# SOIL VAPOR INTRUSION STUDY

# FIELD SAMPLING PLAN

# WORK ASSIGNMENT D004444-10

**SCM CORTLANDVILLE OU#3 SITE**
**TOWN OF CORTLANDVILLE (T)**

**SITE NO. 7-12-006**
**CORTLAND COUNTY, NY**

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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Denise Sheehan, Commissioner

DIVISION OF ENVIRONMENTAL REMEDIATION

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**February 2006**

**FIELD SAMPLING PLAN**
**FOR THE**
**SOIL VAPOR INTRUSION STUDY**

**SCM CORTLANDVILLE OU#3**
**SITE #7-12-006**
**TOWN OF CORTLANDVILLE, NEW YORK**

**Prepared For**

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
**DIVISION OF ENVIRONMENTAL REMEDIATION**
**REMEDIAL BUREAU**
**WORK ASSIGNMENT D004440-10**

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## 1.0 INTRODUCTION

This Field Sampling Plan (FSP) is designed to provide detailed, step-by-step procedures for the field activities outlined in the *Project Management Work Plan/ Budget Estimate* (PMWP) for the Soil Vapor Intrusion Study at the SCM Cortlandville OU#3 Site (Site #7-12-006) in the Town of Cortlandville, Cortland County, New York (Figure 1). It will serve as the field procedures manual to be strictly followed by all URS personnel. Adherence to these procedures will ensure the quality and defensibility of the data collected in the field. In addition to the field procedures outlined in this document, all personnel performing field activities must do so in compliance with: (1) the Quality Assurance/Quality Control measures found in the Quality Assurance/Quality Control Plan; (2) the appropriate Health and Safety guidelines found in the Health and Safety Plan; and (3) the scope of work and schedule, outlined in the Project Management Work Plan.

### 1.1 Site Background

#### 1.1.1 Site History

The SCM Cortlandville OU#3 Site is located at 839 Route 13 South in the Town of Cortlandville, Cortland County, New York (Figure 1). The site was formerly occupied by Smith Corona Company and was used to manufacture typewriters. The site is currently is used for commercial and retail activities.

Previous investigations at the site indicate that the soils and groundwater at the site have been impacted by trichloroethylene (TCE) and associated degradation products. The soil and groundwater contamination is the result of leaking underground storage tanks (USTs) and disposal practices at the site. A plume of impacted groundwater (i.e., approximately 35 feet deep) extends from the site boundary to approximately 1.5 miles down gradient (northeast).

### 1.1.2 Remedial History

A Remedial Investigation and Feasibility Study was performed at the site and a Record of Decision (ROD) was issued in March 1994. The ROD included the operation of a previously installed pump and treat system and soil vapor extraction (SVE) system as the preferred remedial alternatives. The SVE system was deactivated as of December 2004 and the pump and treat system is currently operating.

### 1.1.3 Site Geology

The site is located on a glacial aquifer system consisting of thick outwash deposit that extends from the Valley Heads moraine which is located southwest of the site, northeast throughout the City of Cortland and into the Tioughnioga River valley. In the vicinity of the site, an unconfined sand and gravel aquifer 80 to 110 feet thick is found and is underlain by a lacustrine and glacial till unit 30 to 70 feet thick. The lacustrine and glacial till unit is underlain by a confined sand and gravel aquifer up to 80 feet thick. The two aquifers are connected in some places along the valley walls where the confining layer is absent.

The water table of the surficial aquifer is seasonally variable (up to 10 feet) and is approximately 35 feet below ground surface (bgs) at the site during the high recharge period (Spring) and 45 feet bgs at the site during the low recharge period (Fall). The depth to the water table becomes shallower down gradient northeast of the site and reflects the lower surface elevation of the ground surface.

## 2.0 MOBILIZATION

### 2.1 Staging

A mobile, temporary decontamination pad will be constructed on the site at a location approved by a New York State Department of Environmental Conservation (NYSDEC) representative. The decontamination area will be large enough to store cleaned equipment and materials prior to use. Drums of decontamination fluids and investigation-derived wastes will be stored on pallets covered with plastic sheeting near the decontamination area. A bulk 1,500-gallon high-density polyethylene (HDPE) tank may also be used to store decontamination and well development water.

### 2.2 Utility Clearance

Proposed soil vapor points, Geoprobe groundwater screening points and monitoring well locations will be identified and marked with paint or flagging prior to installation. Utilities in areas designated for intrusive activities will be cleared through the Underground Facilities Protective Organization (UFPO) 1-800-962-7962. All private utilities and agencies must be contacted separately.

Vehicle access routes to drilling and boring locations shall be determined and cleared by the URS field representative prior to any field activities.

## 3.0 SUBSURFACE INVESTIGATION

### 3.1 General Drilling Program

The subsurface investigation program will provide information that will assist in determining the extent of impacted soil vapor and groundwater. As part of the subsurface program, one hundred soil vapor conduits will be installed to collect soil vapor samples and fourteen groundwater monitoring wells are proposed to assess and evaluate the extent of the groundwater contamination plume. Proposed investigation locations are shown in Figures 2 and 3.

A list of applicable investigation and monitoring well installation procedures, and the appropriate section where they are discussed, follows:

- hollow-stem auger drilling procedures (Section 3.2);
- split-spoon sampling procedures (Section 3.3);
- mud-rotary drilling procedures (Section 3.4);
- monitoring well construction procedures (Section 3.5);
- monitoring well development procedures (Section 3.6);
- soil vapor conduit installation procedures (Section 3.7);
- soil vapor conduit sampling procedures (Section 3.8);
- disposal of drill cuttings (Section 3.9);
- documentation (Section 3.10).

## 3.2 Hollow-Stem Auger Drilling Procedures

Summary: A standard method of subsurface drilling which enables the recovery of representative subsurface samples for identification and laboratory testing. A total of fourteen soil borings will be advanced and fourteen monitoring wells installed during the drilling program (Figure 2). The final location of each well will be determined by the NYSDEC based upon the groundwater sample results generated as part of the Geoprobe groundwater sampling program described in Section 4.1. Eleven of the monitoring wells (shallow) will be screened across the top of the water table, which can vary seasonally from 30 to 40 feet bgs at the site, becoming shallower to the northeast. At three of the shallow well locations, a deep well will be installed to the top of the confining unit, which is approximately 115 feet bgs at the site, becoming shallower to the northeast.

The shallow well borings will be advanced to approximately 12 to 13 feet below the water table. The deep well borings will be advanced to approximately 1 foot below the top of the confining layer to create a sump.

Procedure:

1) Hollow stem augers (HSAs), drill rods, and the drill rig will be thoroughly decontaminated prior to advancing boreholes and between each borehole at the centralized decontamination area. All decontamination liquids will be collected and placed in a 1,500 gallon HDPE storage tank.

2) The drill rig will be inspected for oil leaks and any leaks reported prior to starting drilling operations.

3) Advance the boring by rotating and advancing the 4¼-inch I.D. HSAs to the desired depth. The borings will be advanced incrementally to permit continuous or intermittent subsurface soil sampling, as required.

4) Remove center plug from the HSAs and collect a split-spoon sample per the method stipulated by the project geologist or hydrogeologist. Sampling methods are presented in Section 3.3.

Reference: American Society for Testing and Materials (ASTM) Standard Practice for Soil Investigation and Sampling by Auger Borings D1452-80, and Standard Method for Penetration Test and Split Barrel Sampling of Soils D1586-84.

### 3.3 Split-Spoon Sampling Procedures

Summary: Split-spoon sampling is a standard method of soil sampling to obtain representative samples for identification and laboratory testing as well as to serve as a measure of resistance of soil to sampler penetration. Split-spoon samples will be collected continuously to the top of the water table and at 5-foot intervals thereafter. At shallow well locations paired with deep wells, the split-spoon samples will be collected from the deep well location and the deep well will be drilled and sampled first.

Procedure:

1) Measure the sampling equipment lengths to ensure that they conform to specifications. Confirm the weight of the hammer (140 pounds.).

2) Clean out the HSAs to the bottom depth prior to sampling. Select additional components as required (i.e., leaf spring core retainer for clays or a sand trap for non-cohesive sands).

3) Lower the decontaminated two-inch outside diameter (O.D.) split-spoon to the bottom of the HSAs and check the depth against length of the rods and the split-spoon.

4) Attach the drive head and hammer to the drill rods without the weight of the hammer resting on the rods.

5) Lower the weight and allow the split-spoon to settle up to 6 inches below the bottom of the HSAs. If it settles more, consider use of another type of sampler.

6) Mark four 6-inch intervals on the drill rods relative to a drive reference point on the rig. With the split-spoon resting on the bottom of the hole, drive the split-spoon with the 140-

pound hammer falling freely over its 30-inch fall until 24 inches have been penetrated or 100 blows applied.

7) Record the number of blows required to drive the split-spoon 6 inches into the overburden. Determine the "N" value by adding the blows for the 6-to 12-inch and 12-to 18-inch interval of each sample attempt.

8) After penetration is complete, remove the split spoon.

9) Open the split spoon to determine the percent recovery, and describe the soil.

10) Split the sample lengthwise and screen the soil with a photoionization detector (PID) for volatile organic vapors.

11) Document all properties and sample locations in the field notebook, and later on the Boring Log form (Appendix A).

Reference: ASTM Standard Method for Penetration Test and Split Barrel Sampling of Soils D1586-84, and Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) D2488-90.

### 3.3.1 Unified Soil Classification System

Soils are classified for engineering purposes according to the Unified Soil Classification System (USCS) adopted by the U.S. Army Corps of Engineers and U.S. Department of the Interior Bureau of Reclamation. Soil properties which form the basis for the USCS are:

- Percentage of gravel, sand, and fines;
- Shape of the grain-size distribution curve; and
- Plasticity and compressibility characteristics.

According to this system, all soils are divided into three major groups: coarse-grained; fine-grained; and highly-organic (peaty). The boundary between coarse-grained and fine-grained soils is taken to be the 200-mesh sieve (0.074 mm). In the field the distinction is based on whether the individual particles can be seen with the unaided eye. If more than 50% of the soil by weight is judged to consist of grains that can be distinguished separately, the soil is considered to be coarse-grained.

The coarse-grained soils are divided into gravelly (G) or sandy (S) soils, depending on whether more or less than 50% of the visible grains are larger than the No. 4 sieve (3/16 inch). They are each divided further into four groups:

W: Well graded; fairly clean (<5% finer than 0.074 mm)

P: Poorly graded (gap-graded); fairly clean (<5% finer than 0.074mm)

C: Clayey (>12% finer than 0.074mm); plastic (clayey) fines. Fine fraction above the A- line with plasticity index above 7.

M: Silty (>12% finer than 0.074 mm); nonplastic or silty fines. Fine fraction below the A- line and plasticity index below 4.

The soils are represented by symbols such as GW or SP. Borderline materials are represented by a double symbol, as GW-GC.

The fine-grained soils are divided into three groups: inorganic silts (M), inorganic clays (C), and organic silts and clays (O). The soils are further divided into those having liquid limits lower than 50% (L), or higher than 50% (H).

The distinction between the inorganic clays (C), the inorganic silts (M), and organic soils (O) is made on the basis of a modified plasticity chart. Soils CH and CL are represented by points above the A-line, whereas soils OH, OL, and MH correspond to positions below the A-line. Soils ML, except for a few clayey fine sands, are also represented by points below the A-line. The organic soils O are distinguished from the inorganic soils M and C by their characteristic odor and dark color.

Reference: ASTM Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System) D2487-92.

### 3.3.2 Visual Identification

Soil samples collected as borings are advanced will be visually identified. Soil properties required to define the USCS classification of a soil and other observed characteristics normally identified in describing a soil are defined below:

a. Color
b. Moisture conditions
c. Grain size
    (1) Estimated maximum grain size
    (2) Estimated percent by weight of fines (material passing No. 200 sieve)
d. Gradation
e. Grain shape
f. Plasticity
g. Predominant soil type
h. Secondary components of soil
i. Classification symbol
j. Other features such as:
    - organic, chemical, or metallic content;
    - compactness;
    - consistency;
    - cohesiveness near plastic limit;
    - dry strength;
    - and source –residual, or transported (aeolian, water borne, glacial deposit, etc.)
k. Dilatancy

## 3.4 Mud-Rotary Drilling Procedures

Summary: Mud-rotary drilling is a method of subsurface drilling wherein a drilling fluid (drilling mud) is circulated through the drill string to wash cuttings out of the borehole and lubricate drilling tools. The drilling contractor will be required to use a non-clay based drilling mud (polymer mud) that will naturally degrade without the use of chlorine or chlorinated water. Mud-rotary drilling methods will be used to advance borings if the use of HSAs is not feasible due to the presence of large cobbles or boulders. Split-spoon samples will be collected from the borings as presented in Section 3.3.

Procedure

1) Connect drilling water supply pump to drill string.

2) Advance the boring by spinning the drill bit the desired distance into the subsurface.

3) Use a recirculation system to collect and separate cuttings rising out of the borehole.

4) Note rate of drilling and volume of water lost down the borehole.

## 3.5 Monitoring Well Construction Procedures

Summary: A method for construction of groundwater monitoring within unconsolidated material which enables monitoring of groundwater elevation and acquisition of groundwater samples for laboratory testing. Fourteen two-inch ID PVC monitoring wells will be installed.

Upon the completion of the shallow well borings, 2-inch inside diameter (I.D.) schedule 40 polyvinyl chloride (PVC) monitoring wells will be set through the augers. Screens will be 15-foot in length with 0.010-inch machined slots. The top of the screen will be set approximately 2 feet above the top of the water table.

Upon the completion of the deep well borings, 2-inch I.D. schedule 40 PVC monitoring wells will be set through the augers. Screens will be 10-foot in length with 0.010-inch machined slots. The bottom of the screen will be set approximately 1 foot below the top of the confining unit.

Procedure:

1) Advance the subsurface boring to the desired depth by means of HSA drilling or mud-rotary.

2) Remove the center plug from the HSAs and verify borehole depth using a weighted measuring tape.

3) Add washed and graded medium sand as needed to the bottom of the borehole.

4) Insert the well screen fitted with a plug and riser pipe into borehole through the hollow stem augers. Cap the riser to prevent well construction materials from entering the well.

5) Add sand to the screen section of the well while slowly removing the augers. The sand pack should extend at least two feet above the top of the screened material in the shallow well and at least five feet above the top of the screened material in the deep well. Measure with a weighted tape.

6) Slowly add bentonite pellets to seal the borehole as the augers are slowly removed. The bentonite seal should extend at least to approximately two feet below the ground surface. If the bentonite seal is placed above the groundwater level within the borehole, add water to the borehole to hydrate the bentonite pellets. Allow the pellets to hydrate for at least 30 minutes. Measure with a weighted tape.

   Note: The rate of removal of the auger from the borehole should closely follow the rate that the sand pack and bentonite pellets fill the borehole.

7) The flush-mount well risers will be cut off just below the ground surface.

8) Backfill to 6 inches below the top of the well riser with concrete.

9) Install a protective casing (road box) over the well riser pipe and set it into the concrete backfill.

10) Lock the protective casing cover.

11) Document well construction in the field notebook and later on a Monitoring Well Construction Detail Diagram (Appendix A).

Reference: ASTM Standard Practice for Design and Installation of Groundwater Monitoring Wells in Aquifers D5092-90.

## 3.6 Monitoring Well Development Procedures

Summary: Following completion of drilling and well installation, each monitoring well will be developed by pumping until the discharged water is relatively sediment free and the indicator parameters (pH, temperature, and specific conductivity) have reached steady state. Developing the well not only removes any sediment but also may improve the hydraulic properties of the formation. The effectiveness of the development measures will be closely monitored in order to keep the volume of discharged water to the minimum necessary to obtain sediment-free samples. A portable turbidimeter will be used to monitor effectiveness of development. A turbidity reading of < 50 Nephelometric Turbidity Units (NTU) and steady state pH, temperature, and specific conductivity readings will be used as a guide for discontinuing well development. The fourteen monitoring wells installed will be developed as described below. Development water that does not have an odor or sheen will be discharged to the ground surface. Development having an odor or sheen will be containerized and staged onsite in a 1,500-gallon tank for off-site disposal.

Procedure:

1) An appropriate well development method should be selected, depending on water level depth, well productivity, and sediment content of water. Well development options include: (a) manual pumping; and (b) powered suction-lift or hydrolift pumping.

2) Equipment should be assembled, decontaminated (if necessary), and installed in the well. Care should be taken not to introduce contaminants to the equipment during installation.

3) Well development should proceed by repeated removal of water from the well until the discharged water is relatively sediment-free. Effectiveness of development should be monitored at regular intervals using a portable turbidimeter. The volume of water removed and turbidity, pH, temperature, and conductivity measurements will be recorded on a Well Development/Purging Log Form (Appendix A).

4) Well development will be discontinued when the turbidity of the discharged water is below 50 NTU.

Reference: ASTM Standard Practice for Design and Installation of Groundwater Monitoring Wells in Aquifers D5092-90.

## 3.7 Soil Vapor Conduit Installation

Summary: A method for construction of soil vapor conduits within unconsolidated material, which enables acquisition of soil-gas samples for laboratory testing. The installation of the soil vapor conduits will be conducted in two phases. During Phase I, up to 60 soil vapor conduits will be installed at the locations shown on Figure 3. The purpose of Phase I is to assist in delineating TCE impacted soil vapor and determine the locations for the collection of indoor air samples (Section 5.0). The Purpose of Phase II is to assist in the delineating TCE impacted groundwater and determine the locations for the collection of Geoprobe groundwater samples (Section 4.1) and the location of new monitoring wells (Section 3.2). Up to 40 soil vapor conduits will be installed during Phase II.

Shallow soil vapor conduits will have "implants" anchored at depths of approximately 8 feet bgs. Deep soil vapor conduits will have "implants" anchored at approximately 2 feet above the water table, which is anticipated to be encountered at approximately 35 feet bgs. The type of soil vapor conduit installed at each location will be determined by the NYSDEC representative. The soil vapor conduits will be installed using the procedures described below.

Installation Procedures:

1) Implants shall be 6 inches in length (e. g., Geoprobe® AT86 series) and are to be constructed of double woven stainless steel wire screen. Implants shall have a pore diameter of 0.0057 inch, which is equivalent to a 0.007 slot well screen. The bottom of the implants must have a post run tubing (PRT) style thread, the same fitting style used with Geoprobe® PRT vapor sampling tools. The top connection with the Teflon or polyethylene tubing shall be stainless steel swage-lock or clamp fitting to prevent leakage during sample collection. The connection to the sampling summa canister shall be made through the use of 1/8th inch ID Teflon or polyethylene tubing.

2) Once the rods have been advanced to the desired depth, attach appropriate tubing to the implant to be installed. **Allow at least 48 inches of tubing length longer than the required depth of the implant.** Cover or plug the end of the tubing.

3) Remove the pull cap from the rods and lower the implant and tubing down inside the diameter of the rods until the implant hits the top of the Anchor/Drive Point. Note the length of the tubing to ensure proper depth has been reached.

4) Rotate tubing counterclockwise while exerting a gentle downward force to engage the PRT threads. Pull up on the tubing lightly to test the connection. DO NOT cut excess tubing.

5) Position a probe rod pull plate or manual probe rod jack on the top of the probe rod. Exert downward pressure on the tubing while pulling the probe rods up. Pull up about 12 inches.

6) Thread excess tubing through the bottom of a funnel and position funnel over top of probe rod. The funnel will be used to facilitate installation of glass beads into the borehole around the screened portion of the implant.

7) Pour glass beads into the funnel and down the inside diameter of the probe rods around the outside of the tubing and around the screen of the implant. Use tubing to "stir" beads

or sand into place. [NOTE: beads, and bentonite can only be installed in the Vadose (unsaturated zone above the water table)].

8) Lift up an additional 18 to 24 inches and insert a granular bentonite seal above beads. It may be necessary to use distilled water to "chase" the seal down the rods.

9) Pull remaining rods out of the hole and complete with granular bentonite.

10) Cut any excess tubing to allow approximately 8 to 12 inches to extend above the ground surface. Plug the tubing with a cap or plug.

11) Initially all soil vapor conduits will be considered temporary and will not be finished at the surface with a protective casing. At the completion of the soil vapor survey, the NYSDEC may select up to 50 soil vapor conduits to become permanent monitoring points at which time these points will be finished with a protective casing. Soil vapor conduit points that do not become permanent will be removed and the borehole will be backfilled with bentonite chips.

Document well construction in the field notebook and later on a Soil Vapor Conduit Construction Detail diagram (Appendix A).

### 3.8 Soil Vapor Conduit Sampling Procedures

Summary: To collect representative soil vapor samples, soil vapor conduit tubing must be adequately sealed to prevent ambient air from being sampled. A helium tracer gas will be used to verify the integrity of the soil vapor conduit seal. The soil vapor conduits must be purged prior to sampling. Sampling should commence immediately after purging.

The soil vapor conduits will be sampled at least 24-hours after installation. The samples will be labeled following procedures described below. The samples will be analyzed for the parameters indicated in Table 1. The required QA/QC may be found in Table 2.

1) Open the soil vapor well box (if present) and inspect the existing tubing. Check for any signs of cracks, clogging or any other characteristics that may impact the collection of a representative sample.

2) Apply a bentonite slurry to the ground surface in an approximate 2-ft diameter circle. Place an approximately 2 ft by 2 ft square of plastic sheeting over the bentonite slurry. Poke a hole, only as large as needed, for the sampling tube to penetrate the plastic. Seal the plastic sheeting/tube interface with a small amount of bentonite slurry.

3) Place the enclosure over the wellhead, run well tubing through in the top outlet. Use plumber's putty to seal the interface between the tubing and the top of the enclosure.

4) Seal enclosure at the ground surface with a bentonite slurry.

5) Connect helium (99.999%) cylinder to side port of enclosure.

6) Release enough helium to displace any ambient air in enclosure. Continue flushing the inside of the enclosure with helium gas.

7) Connect the tubing to the vacuum pump. Use only new teflon tubing if needed for length and new silicone tubing for leak free unions. Do not reuse any tubing between sample locations.

8) Purge the soil vapor; remove one to three volumes of soil gas. Flow rates for purging and sampling must not exceed 0.2 liters per minute (L/min) to minimize outdoor air infiltration during purging/sampling. Record start and stop time. Verify air is being drawn from the monitoring well by placing finger on the vacuum pump outlet tube to check for positive pressure. Helium cylinder should be open during the purge time, enough to cause a positive pressure within the enclosure.

9) After purging completed, attach a one-liter tedlar bag to the exhaust port of the vacuum pump and collect a soil vapor sample. Flow rates for sampling must not exceed 0.2 liters per minute (L/min) to minimize outdoor air infiltration during purging/sampling. Record start and stop time. Samples collected for confirmation analysis should not be filled completely, in order to allow for expansion during shipment by air.

10) The helium cylinder should remain open during sampling set-up to cause a positive pressure in the enclosure. When you are ready to move onto the next location, stop the flow of the helium with the valve on the regulator, and seal ports on the enclosure to maintain the helium atmosphere within the enclosure.

11) After the collection of the soil vapor sample, connect the Mark Helium Detector (Model 9822) to soil vapor conduit tubing. Obtain and record readings. Absence of helium (< 20%) assures that the conduit seal is competent and ambient air is not entering the soil vapor conduit.

12) Label the tedlar bag as described in Section 3.7.1 and place the bag into a cooler.

13) Replace box cover.

14) Drop off Tedlar bags, with COC, to Buck Laboratories for TO-15 analysis as per Table 1. The required QA/QC may be found in Table 2.

### 3.8.1 Sample Labeling

Summary: In order to prevent misidentification and to aid in the handling of environmental samples collected during the field investigation, the following procedures will be used:

Procedure: Each soil vapor sample will have the following information placed on the laboratory supplied sample label:

- Site name
- Sample identification
- Project number
- Date/time
- Sampler's initials

- Analysis required

The following terminology shall be used to identify soil vapor samples:

Soil Gas Vapor Samples for Temporary Points

SITE ID-ESG-xxS (for shallow locations) and

SITE ID-ESG-xxD (for deep locations)

Where Site ID is the NYSDEC site identification number and xx is the ascending numerical number assigned to the sample.

Field duplicate samples will be assigned a unique identification alphanumeric code that specifies the data of collection, the letters FD (for field duplicate) and an ascending number that records the number of duplicate samples collected that day. For example, the first field duplicate collected on February 22, 2006 would be assigned the following sample number using the code shown below:

YYYYMMDD-FD-1 = 20060222-FD-1

Subsequent duplicates collected on the same day would be assigned FD-2, FD-3 etc. Field sampling crew will record the duplicate sample information on the Summa Canister Sampling Field Data Sheets and also in the field book.

## 3.9 Disposal of Drill Cuttings

Summary: Disposal of boring spoils will be performed in accordance with New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum (TAGM) HWR-89-4032, November 21, 1989.

Procedure:

1) Spoils not exhibiting any PID readings, staining or odors will be stored on-site in a 20 cubic yard roll-off container. The drilling contractor will transport spoils to the staging area at the end of each day.

2) Spoils exhibiting PID readings, staining or odors will be placed in 1A2 open head 55-gallon steel drums. The drilling contractor will transport drums to the designated staging area site at the end of each day.

3) The boring spoils generated during drilling activities are presumed not to be a hazardous waste as defined in 40 CFR Part 261. A sample will be collected for waste characterization prior disposal and analyzed for the parameters shown in Table 1. The drums may be disposed of at a facility licensed to accept hazardous waste, if necessary.

## 3.10 Documentation

Each subsurface boring will be logged in a bound field notebook during drilling by the supervising geologist. Field notes will include descriptions of subsurface materials encountered during drilling, sample numbers, and types of samples recovered from the borehole. Additionally, the geologist will note time and material expenditures for later verification of contractor invoices.

Upon completion of daily drilling activities, the geologist will complete the daily drilling record form and initiate chain-of-custody on any samples recovered for chemical laboratory testing. Following completion of the drilling program, the geologist will transfer field notes onto standard forms for the RI/FS report.

On a weekly basis the project geologist will submit a summary report to the project manager containing at a minimum the following: (1) a summary of the daily drilling records; (2) progress report on field activities; and (3) a record of site visitors.

The proper completion of the following forms/logs will be considered correct procedure for documentation during the drilling program:

1) Field Log Book - weather-proof hand-bound field book
2) Daily Drilling Records (Appendix A)
3) Boring Logs (Appendix A)
4) Monitoring Well Construction Detail Diagrams (Appendix A).

## 4.0 GROUNDWATER INVESTIGATION

Groundwater samples will be collected as grab samples from 25 Geoprobe groundwater samples locations and approximately 25 new and existing monitoring wells to determine whether VOC groundwater contamination exists. The location of the 25 Geoprobe groundwater samples locations will be determined by the NYSDEC and based upon the Phase II soil vapor sampling (Section 3.8).

### 4.1 Geoprobe Groundwater Sampling

Summary: This work will consist of the advancing up to 25 Geoprobe groundwater samples. The location of the groundwater samples will be determined in the field by NYSDEC personnel. The Geoprobe groundwater samples will be collected from approximately one foot below the water table. The water table within the area of the investigation varies from 15 to 30 feet bgs. The samples will be analyzed for the parameters indicated in Table 1. The volume of sample required, bottle type and required QA/QC may be found in Table 2.

1) A Screen Point Sampler 15 (SP15) groundwater sampler, or an equivalent unit, will be utilized to collect groundwater samples in direct-push borings that intercept the groundwater table.

2) To collect groundwater samples, a clean sampler will be threaded onto the leading end of the probe rod and lowered or driven to the desired sampling interval (approximately 1 foot below the top of the water table). While the sampler is driven to depth, O-ring seals at the drive head and expendable drive point will provide a watertight system.

3) Once at the desired sampling depth, chase rods will be sent down-hole until the leading rod contacts the bottom of the sampler screen. The tool string will then be retracted while the screen is held in place by the chase rods. As the tool string is retracted, the expendable point is released from the sampler sheath. An O-ring on the screen head maintains the seal at the top of the screen. As a result, any liquid entering the sampler during screen deployment must first pass through the screen.

4) The tool string and sheath may be retracted the full length of the screen or as little as a few inches if a small sampling interval is desired. The SP15 Sampler utilizes a screen with a standard slot size of 0.004 inches and an exposed length of 41 inches.

5) A minimum of 1 gallon of water will be purged from the sampler prior to sample collection with dedicated Teflon or polyethylene tubing of laboratory or food grade quality, and a check valve. The groundwater sample will be collected with dedicated Teflon or polyethylene tubing of laboratory or food grade quality, and a check valve.

6) Groundwater sampled will be placed on ice and shipped overnight to the laboratory under chain-of-custody (COC) control (Appendix A) for the parameters indicated in Table 1. The volume of sample required, bottle type and required QA/QC may be found in Table 2. Samples will be shipped the same day as collection.

7) Upon the completion of the sampling, the sampler will be removed and the borehole backfilled with bentonite pellets and marked with a flag or stake

## 4.2 Monitoring Well Purging Procedures

Summary: To collect representative groundwater samples, groundwater wells must be adequately purged prior to sampling. New wells will not be purged until 7 days after installation. Purging will require the removal of three standing water volumes in rapidly recharging wells and at least one volume from wells with slow recharge rates. Shallow wells in which the screen intersects the water table should require a minimum amount of purging since the groundwater would flow through the screen and not be entrapped in the casing. Deeper wells should be purged more thoroughly since they may be located at the bottom of the unconfined aquifer and water may rise up into the casing. A thorough purging would require the removal of several volumes of this trapped water to ensure that representative groundwater is brought into the well for sampling. Sampling should commence immediately after purging as soon as adequate recharge has occurred.

The wells will be sampled following procedures found in Section 4.2.3. The samples will be labeled and shipped following procedures outlined in Sections 4.2.4 and 8.0 and analyzed for the parameters indicated in Table 1. The volume of sample required, bottle type and required QA/QC may be found in Table 2.

### 4.2.1 Water Level Monitoring Procedures

Summary: Determination of groundwater depths in monitoring wells is necessary to calculate required purge volumes prior to groundwater sampling and to make potentiometric surface maps. Water levels in monitoring wells scheduled to be sampled during the field work will be measured using an electronic interface probe/water level indicator. Initially, measurements will be taken following well development until the well has recovered to anticipated static conditions. Water level measurement procedures are presented below. Each new and existing well will also be checked for the presence of DNAPL using the electronic interface probe/water level indicator.

Procedure:

1) Clean the water level probe and the lower portion of cable following standard decontamination procedures (Section 10.0) and test water level meter to ensure that the batteries are charged.

2) Lower the probe slowly into the monitoring well until the solid audible alarm indicates water.

3) Read the depth to the nearest hundredth of a foot from the graduated cable using the V-notch on the riser pipe as a reference.

4) Repeat the measurement for confirmation and record the water level.

5) Lower the probe slowly to the bottom of the monitoring well. If the solid audible alarm becomes intermittent, this indicated the presence of DNAPL. Record the depth to the top of the DNAPL and record the bottom depth of the well.

6) Remove the probe from the well slowly, drying the cable and probe with a clean "Chem Wipe" or paper towel.

7) Replace the well cap and lock protective cap in place.

8) Decontaminate the water level meter (Section 10.0) if additional measurements are to be taken.

### 4.2.2 Well Purging Procedures

1) The well cover will be unlocked and carefully removed to avoid having any foreign material enter the well. The interior of the riser pipe will be monitored for organic vapors using PID. If a reading of greater than 5 ppm is recorded, the well will be vented until levels are below 5 ppm before purging begins.

2) Using an electronic interface probe/water level detector, the water level below top of casing will be measured. The depth of the well will be measured, knowing the total depth of the well, it will be possible to determine the volume of water in the well. The bottom of the well will also be checked for DNAPL using the interface probe/water level indicator. The end of the probe will be soap-and-water-washed and deionized-water-rinsed between wells.

3) Calibrate field instruments (e.g., pH, specific conductance, PID, turbidity).

4) In all wells, a Waterra Hydrolift pump will be used to purge the required water volume (i.e., until stabilization of pH, temperature, specific conductivity, and turbidity). Dedicated/ disposable new high-density polyethylene (HDPE) discharge and intake tubing will be used for each well. A dedicated/disposable HDPE foot-valve will also be used at each location.

5) Slowly install the HDPE tubing with foot-valve into the well and set to about the midpoint of the well screen. Configure the dedicated HDPE tubing with a three-way gate valve with the discharge directed through the three-way valve and micropurge flow cell and into a calibrated bucket.

6) Purge well until the water quality parameters have stabilized and at least 3 well volumes have been removed. The stabilization criteria are: specific conductivity - 3% full scale range; pH - 0.10 pH unit; temperature - 0.2°C, and turbidity <50 NTU.

7) During purging, it is permissible to by-pass the flow cell until the groundwater has cleared.

8) Indicator parameters of pH, conductivity, dissolved oxygen, oxygen/reduction potential, turbidity, and temperature must be measured continuously using the flow cell.

9) Well purging data are to be recorded in the field notebook and on the Well Purge Log (Appendix A).

### 4.2.3 Groundwater Sampling Procedures

The following groundwater sampling procedures will be used for new and existing monitoring wells after purging has been conducted as described above in Section 4.2.2:

Procedures

1) After well purging is completed, a sample will be collected into the appropriate laboratory supplied containers.

2) Direct water flow toward the inside wall of the sample container to minimize volatilization. Fill volatile sample containers so no headspace (air bubbles) is present. If containers are pre-preserved, do not overfill sample containers. Note if effervescence is observed.

3) All sample bottles will be labeled in the field using a waterproof permanent marker.

4) Samples will be collected into sample bottles (Table 2) (containing required preservatives) and placed on ice in coolers for processing (preservation and packing) prior to shipment to the analytical laboratory. A chain-of-custody record will be initiated. The analytical laboratory will certify that the sample bottles are analyte-free prior to shipping.

5) Remove dedicated/disposable HDPE tubing and foot-valve.

6) Well sampling data are to be recorded in the field notebook and on the Well Purging Log (Appendix A).

7) Groundwater samples will be placed on ice and shipped overnight to the laboratory under COC control (Appendix A) for the parameters indicated in Table 1. The volume of sample required, bottle type and required QA/QC may be found in Table 2. Samples will be shipped the same day as collection. Samples will be shipped to Life Sciences Laboratories.

#### 4.2.4 Sample Labeling

Summary: In order to prevent misidentification and to aid in the handling of environmental samples collected during the field investigation, the following procedures will be used:

Procedure: Each groundwater sample will have the following information placed on the laboratory supplied sample label:

- Site name
- Sample identification
- Project number
- Date/time

- Sampler's initials
- Analysis required

The following terminology shall be used for the groundwater sample identification:

Groundwater Samples

SITE ID-GW-xx (for new monitoring wells) or

SITE ID-MW ID (for existing monitoring wells)

Where Site ID is the NYSDEC site identification number and xx is the ascending numerical number assigned to the sample

## 5.0 INDOOR AIR INVESTIGATION

For purposes of this FSP, potentially one hundred and fifty area residential locations are assumed to be included in the indoor air sampling program. The indoor air investigation program will generally include the following: 1) conducting interviews with homeowners using air quality questionnaires provided by the NYSDOH (Appendix A); 2) conducting a survey of household chemicals present and evaluating their potential to affect air sample results; 3) collect one indoor air sample each from the breathing zones of the first floor and basement areas; (4) collect one vapor sample from beneath the basement concrete slab; and one outdoor ambient sampler per household.

The samples will be labeled and shipped following procedures outlined in Sections 5.5 and 8.0 and analyzed for the parameters indicated in Table 1.

### 5.1 Indoor Air Quality Survey and Questionnaire

Once the homeowners have been contacted by the NYSDEC and/or NYSDOH, appointments will be made to conduct homeowner/occupant interviews and building inventory of household chemicals. Questionnaire and Building Inventory forms provided by the NYSDOH (Appendix A) will be used. Once the questionnaires have been completed, the building inventory (first floor, basements, and attached garages) for household chemicals will be prepared. Areas that may be inspected include kitchen and bathroom cabinets, basement shelves, and any other area commonly used for storage of household chemicals. During this inventory, a handout will be provided to the residents that list home activities that should be avoided prior to and during the air sampling. This handout is provided in Appendix A. The general procedures to be followed during the surveys are summarized below:

- Identify all areas on the first floor and basement levels that may be used for storage of chemical containers.
- Identify and record each container likely to contain chemicals that may affect air quality. These may include any of the following: cleaning products, cosmetic products, aerosol cans, paint or stain products, deodorants/air fresheners, solvents, glue or epoxy

containers, caulks, petroleum based soils and penetrants, sealants, fuel containers, scented natural products (e.g., Christmas trees, wreaths, potpourri, scented wood), and pesticide products.

- Other potential sources that may influence air quality testing that should be noted and scanned with field instrumentation include: new construction/remodeling/painting, new carpeting, freshly dry-cleaned clothing, and the presence of tobacco smokers.

- On the product inventory form provided in the Questionnaire/Building Inventory, record each container/potential source on the product inventory form. For each container, note the product description, container size, the condition of the container, and the chemical ingredients.

- For each container, check the areas around the lids or other openings for the presence of VOCs using a low-level field photoionization detector (PID) (e.g., ppb RAE). Move the tip of the PID around the entire area and record the highest reading measured. For aerosol cans with a slot in the cap, insert the PID in the slot.

## 5.2 Sub-Slab Air Sampling Procedures

The sub-slab air sampling procedures are summarized below:

1) Drill a one-inch (1") diameter hole about one-inch (1") into the concrete using an electric hammer drill. Extend the hole through the remaining thickness of the slab using a ½ -inch drill bit. Lengthen the hole about three inches (3") beyond the sub-slab using either a drill bit or a steel probe rod.

2) Insert one end of a 3/8-inch outside diameter by ¼-inch inside diameter Teflon-lined tube through a rubber stopper and insert the stopper into the one-inch hole.

3) Seal the annular space between the one-inch (1") hole and the rubber stopper with bees wax.

4) Connect the tubing to an air-sampling pump with polyethylene discharge tubing attached to a 1 L Tedlar bag. Purge approximately one liter (1L) of gas from the subsurface probe into the Tedlar bag, using the air-sampling pump. Analyze the one-liter Tedlar bag containing the sub-slab purged air with the PID when **outside** the residence.

5) Record the canister's serial number on the Summa Canister Sampling Field Data Sheet (Appendix A).

6) Assign sample identification to the canister identification tag and record on chain of custody (COC), and the Summa Canister Sampling Field Data Sheet (Appendix A).

7) Remove brass plug from canister fitting.

<u>Using Flow Controllers Without a Built-in Pressure Gauge</u>

1) Attach the pressure gauge provided by the laboratory to the Summa canister, open valve completely, record reading on the Summa Canister Sampling Field Data Sheet (Appendix A), close valve completely, and remove the pressure gauge. If the canister does not show a vacuum, do not use.

2) Attach a pre-calibrated/certified 24-hour flow controller, and particulate filter to the Summa canister. Note: Some laboratories provide a built-in filter within the regulator apparatus. **Do not reuse flow controllers** between locations.

3) After purging the hole, remove the sampling pump from the Teflon-lined probe tube and attach tube to the Summa canister, via the flow controller/particulate filter assembly.

4) Open canister valve to initiate sample collection and record start time and date on the canister identification tag and on the Summa Canister Sampling Field Data Sheet (Appendix A).

5) Take a photograph of canister setup and surrounding area.

6) Clean up any dust/debris with a brush and dustpan. **Do not** use a vacuum based device.

7) After 24 hours, record sampling end time on the Summa Canister Sampling Field Data Sheet (Appendix A), and close valve.

8) Disconnect polyethylene tubing and remove flow controller/particulate filter assembly from canister.

9) Upon removing the flow controller/particulate filter assembly, record gauge pressure using procedure outlined in "Step 1" and seal canister with brass plug.

10) Seal the hole in the basement slab with hydraulic cement patch.

11) Ship the samples, with COCs, overnight via FedEx to STL-Burlington for TO-15 analysis.

Using Flow Controllers With a Built-in Pressure Gauge

1) Attach the flow controller provided by the laboratory to the Summa canister inlet (you must have one for each summa canister). Read the pressure gauge. **Do not reuse flow controllers** between locations.

2) After purging the hole, remove the sampling pump from the Teflon-lined probe tube and attach tube to the Summa canister, via the flow controller/particulate filter assembly.

3) Open canister valve to initiate sample collection and record start time and date on the canister identification tag and on the Summa Canister Sampling Field Data Sheet (Appendix A).

4) After 24 hours, close the Summa canister valve completely and record the time.

5) Disconnect the tubing from the Summa canister.

6) Record the reading on the pressure gauge. There should still be a slight vacuum in the Summa canister. If no vacuum remains in the canister, do not send the canister for analysis. Retake the sample using the same procedure with a fresh canister.

7) Remove the flow controller.

8) If the canister does not show a significant net loss in vacuum after sampling, evaluate and document the problem. If necessary, use another summa canister to recollect the sample and **contact the project manager immediately.**

9) Seal the hole in the basement slab with hydraulic cement patch.

10) Ship the samples, with COCs, overnight via FedEx to STL-Burlington for TO-15 analysis.

## 5.3 Indoor Air and Outdoor Ambient Blank Air Sampling Procedure

The indoor air for the first floor, basement levels and outdoor ambient blank sampling procedures are summarized below:

1) Place indoor air Summa canister inlet at breathing height in the approximate center of the structure, or, for the ambient air sample, elevated on a table or other object in a

location upwind of the samples collected that day. The breathing height is defined as four to six feet above the floor or ground. As an option, a length of Teflon lined polyethylene tubing can be attached to the Summa canister inlet and raised to breathing zone height.

2) Record the canister and flow controller serial numbers on the Summa Canister Sampling Field Data Sheet (Appendix A) and the canister identification tag.

3) Assign sample identification to the canister identification tag and record on COC and the Summa Canister Sampling Field Data Sheet (Appendix A).

4) Remove brass plug from canister fitting and save.

<u>Using Flow Controllers Without a Built-in Pressure Gauge</u>

1) Attach the pressure gauge provided by the laboratory to the Summa canister, open valve completely, record reading on the Summa Canister Sampling Field Data Sheet (Appendix A), close valve completely, and remove the pressure gauge. If the canister does not show a vacuum, do not use.

2) Attach a pre-calibrated/certified 24-hour flow controller, and particulate filter to the Summa canister. Note: Some laboratories provide a built-in filter within the regulator apparatus.

3) Open canister valve to initiate sample collection and record start time and date on the canister identification tag and on the Summa Canister Sampling Field Data Sheet (Appendix A).

4) Take a photograph (digital or film photography) of canister setup and surrounding area.

5) After 24 hours, record end time on the Summa Canister Sampling Field Data Sheet (Appendix A), and close valve.

6) Disconnect flow controller/particulate filter assembly from canister.

7) Upon removing the flow controller/particulate filter assembly, record gauge pressure using procedure outlined in "Step 1" and seal canister with brass plug.

8) Ship the samples, with COCs, overnight via FedEx to STL-Burlington for TO-15 analysis.

Using Flow Controllers With a Built-in Pressure Gauge

1) Attach the flow controller provided by the laboratory to the Summa canister inlet (you must have one for each summa canister). Read the pressure gauge. **Do not reuse flow controllers** between locations.

2) Open canister valve to initiate sample collection and record start time and date on the canister identification tag and on the Summa Canister Sampling Field Data Sheet (Appendix A).

3) Take a photograph (digital or film photography) of canister setup and surrounding area.

4) After 24 hours, record end time on the Summa Canister Sampling Field Data Sheet (Appendix A), and close valve.

5) Disconnect the tubing from the Summa canister.

6) Record the reading on the pressure gauge. There should still be a slight vacuum in the Summa canister. If no vacuum remains in the canister, do not send the canister for analysis. Retake the sample using the same procedure with a fresh canister.

7) Remove the flow controller.

8) If the canister does not show a significant net loss in vacuum after sampling, evaluate and document the problem. If necessary, use another summa canister to recollect the sample and **contact the project manager immediately.**

9) Replace the brass plug on the canister.

10) Ship the samples, with COCs, overnight via FedEx to STL-Burlington for TO-15 analysis.

## 5.4 Quality Control

The number of Quality Control samples (duplicates and ambient blanks) to be taken during sub-slab, indoor and outdoor sampling may be found on Table 1.

Field duplicates for sub-slab samples will be collected by attaching the T-fitting supplied by the laboratory to two Summa canisters with attached regulators. The inlet for the T-fitting will then be attached to the sub-slab sample tubing. Indoor air and ambient air duplicates will also use T-fittings connected to two Summa canisters. Tubing will not be required unless needed to the raise the sampling point to the breathing zone. For sampling, both Summa canister valves are opened and closed simultaneously.

## 5.5 **Sample Labeling**

Summary: In order to prevent misidentification and to aid in the handling of environmental samples collected during the field investigation, the following procedures will be used:

Procedure: Each indoor air/outdoor air/soil gas and groundwater sample will have the following information placed on the laboratory supplied sample label:

- Site name
- Sample identification
- Project number
- Date/time
- Sampler's initials
- Analysis required

The serial number of the canister and regulator used during sampling will also be noted on the label and on the COC.

The following terminology shall be used for the structure sample identification:

Structure Air Samples

SITE ID-SS-xx (for sub-slab locations)

SITE ID-BS-xx (for basement indoor ambient air)

SITE ID-FF-xx (for first floor indoor ambient air)

SITE ID-OA-xx (for outdoor ambient air)

Where Site ID is the NYSDEC site identification number and xx is the ascending numerical number assigned to the sample.

Field duplicate samples will be assigned a unique identification alphanumeric code that specifies the date of collection, the letters FD (for field duplicate) and an ascending number that records the number of duplicate samples collected that day. For example, the first field duplicate collected on February 22, 2006 would be assigned the following sample number using the code shown below:

YYYYMMDD-FD-1 = 20060222-FD-1

Subsequent duplicates collected on the same day would be assigned FD-2, FD-3 etc. Field sampling crew will record the duplicate sample information on the Summa Canister Sampling Field Data Sheets and also in the field book.

## 6.0 FIELD DOCUMENTATION

Field notebooks will be used during all on-site work. A dedicated field notebook will be maintained by the field technician overseeing the site activities. In addition to the notebook, any and all original sampling forms, purge forms and notebooks used during field activities will be submitted to the NYSDEC as part of the final report. Soil gas and groundwater field and sampling procedures, including the installation of the soil vapor probe points, purging, sampling, backfilling, etc., should be photo-documented.

The field sampling team will maintain a sample log sheet summarizing the following data:

1. Sample Identification
2. Date and time of sample collection
3. Sampling depth
4. Identity of samplers
5. Sampling methods and devices
6. Purge volumes (soil vapor and groundwater)
7. Groundwater purge parameters
8. Volume of soil vapor extracted
9. The Summa canister vacuum before and after samples collected
10. Chain of custody and shipping information

The supervising geologist will log the time and material expenditures for later verification of contractor invoices. Upon completion of daily drilling activities, the geologist will complete the daily drilling record form (Appendix A). Following completion of the program, the geologist will transfer field notes onto standard forms for the investigation report.

The proper completion of the following forms/logs will be considered correct procedure for documentation during the drilling program:

1) Field Log Book - weather-proof hand-bound field book

2) Daily Drilling Records (Appendix A)

3) Boring Logs (Appendix A)

4) Monitoring Well Construction Detail Diagrams (Appendix A)

5) Soil Vapor Implant Construction Detail Diagrams (Appendix A)

## 7.0 SURVEYING AND MAPPING

Project surveying will provide data necessary to plot soil vapor conduits and new monitoring well locations on the existing base map. All surveying will be performed under the supervision of a New York State licensed land surveyor, following the requirements of the Project Management Work Plan, and the HASP.

Control for this project shall be based upon site control, which has been established for prior work. Horizontal control is referenced to New York State Plane, North American Datum 1927 (NAD27) east zone coordinate system, vertical control is referenced to National Geodectic Vertical Datum 1929 (NGVD29).

## 8.0 SAMPLE SHIPPING

Summary: Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presentation of sample analytical chemistry results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The procedures used in this off-site vapor intrusion study follow the chain-of-custody guidelines outlined in NEIC Policies and Procedures, prepared by the National Enforcement Investigations Center (NEIC) of the U.S. Environmental Protection Agency Office of Enforcement.

Procedure:

1) The chain-of-custody (COC) record (Appendix A) should be completely filled out, with all relevant information.

2) The original COC goes with the samples. It should be placed in a Ziplock bag and placed inside the box containing a Summa canister. The sampler should retain a copy of the COC.

3) Summa canisters are shipped in the same boxes the laboratory used for shipping.

4) Groundwater samples should be shipped on ice in the laboratory supplied coolers.

5) Place the lab address on top of sample box/cooler. Affix numbered custody seals across box lid flaps and cooler lid. Cover seals with wide, clear tape.

6) Ship samples via overnight carrier the same day that they are collected. Shipping soil gas samples one day after collection is permitted if required.

## 9.0 FIELD SAMPLING INSTRUMENTATION

URS-owned and rented field sampling equipment will require no maintenance beyond decontamination between sampling locations. The use of disposable filters for the PID is recommended. Calibration procedures for electronic instruments can be found in the equipment operating manuals. Calibration and maintenance procedures for the common instrumentation that will be used during field investigations are discussed in the equipment operating manuals. A copy of the manufacturer's operating manual for each instrument will be kept with the instrument or the operator. All field sampling equipment will be calibrated as recommended by the manufacturer. The calibration procedures and results will be recorded in the field notebook.

### 9.1 Preventative Maintenance

In case of an emergency, the equipment rental vendor, other URS offices, and/or the instrument manufacturer will be contacted. Instrumentation rental vendors, which provide overnight UPS/Federal Express service, are listed below.

Vendor:

Pine Environmental Services, Inc.: Mattydale, NY: 1-877-903-7463

## 10.0 SAMPLING EQUIPMENT CLEANING PROCEDURES

Summary: To assure that no outside contamination will be introduced into the samples/data, thereby invalidating the samples/data, the following cleaning protocols will apply for all equipment used to collect samples/data during the field investigations. All downhole drilling equipment will be cleaned with a high-pressure steam cleaner. Geoprobe equipment and will be brush cleaned between locations.

Procedures:

1) Thoroughly clean equipment with laboratory-grade soap and water, until all visible contamination is gone.

2) Rinse with water, until all visible evidence of soap is removed.

3) Rinse several times with deionized water.

4) Air dry before using.

5) If equipment will not be used immediately, wrap in aluminum foil.

## 11.0 INVESTIGATION-DERIVED WASTE CHARACTERIZATION AND DISPOSAL

All soil cuttings will be contained in U. S. Department of Transportation (DOT) 55-gallon 1A2 steel drums. and/or a 20 cubic yard roll-off containers and staged onsite. Approximately 3,000 gallons of decontamination water, drilling fluid and development water will be generated as part of the monitoring well installation. Any fluid that does not have an odor or sheen will be discharged to the ground surface. Any fluid having an odor or sheen will be containerized and staged onsite in a 1,500-gallon tank for off-site disposal as non-hazardous. Personal protective equipment and HDPE sampling tubing will also be drummed for disposal. The drilling contractor will transport the bulk soils or drums of material to the site at the end of each day.

URS will collect analytical samples from each media to profile the materials for proper disposal. The IDW subcontractor shall be responsible for removing all containers of IDW from the work site as needed. The IDW subcontractor will affix a non-hazardous waste label to each drum of non-hazardous contaminated solid waste and/or a RCRA hazardous waste label, proper DOT shipping name, and proper DOT shipping label to each drum of RCRA hazardous waste. All waste will be profiled and disposed of at a permitted off-site disposal facility by the IDW subcontractor.

# TABLES

**Table 1**
**Sample and Analysis Summary**
**Soil Vapor Intrusion Study**
**SCM Cortlandville OU #3, Site No. 7-12-006**
**Work Assignment No. D004440-10**

| Parameter | Method Number / Reference [1,2] | Estimated Number of Samples | Field QA/QC Samples | | | | Total No. of Samples |
|---|---|---|---|---|---|---|---|
| | | | Field Duplicates | MS/MSD | Rinsate Blanks | Trip Blanks | |
| **Task 2 - Preliminary Soil Gas Sampling** | | | | | | | |
| **I. Soil Gas** | | | | | | | |
| VOCs [3] | TO-15 | 60 | 6 | NA | NA | NA | 66 |
| **Task 3 - Structure Sampling** | | | | | | | |
| **I. Indoor Air [4]** | | | | | | | |
| VOCs [3] | TO-15 (Low Level) | 300 | 30 | NA | NA | NA | 330 |
| **II. Ambient Air [4]** | | | | | | | |
| VOCs [3] | TO-15 (Low Level) | 150 | 15 | NA | NA | NA | 165 |
| **III. Sub-Slab Air** | | | | | | | |
| VOCs [3] | TO-15 | 150 | 15 | NA | NA | NA | 165 |
| **Task 4 - Environmental Sampling** | | | | | | | |
| **I. Groundwater - Geoprobe** | | | | | | | |
| Target Compound List (TCL) VOCs [5] + Tentatively Identified Compounds (TICs) | 8260B | 25 | 2 | 2/2 | 2 | 5 | 38 |
| **II. Groundwater - Monitoring Well** | | | | | | | |
| Target Compound List (TCL) VOCs [5] + Tentatively Identified Compounds (TICs) | 8260B | 25 | 2 | 2/2 | 2 | 5 | 38 |
| Nitrate/Nitrite | 300 | 25 | 2 | 2/2 | 2 | NA | 33 |
| Chloride | 300 | 25 | 2 | 2/2 | 2 | NA | 33 |
| Sulfate | 300 | 25 | 2 | 2/2 | 2 | NA | 33 |
| Total Alkalinity | 310 | 25 | 2 | 2/2 | 2 | NA | 33 |
| Iron (total) | ILM04.1 | 25 | 2 | 2/2 | 2 | NA | 33 |
| Iron (dissolved) | ILM04.1 | 25 | 2 | 2/2 | 2 | NA | 33 |
| Ferrous Iron ($Fe^{+2}$) | Field | 25 | 2 | --- | --- | NA | 27 |
| pH | Field | 25 | 2 | --- | --- | NA | 27 |
| Temperature | Field | 25 | 2 | --- | --- | NA | 27 |
| Dissolved Oxygen | Field | 25 | 2 | --- | --- | NA | 27 |
| Redox Potential | Field | 25 | 2 | --- | --- | NA | 27 |
| **III. Soil Gas** | | | | | | | |
| VOCs [3] | TO-15 | 40 | 4 | NA | NA | NA | 44 |
| **IV. Investigation-Derived Waste (IDW)** | | | | | | | |
| TCLP VOCs | 1311/8260B | 5 | 0 | 0/0 | 0 | 0 | 5 |
| TCLP SVOCs | 1311/8270C | 5 | 0 | 0/0 | 0 | 0 | 5 |
| TCLP Pesticides | 1311/8081A | 5 | 0 | 0/0 | 0 | 0 | 5 |
| TCLP Herbicides | 1311/8151A | 5 | 0 | 0/0 | 0 | 0 | 5 |
| TCLP Metals | 1311/6010B/7470A | 5 | 0 | 0/0 | 0 | 0 | 5 |
| Reactivity | SW-846 Chapter 7, Sec. 3 | 5 | 0 | 0/0 | 0 | 0 | 5 |
| Ignitability | 1010/1030 | 5 | 0 | 0/0 | 0 | 0 | 5 |
| Corrosivity (pH) | 9040B/9045C | 5 | 0 | 0/0 | 0 | 0 | 5 |

NOTES:
1. NYSDEC Analytical Services Protocol (ASP), June 2000 Edition.
2. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, January 1999.
3. VOCs include the laboratory's standard list of VOCs, including tetrachloroethene/trichloroethene and all associated breakdown products.
4. For all indoor and ambient air samples, the reporting limit for trichloroethene shall be 0.25 micrograms per cubic meter (ug/m3) and approximately 1 ug/m3 for all other compounds.
5. Target compound list VOCs as listed in USEPA OLM04.2.

VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
TCLP - Toxicity Characteristic Leaching Procedure
NA - Not applicable
MS/MSD - Matrix spike/matrix spike duplicate

## Table 2

### Analytical Methods and Sample Container, Preservation, and Holding Time Requirements

### Soil Vapor Intrusion Study

### SCM Cortlandville OU #3, Site No. 7-12-006

### Work Assignment No. D004440-10

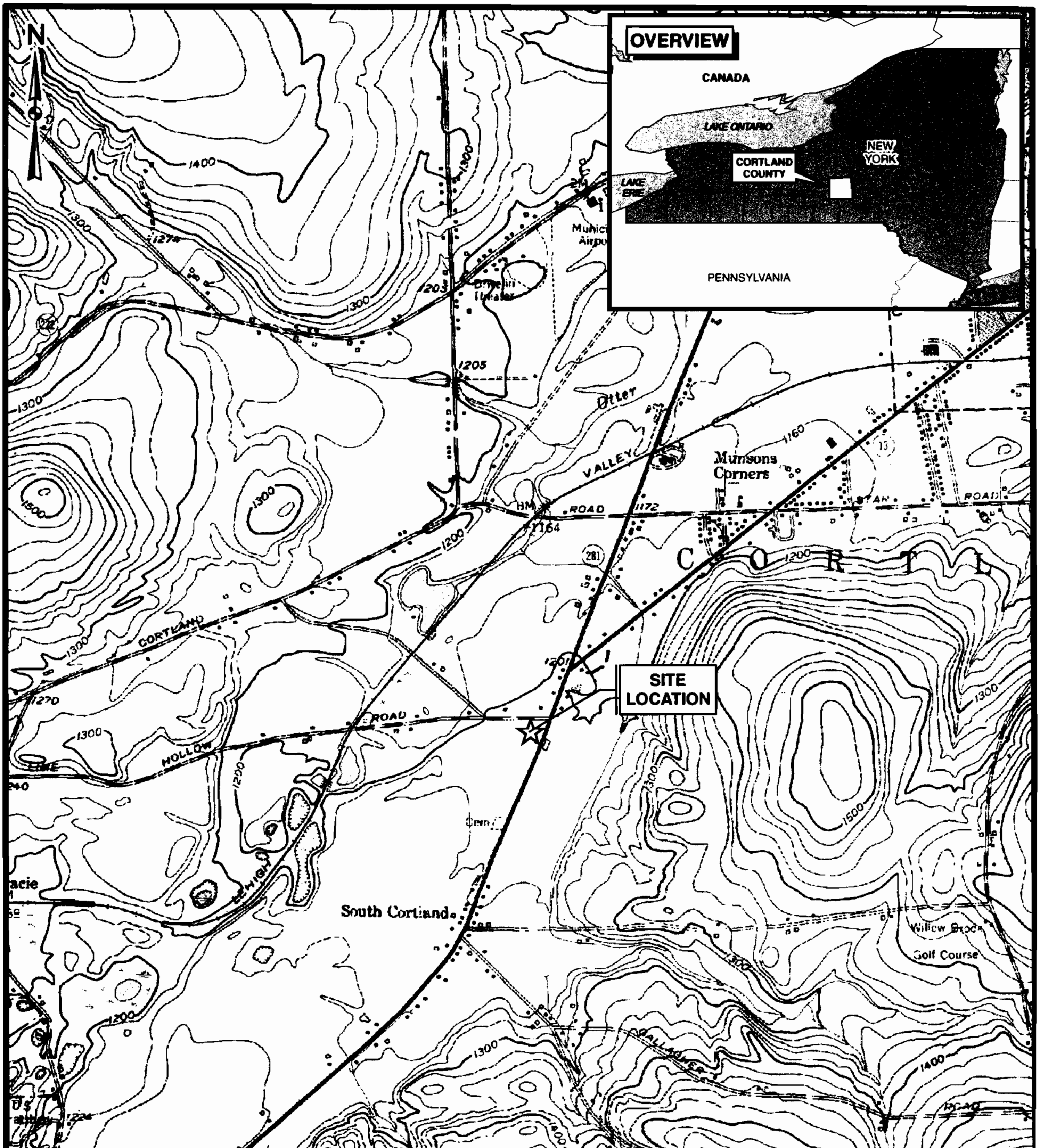
| Parameter | Method Number/ Reference[1,2] | Container/Sample Volume | Preservation | Holding Time[3] |
|---|---|---|---|---|
| **Soil Gas Samples (Tasks 2 and 4)** | | | | |
| VOCs [4] | TO-15 | 1 Tedlar Bag | None | 72 Hours from collection |
| **Ambient/Subslab/Indoor Air (Task 3)** | | | | |
| VOCs [4] | TO-15/TO-15 Low Level | 6-L Summa canister collected via flow controller for 24 hours | None | 7 Days polar compounds/ 14 days non-polar compounds [5] |
| **Groundwater (Task 4)** | | | | |
| TCL VOCs + 10 TICs [6] | 8260B | 3 x 40 mL VOA | None | 7 Days |
| Nitrate/Nitrite | 300 | 250 ml Poly | None | 28 Days |
| Chloride | 300 | 125 ml Poly | None | 28 Days |
| Sulfate | 300 | 250 ml Poly | None | 28 Days |
| Total Alkalinity | 310 | 250 ml Poly | None | 14 Days |
| Iron (total) | ILM04.1 | 250 ml Poly | pH < 2 $HNO_3$ | 180 Days |
| Iron (dissolved) | ILM04.1 | 250 ml Poly | pH < 2 $HNO_3$ | 180 Days |
| **Investigation-Derived Waste** | | | | |
| TCLP Leaching (ZHE) | 1311 | 2 x 4 oz. Glass | None | 7 Days |
| TCLP VOCs | 8260B | | | 7 Days from leaching |
| TCLP Leaching (non-ZHE) | 1311 | 1 x 16 oz. Glass | None | 5 Days for extractable organics and mercury; 180 days for other metals |
| TCLP SVOCs | 8270C | | | 7 Days from leaching to preparative extraction; 40 days from extraction to analysis |
| TCLP Pesticides | 8081A | | | 7 Days from leaching to preparative extraction; 40 days from extraction to analysis |
| TCLP Herbicides | 8151A | | | 7 Days from leaching to preparative extraction; 40 days from extraction to analysis |
| TCLP Metals | 6010B/7470A | | | Mercury - 28 days from leaching to analysis; Other metals - 180 days from leaching to analysis |
| Reactivity | SW-846 Ch. 7, Sec. 3 | | | As soon as possible |
| Ignitability | 1010/1030 | | | |
| Corrosivity (pH) | 9040B/9045C | | | |

**NOTES:**

1. NYSDEC Analytical Services Protocol (ASP), June 2000 Edition.
2. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, January 1999.
3 - All holding times are from validated time of sample receipt (VTSR) at the laboratory unless otherwise noted.
4 - Laboratory standard list of VOCs.
5 - ASP holding time not established. Holding time is from VTSR at the laboratory, based on USEPA Region II validation guidelines.
6 - TCL VOCs as listed in USEPA CLP OLM04.2.

VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
TCLP - Toxicity Characterisitic Leaching Procedure
TICs - Tentatively Identified Compounds

# FIGURES

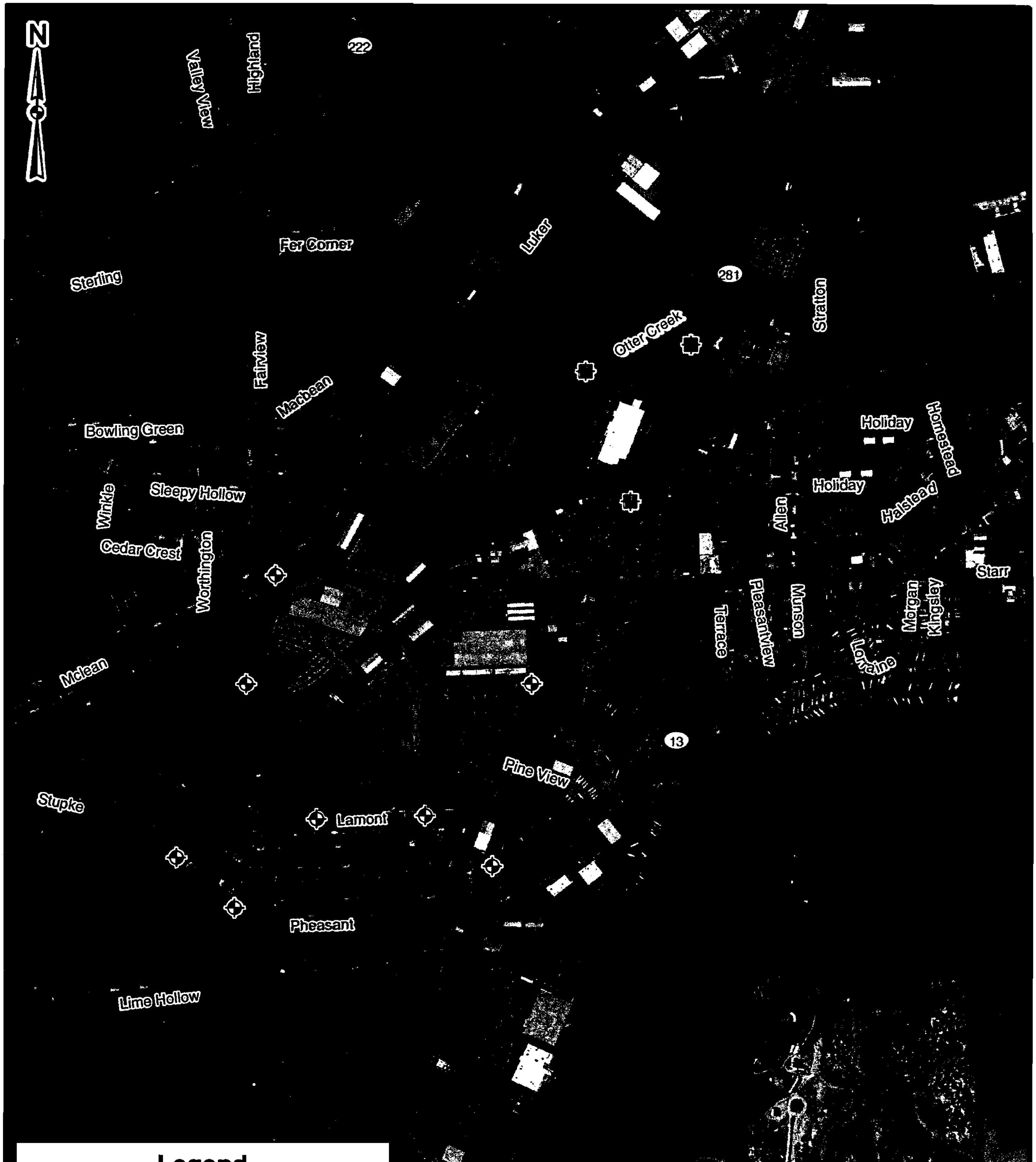



SOURCE: USGS 7.5 Minute Quadrangle
Cortland, NY - 1955

2,000 0 2,000
Feet

| URS | SCM - CORTLANDVILLE<br>SITE LOCATION MAP | FIGURE 1 |
| --- | --- | --- |

J:\11174500.00000\DB\GIS\SITE LOCATION.mxd
1/24/2006




**Legend**

- Proposed Shallow / Deep Well Pair
- Proposed Shallow Well

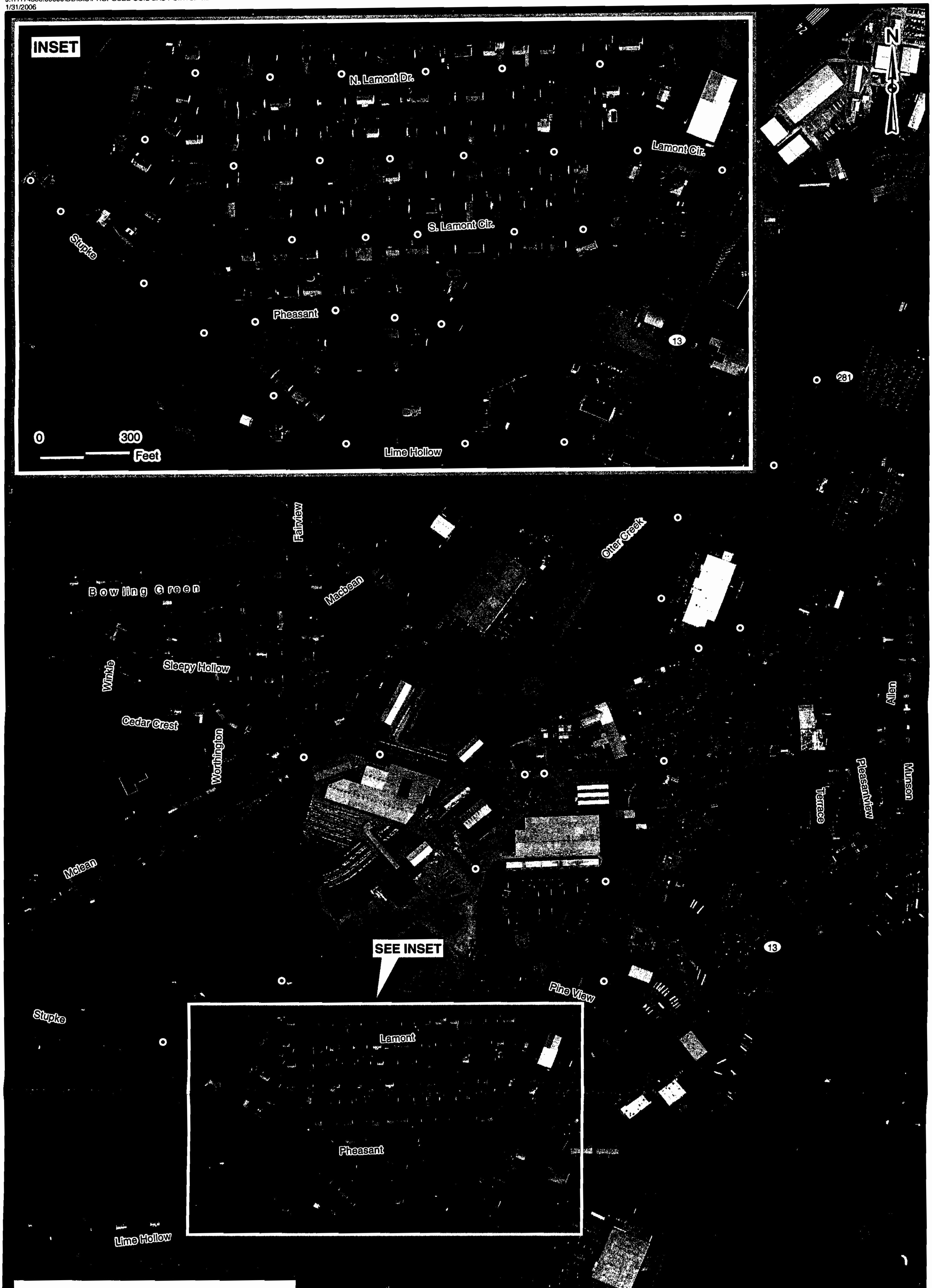
SOURCE: NYSGIS Clearinghouse Digital Orthoimagery
Cortland County - 2003

1,000 0 1,000 Feet

| | | |
|---|---|---|
| URS | SCM - CORTLANDVILLE<br>PROPOSED GROUNDWATER MONITORING WELL MAP | FIGURE 2 |

J:\11174500.00000\DB\GIS\PROPOSED GROUNDWATER MONITORING WELLS.mxd
1/25/2006

J:\11174500.00000\DB\GIS\PROPOSED SOIL GAS POINTS.mxd
1/31/2006




**Legend**

⊙ Proposed Soil Gas Point

SOURCE: NYSGIS Clearinghouse Digital Orthoimagery
Cortland County - 2003

600 0 600 Feet

| URS | SCM - CORTLANDVILLE<br>PROPOSED SOIL GAS POINT LOCATION MAP | FIGURE 3 |
|---|---|---|

# APPENDIX A

# FIELD ACTIVITY FORMS

**DAILY DRILLING RECORD** ***URS Corporation***

PROJECT TITLE: ______________________ DATE: ______________________

CLIENT: ______________________ CONTRACTOR: ______________________

| FROM | TO | PRODUCTIVE HOURS | ACTIVITIES/COMMENTS |
|---|---|---|---|
| | | | |
| | | | |
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| | | | |
| | | | |
| **TOTAL PRODUCTIVE HOURS** | | | LEVEL B / LEVEL C / LEVEL D<br>(CIRCLE ONE SELCTION) |

| LABOR: | | MATERIALS / SUPPLIES: | |
|---|---|---|---|
| UNITS | | UNITS | |
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WEATHER:

______________________ URS ONSITE COORDINATOR

______________________ CONTRACTOR REPRESENTATIVE

**URS**

## DAILY INSTRUMENT CALIBRATION CHECK SHEET

| DATE | INSTRUMENT | BATTERY CHECK OK? | ZERO ADJUST OK? | CALIBRATION GAS (PPM) | READING (PPM) | CALIBRATED BY |
|---|---|---|---|---|---|---|
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| *URS Corporation* | | | | | | | | | | **TEST BORING LOG** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | BORING NO: |
| PROJECT: | | | | | | | | | | SHEET: 1 of 1 |
| CLIENT: | | | | | | | | | | JOB NO.: |
| BORING CONTRACTOR: | | | | | | | | | | BORING LOCATION: |
| GROUNDWATER: | | | | | | CAS. | SAMPLER | CORE | TUBE | GROUND ELEVATION: |
| DATE | TIME | LEVEL | TYPE | | TYPE | | | | | DATE STARTED: |
| | | | | | DIA. | | | | | DATE FINISHED: |
| | | | | | WT. | | | | | DRILLER: |
| | | | | | FALL | | | | | GEOLOGIST: |
| | | | | | * POCKET PENETROMETER READING | | | | | REVIEWED BY: |

| DEPTH FEET | SAMPLE TIME | SAMPLE NO. | SAMPLE TYPE | SAMPLE BLOWS PER 6" | SAMPLE ROD% | DESCRIPTION COLOR | DESCRIPTION CONSISTENCY HARDNESS | DESCRIPTION MATERIAL DESCRIPTION | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
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|---|---|
| COMMENTS: | PROJECT NO.<br>BORING NO. |

| *URS Corporation* | **TEST BORING LOG** |
|---|---|
| | BORING NO: |
| PROJECT: | SHEET: 2 of 2 |
| CLIENT: | JOB NO.: |
| BORING CONTRACTOR: | BORING LOCATION: |
| GROUNDWATER: | GROUND ELEVATION: |

| DATE | TIME | LEVEL | TYPE | | CAS. | SAMPLER | CORE | TUBE |
|---|---|---|---|---|---|---|---|---|
| | | | | TYPE | | | | |
| | | | | DIA. | | | | |
| | | | | WT. | | | | |
| | | | | FALL | | | | |
| | | | | * POCKET PENETROMETER READING | | | | |

DATE STARTED:
DATE FINISHED:
DRILLER:
GEOLOGIST:
REVIEWED BY:

| DEPTH FEET | SAMPLE | | | | | DESCRIPTION | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | TIME | NO. | TYPE | BLOWS PER 6" | ROD% | COLOR | CONSISTENCY HARDNESS | MATERIAL DESCRIPTION | |
| | | | | | | | | | |

| COMMENTS: | PROJECT NO.<br>BORING NO. |
|---|---|

# WELL DEVELOPMENT LOG

*URS Corporation*

PROJECT TITLE: ______________________ WELL NO.: ______________

PROJECT NO.: ______________________

STAFF: ______________________

DATE(S): ______________________

| | | | WELL ID. | VOL. (GAL/FT) |
|---|---|---|---|---|
| 1. TOTAL CASING AND SCREEN LENGTH (FT.) | = | ________ | 1" | 0.04 |
| 2. WATER LEVEL BELOW TOP OF CASING (FT.) | = | ________ | 2" | 0.17 |
| 3. NUMBER OF FEET STANDING WATER (#1 - #2) | = | ________ | 3" | 0.38 |
| 4. VOLUME OF WATER/FOOT OF CASING (GAL.) | = | ________ | 4" | 0.66 |
| 5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4) | = | ________ | 5" | 1.04 |
| 6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x ___ ) | = | ________ | 6" | 1.50 |
| 7. VOLUME OF WATER ACTUALLY REMOVED (GAL.) | = | ________ | 8" | 2.60 |

OR

$V=0.0408 \times (\text{CASING DIAMETER})^2$

| | ACCUMULATED VOLUME PURGED (GALLONS) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETERS | | | | | | | | | | | |
| pH | | | | | | | | | | | |
| SPEC. COND. (umhos) | | | | | | | | | | | |
| APPEARANCE | | | | | | | | | | | |
| TEMPERATURE (°C) | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

COMMENTS:

# WELL PURGING LOG

***URS Corporation***

PROJECT TITLE: ______________________ WELL NO.: ______________

PROJECT NO.: ______________________

STAFF: ______________________

DATE(S): ______________________

| | | | WELL ID. | VOL. (GAL/FT) |
|---|---|---|---|---|
| 1. TOTAL CASING AND SCREEN LENGTH (FT.) | = | | 1" | 0.04 |
| 2. WATER LEVEL BELOW TOP OF CASING (FT.) | = | | 2" | 0.17 |
| 3. NUMBER OF FEET STANDING WATER (#1 - #2) | = | | 3" | 0.38 |
| 4. VOLUME OF WATER/FOOT OF CASING (GAL.) | = | | 4" | 0.66 |
| 5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4) | = | | 5" | 1.04 |
| 6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x 3) | = | | 6" | 1.50 |
| 7. VOLUME OF WATER ACTUALLY REMOVED (GAL.) | = | | 8" | 2.60 |

OR

$V=0.0408 \times (\text{CASING DIAMETER})^2$

| PARAMETERS | ACCUMULATED VOLUME PURGED (GALLONS) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| pH | | | | | | | | | | | |
| SPEC. COND. (umhos) | | | | | | | | | | | |
| APPEARANCE | | | | | | | | | | | |
| TEMPERATURE (°C) | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

COMMENTS:

## DRILLING SUMMARY

**Geologist:**

**Drilling Company:**

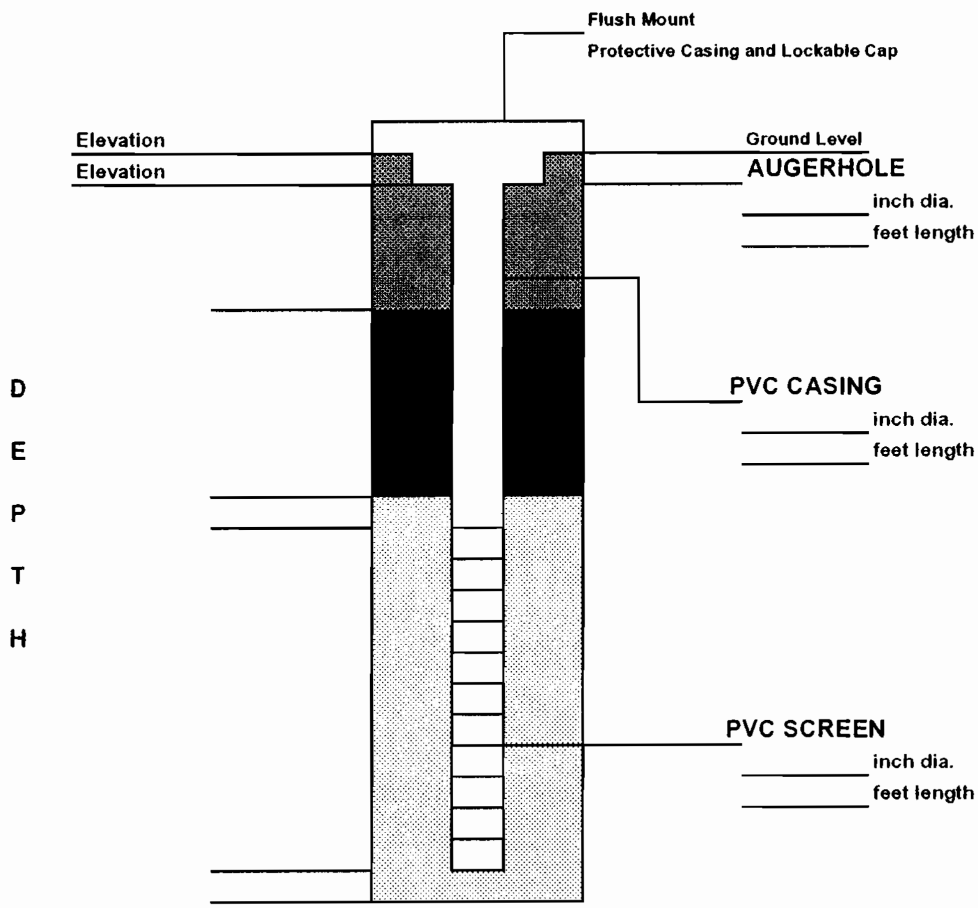
**Driller:**

**Rig Make/Model:**

**Date:**

## GEOLOGIC LOG

| Depth(ft.) | Description |
|---|---|
| | |

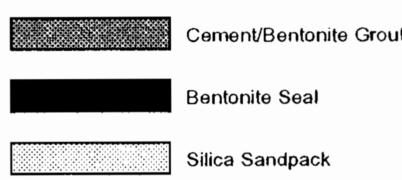



## WELL DESIGN

| *CASING MATERIAL* | *SCREEN MATERIAL* | *FILTER MATERIAL* |
|---|---|---|
| **Surface:** Steel grade box | **Type:** 4" PVC | **Type:** #2 Sand **Setting:** |
| | | *SEAL MATERIAL* |
| **Monitor:** 4" PVC | **Slot Size:** .020" | **Type:** Bentonite **Setting:** |

*COMMENTS:*

*LEGEND*




| **Client:** | **Location:** | **Project No.:** |
|---|---|---|
| *URS Corporation* | **MONITORING WELL CONSTRUCTION DETAILS** | **Well Number:** |

**DRILLING SUMMARY**

Geologist:

Drilling Company:

Driller:

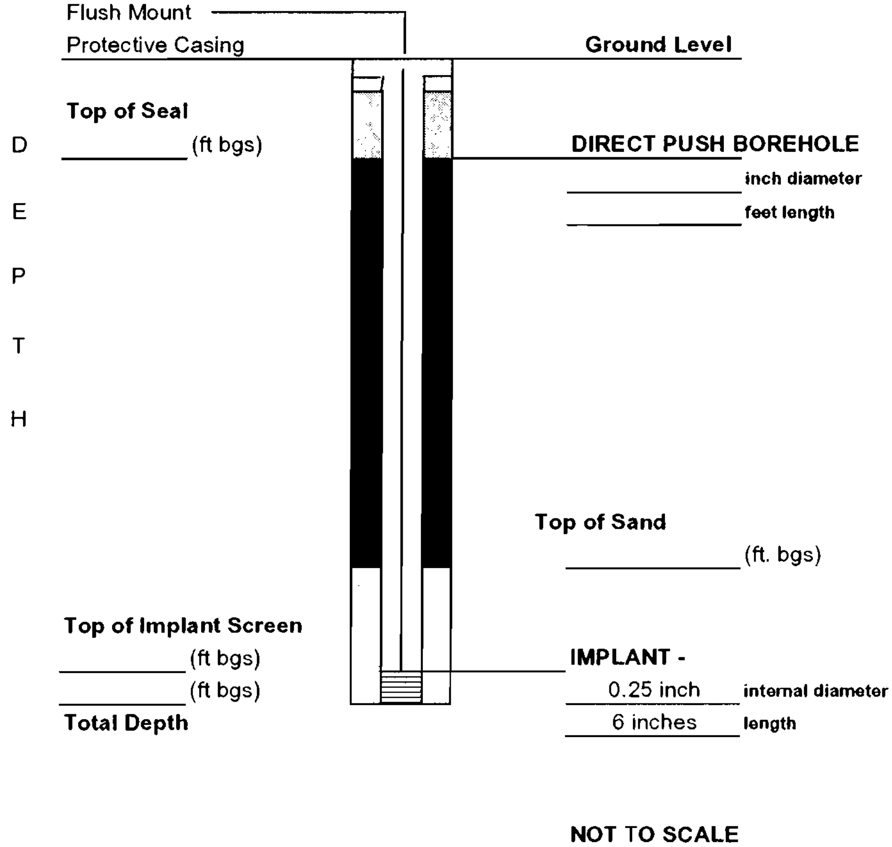
Rig Make/Model:

Date:

**GEOLOGIC LOG**

| Depth(ft.) | Description |
|---|---|
| | |

**WELL DESIGN**




| CASING MATERIAL | SCREEN MATERIAL | FILTER MATERIAL |
|---|---|---|
| Surface: Steel flush-mount<br>Well: 3/8 inch OD polyethylene tubing | Type: 6 inch stainless steel implant<br>Pore Diameter: 0.007 inch | Type: #1 Sand Setting:<br>*SEAL MATERIAL*<br>Type: Bentonite Granuals Setting: |

*COMMENTS:*

Implant conncted to anchor point at bottom of boring. 3/8 inch outside diameter (OD) poly tubing connected from implant to surface for soil gas sampling.

*LEGEND*

Cement/Bentonite Grout

Bentonite Seal

Silica Sandpack

| Client: NYSDEC | Location: | Project No.: |
|---|---|---|
| ***U R S Corporation*** | **SOIL VAPOR CONDUIT CONSTRUCTION DETAILS** | **Well Number:** |

**NEW YORK STATE DEPARTMENT OF HEALTH**
**INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY**
**CENTER FOR ENVIRONMENTAL HEALTH**

This form must be completed for each residence involved in indoor air testing.

Preparer's Name ______________________________ Date/Time Prepared ____________

Preparer's Affiliation ___________________________ Phone No.__________________

Purpose of Investigation_____________________________________________________

**1. OCCUPANT:**

**Interviewed: Y / N**

Last Name: _____________________ First Name: _____________________

Address: _____________________________________________________

County: ______________

Home Phone: ________________ Office Phone: _________________

Number of Occupants/persons at this location ______ Age of Occupants ____________________

**2. OWNER OR LANDLORD:** (Check if same as occupant ___ )

**Interviewed: Y / N**

Last Name: _____________________First Name: _______________________

Address: _____________________________________________________

County: ______________

Home Phone: ________________ Office Phone: _________________

**3. BUILDING CHARACTERISTICS**

**Type of Building:** (Circle appropriate response)

| | | |
|---|---|---|
| Residential | School | Commercial/Multi-use |
| Industrial | Church | Other: ______________ |

**If the property is residential, type?** (Circle appropriate response)

| | | |
|---|---|---|
| Ranch | 2-Family | 3-Family |
| Raised Ranch | Split Level | Colonial |
| Cape Cod | Contemporary | Mobile Home |
| Duplex | Apartment House | Townhouses/Condos |
| Modular | Log Home | Other:_______________ |

**If multiple units, how many?** ________

**If the property is commercial, type?**

Business Type(s) ______________________________________

Does it include residences (i.e., multi-use)? Y / N If yes, how many? ______

**Other characteristics:**

Number of floors______ Building age______

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

**4. AIRFLOW**

**Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:**

Airflow between floors

_______________________________________________________________

_______________________________________________________________

_______________________________________________________________

Airflow near source

_______________________________________________________________

_______________________________________________________________

_______________________________________________________________

Outdoor air infiltration

_______________________________________________________________

_______________________________________________________________

_______________________________________________________________

Infiltration into air ducts

_______________________________________________________________

_______________________________________________________________

_______________________________________________________________

5. **BASEMENT AND CONSTRUCTION CHARACTERISTICS** (Circle all that apply)

| | | | | |
|---|---|---|---|---|
| **a. Above grade construction:** | wood frame | concrete | stone | brick |
| **b. Basement type:** | full | crawlspace | slab | other ________ |
| **c. Basement floor:** | concrete | dirt | stone | other ________ |
| **d. Basement floor:** | uncovered | covered | covered with ______________ | |
| **e. Concrete floor:** | unsealed | sealed | sealed with _______________ | |
| **f. Foundation walls:** | poured | block | stone | other ________ |
| **g. Foundation walls:** | unsealed | sealed | sealed with _______________ | |
| **h. The basement is:** | wet | damp | dry | moldy |
| **i. The basement is:** | finished | unfinished | partially finished | |
| **j. Sump present?** | Y / N | | | |
| **k. Water in sump?** | Y / N / not applicable | | | |

**Basement/Lowest level depth below grade:** ________(feet)

**Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)**

_______________________________________________________________________________

_______________________________________________________________________________

6. **HEATING, VENTING and AIR CONDITIONING** (Circle all that apply)

**Type of heating system(s) used in this building: (circle all that apply – note primary)**

| | | | |
|---|---|---|---|
| Hot air circulation | Heat pump | Hot water baseboard | |
| Space Heaters | Stream radiation | Radiant floor | |
| Electric baseboard | Wood stove | Outdoor wood boiler | Other __________ |

**The primary type of fuel used is:**

| | | |
|---|---|---|
| Natural Gas | Fuel Oil | Kerosene |
| Electric | Propane | Solar |
| Wood | Coal | |

**Domestic hot water tank fueled by:** _________________________

**Boiler/furnace located in:** Basement Outdoors Main Floor Other__________

**Air conditioning:** Central Air Window units Open Windows None



**Are there air distribution ducts present?** Y / N

**Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.**

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

## 7. OCCUPANCY

**Is basement/lowest level occupied?** Full-time Occasionally Seldom Almost Never

| **Level** | **General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)** |
|---|---|
| Basement | ______________________________ |
| 1st Floor | ______________________________ |
| 2nd Floor | ______________________________ |
| 3rd Floor | ______________________________ |
| 4th Floor | ______________________________ |

## 8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. **Is there an attached garage?** Y / N

b. **Does the garage have a separate heating unit?** Y / N / NA

c. **Are petroleum-powered machines or vehicles stored in the garage** (e.g., lawnmower, atv, car) Y / N / NA Please specify__________________

d. **Has the building ever had a fire?** Y / N When?__________________

e. **Is a kerosene or unvented gas space heater present?** Y / N Where? __________________

f. **Is there a workshop or hobby/craft area?** Y / N Where & Type? __________________

g. **Is there smoking in the building?** Y / N How frequently? __________________

h. **Have cleaning products been used recently?** Y / N When & Type? __________________

**i. Have cosmetic products been used recently?** Y / N When & Type? ______________



**j. Has painting/staining been done in the last 6 months?** Y / N Where & When? ______________

**k. Is there new carpet, drapes or other textiles?** Y / N Where & When? ______________

**l. Have air fresheners been used recently?** Y / N When & Type? ______________

**m. Is there a kitchen exhaust fan?** Y / N If yes, where vented?____________

**n. Is there a bathroom exhaust fan?** Y / N If yes, where vented?____________

**o. Is there a clothes dryer?** Y / N If yes, is it vented outside? Y / N

**p. Has there been a pesticide application?** Y / N When & Type?______________

**Are there odors in the building?** Y / N
If yes, please describe: ______________________________________________

**Do any of the building occupants use solvents at work?** Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? ______________________________________

If yes, are their clothes washed at work? Y / N

**Do any of the building occupants regularly use or work at a dry-cleaning service?** (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) No
Yes, use dry-cleaning infrequently (monthly or less) Unknown
Yes, work at a dry-cleaning service

**Is there a radon mitigation system for the building/structure?** Y / N Date of Installation: ____________
**Is the system active or passive?** Active/Passive

**9. WATER AND SEWAGE**

| | | | | | |
|---|---|---|---|---|---|
| **Water Supply:** | Public Water | Drilled Well | Driven Well | Dug Well | Other: _______ |
| **Sewage Disposal:** | Public Sewer | Septic Tank | Leach Field | Dry Well | Other: _______ |

**10. RELOCATION INFORMATION (for oil spill residential emergency)**

**a. Provide reasons why relocation is recommended:** ______________________________

**b. Residents choose to:** remain in home relocate to friends/family relocate to hotel/motel

c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N



## 11. FLOOR PLANS

**Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.**

**Basement:**

**First Floor:**

# CHAIN OF CUSTODY RECORD

URS

PROJECT NO. | SITE NAME

SAMPLERS (PRINT/SIGNATURE)

LAB ______

COOLER ______ of ______

PAGE ______ of ______

DELIVERY SERVICE: ______ AIRBILL NO.: ______

| LOCATION IDENTIFIER | DATE | TIME | COMP/ GRAB | SAMPLE ID | MATRIX | TOTAL NO.# OF CONTAINERS | TESTS / BOTTLE TYPE AND PRESERVATIVE | | | | | | | | REMARKS | SAMPLE TYPE | BEGINNING DEPTH (IN FEET) | ENDING DEPTH (IN FEET) | FIELD LOT NO.# (IRPIMS ONLY) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | |
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**MATRIX CODES**

AA - AMBIENT AIR
SE - SEDIMENT
SH - HAZARDOUS SOLID WASTE
SL - SLUDGE
WP - DRINKING WATER
WW - WASTE WATER
WG - GROUND WATER
SO - SOIL
DC - DRILL CUTTINGS
WL - LEACHATE
GS - SOIL GAS
WC - DRILLING WATER
WO - OCEAN WATER
WS - SURFACE WATER
WQ - WATER FIELD QC
LH - HAZARDOUS LIQUID WASTE
LF - FLOATING/FREE PRODUCT ON GW TABLE

**SAMPLE TYPE CODES**

TB# - TRIP BLANK
SD# - MATRIX SPIKE DUPLICATE
RB# - RINSE BLANK
FR# - FIELD REPLICATE
N# - NORMAL ENVIRONMENTAL SAMPLE
MS# - MATRIX SPIKE

(# - SEQUENTIAL NUMBER (FROM 1 TO 9) TO ACCOMMODATE MULTIPLE SAMPLES IN A SINGLE DAY)

| RELINQUISHED BY (SIGNATURE) | DATE | TIME | RECEIVED BY (SIGNATURE) | DATE | TIME |
|---|---|---|---|---|---|
| | | | | | |
| RELINQUISHED BY (SIGNATURE) | DATE | TIME | RECEIVED FOR LAB BY (SIGNATURE) | DATE | TIME |
| | | | | | |

SPECIAL INSTRUCTIONS

*Distribution: Original accompanies shipment, copy to coordinator field files*

URSF-075C/1 OF 1/CofCR/GCM

# Summa Canister Sampling Field Data Sheet

Site:

Samplers:

Date:

| | | | | | |
|---|---|---|---|---|---|
| Sample # | | | | | |
| Location | | | | | |
| Summa Canister ID (Lab ID, if provided) | | | | | |
| Additional Tubing Added | NO/ YES - How much | NO/ YES - How much | NO/ YES - How much | NO/ YES - How much | NO/ YES - How much |
| Purge Time (Start) | | | | | |
| Purge Time (Stop) | | | | | |
| Total Purge Time (min) | | | | | |
| Pressure Gauge - before sampling | | | | | |
| Sample Time (Start) | | | | | |
| Sample Time (Stop) | | | | | |
| Total Sample Time (min) | | | | | |
| Pressure Gauge - after sampling | | | | | |
| Canister Pressure Went To Ambient Pressure? | YES / NO | YES / NO | YES / NO | YES / NO | YES / NO |
| General Comments: | | | | | |