Soil Vapor Migration Through Subsurface Utilities

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Presentation Outline

- Initial Investigation
- Investigation Area
- Subsequent Investigation
  - Approach
  - Results
Initial Investigation

- State agency initial investigation
  - Residential area adjacent to industrial area
Initial Investigation (cont’d)

- Limited detections of PCE and TCE in shallow groundwater
  - No detections in 7 of 9 wells
  - BTEX (low levels) found in 8 of 9 wells
Initial Investigation (cont’d)

- Sporadic detections of PCE and TCE in soil vapor
  - PCE in 26 of 43 sample points (3 >100 µg/m³)
  - TCE in 16 of 43 sample points (4 >50 µg/m³)
Sample Annotation:

J: Compound detected below reporting limit, value is approximate.
A: Compound detected in duplicate sample, highest concentration shown.

Soil vapor samples were analyzed for VOCs by EPA Method TO-15. Units for soil vapor samples are micrograms per cubic meter (μg/m³).
Subsequent Investigation Objective

- Further investigation required by State agency
  - In area of 3 highest PCE and TCE soil vapor results
  - What is source of PCE / TCE in soil vapor?

![Investigation Area Image]
Investigation Area

- **Geology**
  - 4-10 foot clay / glacial till overburden on top of bedrock

- **Subsurface utilities**
  - Under most streets, incised in bedrock, 8-13 bgs
Investigation Area (cont’d)

- Hydrogeology
  - 2-6 feet bgs
  - Shall flow vertically downward and toward incised sewers
Investigation Goals

1. Develop soil vapor conceptual model
   - Groundwater plume
     - Lack of GW detections
     - Sporadic soil vapor detections
   - Vadose zone migration
     - Shallow and low porosity vadose zone
     - Significant distance between industrial area and soil vapor detections
   - Subsurface utility migration
     - Sewers within residential area and between industrial area

2. Assess potential of SVI
Field Investigation

- **Sampling objectives**
  - Evaluate SV migration from sewers
  - Evaluate the potential for migration to buildings

- **Sampling approach**
  - Soil vapor
    - 6 series of 3 sample points
    - Each series at increasing distances from respective sewer
      - 1 – near sewer
      - 2 – represent front house setback
      - 3 – represent back of house setback
  - Sewer vapor
  - Lateral utility
Conceptual Elevation Schematic
Soil Vapor Sampling
Sample Results
## Sampling Results

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<th>TCE</th>
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Conclusions

- TCE / PCE present or migrating through utility corridor
- Soil vapor diffusion in overburden is limited
- Primary industrial discharge along Buffalo Ave./27th Street may be contributing to soil vapor in the utility corridor
QUESTIONS?
THANK YOU