was dedicated and therefore discarded following each sample collection. In order to minimize potential carry-over or cross contamination, repeated flushing with purified air through the glass sampling bulb and syringes was conducted between samples.

## 7.0 ANALYTICAL RESULTS

Examination of the raw data (i.e., sample chromatograms) reveals that high concentrations of tetrachloroethylene (perc) was detected in the soil gas sample taken directly behind the cleaner facility (over 82 parts per million; ppm). This sample location (sample # 5) is most likely the source of the contamination problem as there are two other locations that indicate lesser concentrations of perc over 3 ppm; (sample # 2 with 3.8ppm and sample # 4 with 3.3ppm). All other sample locations revealed the presence of perc at levels lower than 1ppm.

Sample # 1 collected in front of the facility beneath the lawn, indicated the presence of petroleum-based compounds in the range of 40 to 478 parts per billion (ppb). These levels are not significant in trying to determine potential leaks from the underground fuel tank in the vicinity of sample # 6 which does not show any level of petroleum contamination.

The main compound evaluated during analysis is an organic solvent by nature and its presence would be anthropogenic (i.e., introduced by human activities). In general, the site exhibits evidence of subsurface contamination (i.e., concentrations above background or normal) with selected areas indicating higher levels of contamination.

Soil gas screening cannot identify the specific vertical location of the source of contamination, especially in the absence of any other subsurface hydrogeologic information (i.e., depth to water, soil type, depth to rock). It does, however, provide a useful indication of the horizontal extent of contamination. Any given concentration of soil gas can be from a "highly" contaminated source at a "greater" depth, or a less contaminated source at a shallower depth. The soil gas may be derived from contaminated soil, or from product dissolved in, or floating on top of, groundwater- or both.

The elevated levels of soil gas measured at the Camarota Cleaners facility suggest that relevant regulatory levels for soil and/or groundwater may be exceeded. While it is very likely that these levels are present, it is not known what they are for soil or groundwater, nor whether they pose an overall risk to the environment.

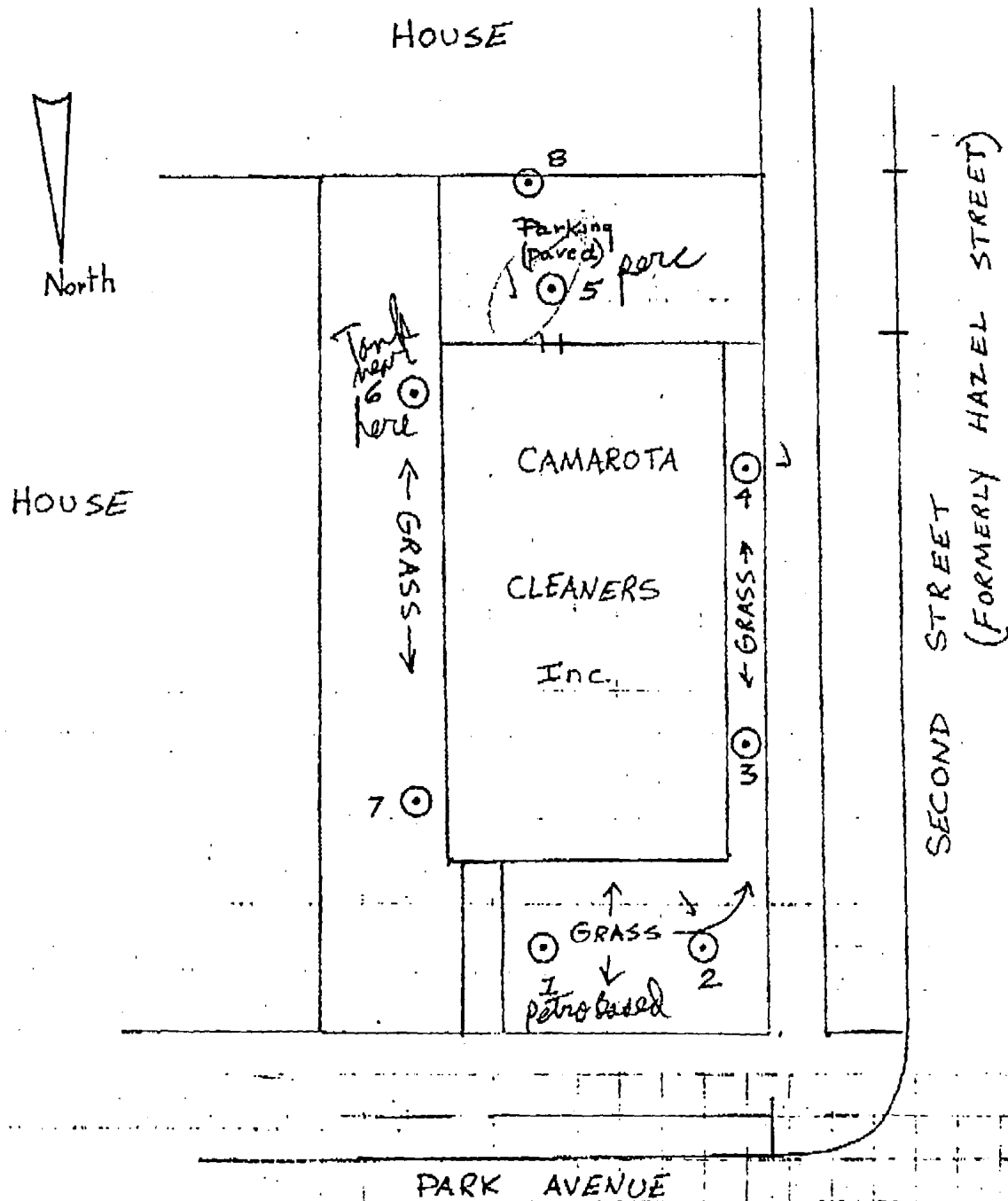




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Figure 1



⊙ Soil Gas Sampling Locations