Soil Vapor Point Installation Work Plan
Dow Essex/Hope Site, Jamestown, NY

1.0 Background

URS completed (for Dow Chemical) the Phase II offsite investigations for groundwater at the Essex/Hope Site in February, 2006. Three (3) distinct offsite groundwater zones have been identified which contain VOCs that originated from the site. One of these zones, identified as the shallow groundwater north area, is adjacent and beneath two (2) residential buildings located on Hopkins Ave. and Bigelow St. The depth to the shallow groundwater is approximately 9 ft below ground surface (BGS).

NYDEC has requested that Dow assess the potential impacts on residential air from the shallow groundwater VOCs. This Work Plan summarizes the approach for soil vapor point installation at the two residential locations.

2.0 Vapor Point Installation Method

URS proposes to install four (4) soil vapor monitoring points at each residence, generally, one on each side of the building. The points will be placed in native (non-fill) soils, if present, as close to the structures as possible. Due to the proposed shallow depth of the soil vapor sampling points, all eight locations will be installed using direct-push drilling methods. The boreholes will be advanced to approximately 8 feet bgs and a 6-inch length of stainless steel screen (½ in. dia. implants) attached to ¼-inch diameter polyethylene tubing will be placed in the borehole. The polyethylene tubing will be extended to ground surface. See the attached information on the vapor points. The borehole will then be backfilled with quartzite coarse-grained sand to 1.5 feet bgs. A 1-foot bentonite seal with then be placed in the borehole and the top six-inches will be finished with cement and a permanent flushmount well casing.

3.0 Sample Collection

Two (2) samples will be taken from each vapor point. The first soil vapor sampling will commence no sooner than 24 hours after installation of the vapor points. The second sample round will occur 30 days later.

The field team conducting the sampling will record all pertinent information on Field Sheets. Soil vapor points will be purged of one to three times the volume of the sampling point (tubing and screened area combined). Air will be evacuated from the vapor point via a peristaltic pump. Initailly, the purge rate will be set high to evacuate any residual moisture. A Gilian Calibration Unit will be utilized to set the flow rate via the peristaltic pump. When the air flow rate is approximately 300 cubic centimeters/minute (ccm), the purged air will be passed through a RAE Systems MultiRAE Plus 11.7 eV lamp, capable of data logging, to monitor concentrations of oxygen, percent lower explosive limit (%LEL/ Methane), organic vapors and carbon monoxide

for a minimum of one minute per foot of tubing in the boring. All field parameter measurements will be recorded.
Soil vapor samples will be collected using a 6-liter summa canister with a thirty-minute flow controller. During purging, the soil vapor will be continuously monitored with a triple gas meter (O2, CO2, and CH4) and a PID to ensure that the analytical data that is collected is consistent with field conditions. Samples will be obtained by extracting soil vapor from the sample tube at a flow rate that does not exceed 0.2 liters per minute. Laboratory cleaned and blanked Summa canisters will be used to collect the samples. Sampling flow rate is set based on the generated sampling vacuum and is maintained at a point that minimizes leakage from ambient air.

In order to ensure that no ambient air leaks into the sample, helium or another appropriate tracer gas will be used as a quality assurance/quality (QA/QC) control measure. Prior to sampling, during purging activities, the atmosphere surrounding the soil vapor probe interface with the ground surface will be enriched with helium. A portable monitoring device will be utilized to analyze the soil vapor being purged from the vapor probe to determine if helium is present in elevated amounts. If helium is detected, the vapor probe to ground surface interface will be evaluated and resealed as appropriate. Once the soil vapor sample has been collected, the tracer gas test will be repeated to ensure that the seal has remained intact. The results of the tracer gas test will be included with the sample analytical results to NYSDEC as part of the QA/QC program.

3.1 Sample Analyses

Soil vapor samples will be analyzed for the following compounds:

- Vinyl chloride
- Cis-1,2 dichloroethylene
- Trichloroethylene
- Benzene
- Toluene
- Xylenes
- Cumene
- Ethylbenzenes

Once all soil vapor samples have been collected, URS will forward all samples, under proper chain-of-custody to Microseeps Labs, Pittsburgh, PA location for analysis of the above compounds via USEPA Method TO-15. Microseeps maintains a current Environmental Laboratory Approval Program (ELAP) certification and is approved by NYSDEC.

3.2 Sub-Slab and Indoor Air Vapor Sampling Assessment

The soil vapor analytical data will be evaluated to determine if the data indicates a need for sub-slab vapor sampling in the two homes located over or directly adjacent to the groundwater plume of the Site. If all of the VOCs are not detected in the soil vapor samples, Dow will not proceed with sub-slab sampling. In the event that one or more of these site- related compounds are detected in the soil vapor near the homes, Dow will proceed with an assessment of sub-slab and indoor air sampling, or direct installation of vapor venting system installation.

4.0 Sub-Slab and Indoor Air Vapor Sampling (contingent plan)

The soil vapor analytical data will be evaluated to determine if the data indicates a need for sub-slab vapor sampling in the homes located over or directly adjacent to the groundwater plume of the Site. If all of the VOCs are not detected in the soil vapor samples, Dow will not proceed with sub-slab sampling.

4.1.1 Preliminary Home Condition Investigation

Prior to installation of any sub-slab vapor points, a preliminary investigation of the conditions present in the home will take place. This will be performed following the guidance as contained in the NYSDOH document "Indoor Air Sampling & Analysis Guidance – Feb. 1, 2005". The field team will take an inventory of all volatile chemicals stored in the home near the proposed sampling location(s). The number of sampling locations needed in each of the homes will be determined at this point and based on the number of different types of slabs that were used in the homes construction. Two (2) sub-slab vapor points are assumed to be sampled in each of the homes, however this can not be verified until the preliminary investigation is performed.

The condition of the slab where the vapor points are going to be installed will be inspected. Any cracks, holes, or other breaches in the slab will be measured and noted in the field logbook. In addition, the field team will note any staining observed on the slab and sketch the floor plan into the logbook. If possible, photographs of the area surrounding the proposed sampling point will be taken.

4.1.2 Sub-Slab Vapor Point Installation

Sub-slab vapor points will be installed into the gravel layer located directly beneath the slab. A 4-inch coring bit will be used to penetrate the concrete slab at each sampling location. Following removal of the concrete core, all sub-slab sampling locations will be installed using a 3-inch diameter hand auger. The boreholes will be advanced to no more than two inches into the gravel layer and ¼-inch diameter stainless steel tubing will be placed in the borehole. The tubing will be extended to the surface of the slab. The borehole will then be backfilled with quartzite coarse-grained sand so that about 1-inch of the tubing is covered. The vapor point will then be sealed to the surface with cement.

4.1.3 Sub-Slab Vapor and Indoor Air Sample Collection

On the day of the sampling event, the field team will note the approximate temperature in the home and verify that the heating system has been operational for at least 24 hours. Sub-slab vapor points will be purged of one to three times the volume of the sampling point (tubing area). During purging, the soil vapor will be continuously monitored with a multi-parameter gas meter (O2, CO2, and CH4) and a PID to ensure that the analytical data that is collected is consistent with field conditions.

As recommended by the NYSDOH Draft Guidance Document, indoor air samples will be collected simultaneously with the sub-slab samples. Indoor air samples will be collected from

each room where a sub-slab sample is collected. Sample ports will be set approximately 4 feet above the ground surface to obtain representative breathing zone samples.

Samples will be obtained by extracting soil vapor and indoor air from the sample tube at a flow rate that does not exceed 0.2 liters per minute. Laboratory cleaned and blanked Summa canisters will be used to collect the samples. Sampling flow rate is set based on the generated sampling vacuum and is maintained at a point that minimizes leakage from ambient air.

4.1.4 Sample Analyses

As described previously, sub-slab and indoor vapor samples will be analyzed by method TO-15 for the same group of VOC compounds.