

A Breath of “Fresh Air”: Evaluating the Role of Sewer Pathways in Vapor Intrusion

Thomas McHugh (temchugh@gsi-net.com) (GSI Environmental, Houston, TX, USA)
Lila Beckley (GSI Environmental, Austin, TX, USA)

Background/Objectives. Although the potential importance of preferential pathways is highlighted in many vapor intrusion guidance documents, there is little useful guidance on how to identify sites with preferential pathways and how to test for the presence or absence of VOCs in such pathways. As a result, there are no consistent procedures for evaluation of preferential pathways when assessing vapor intrusion. There are now a number of sites documented in the literature where sewer lines have been identified as important preferential pathways for vapor intrusion. However, at most of these sites, the role of the sewer was discovered only late in the investigation process.

Approach/Activities. Through a research project funded by the Department of Defense ESTCP program, we have developed a step-wise protocol for evaluation of sewer preferential pathways at vapor intrusion sites. This protocol includes i) preliminary screening to eliminate sites where sewers are unlikely to act as preferential pathways, ii) procedures for initial testing of sewers at locations most likely to be impacted by VOCs, and iii) delineation and building testing. We have implemented and refined this protocol through testing at several sites where VOCs were known to be present in sewer lines.

Results/Lessons Learned. VOCs can enter sewer lines through infiltration of contaminated groundwater, direct discharge of contaminated water into the sewer line, or, in some cases, infiltration of soil gas. The spatial and temporal variability within the sewer line depends on a variety of factors including the type of sewer (storm, sanitary, combined), the source of vapors (discharge, groundwater, soil gas), season, and rainfall events. In addition, at many sites with chlorinated VOCs in groundwater, vapor concentrations within sewer lines can be above typical soil gas screening levels. Tracer testing conducted as part of our research project showed that measurable gas exchange commonly occurs between sewer lines and connected buildings. As a result, when VOCs are present at elevated concentrations within sewer lines, there is likely to be some risk to connected buildings. Overall, our investigation results indicate that traditional sub-slab and indoor air testing provide an incomplete picture of vapor intrusion in some buildings.