

## The Autobahn of Vapor Intrusion Migration: Pathway Evaluation from a Sole Source Impacted Subsurface Sewer

**Aaron Friedrich** (aaron.friedrich@erm.com) (Environmental Resources Management, Indianapolis, IN, USA)

Andrew Wallace (andrew.wallace@erm.com) (Environmental Resources Management, Indianapolis, IN, USA)

**Background/Objectives.** The evaluation of atypical preferential pathways, such as subsurface sewers, presents a significant challenge when developing the vapor intrusion (VI) conceptual site model (CSM). While most preferential pathway assessments involve vapor or groundwater migrating preferentially in higher permeability strata around the outside of a sewer, there is very limited understanding on the methods necessary to evaluate potential exposure risks resulting from volatile organic compounds (VOCs) migration within a sewer. The sewer gas to indoor air migration pathway is an emerging preferential pathway for VI. At sites where VOC contamination is intersecting or near sewers, there should be increased attention on completing an adequate sewer gas to indoor air pathway assessment for potential contaminant migration.

**Approach/Activities.** Current VI and CSM guidance documents present concepts to consider when evaluating preferential pathways. However, there is limited descriptive guidance on the appropriate screening, sampling, evaluation, and mitigation methods associated with the sewer gas to indoor air migration pathway. Preliminary VI screening mechanisms, such as those based on the proximity to the source or attenuation factors, only comprise a small set of the multiple lines of evidence (MLE) that must be considered. VI CSMs must consider groundwater, sewer water, sewer gas, and soil gas and their corresponding interrelationship. This presentation will focus on the methods utilized during the pathway evaluation and the specific tasks completed to complete the pathway evaluation. In addition, a discussion of sampling methods (TO-15, TO-17, etc.) and assessment methods (e.g., vapor testing) will be presented.

**Results/Lessons Learned.** Attendees will learn i) a sampling approach for the sewer gas to indoor air pathway, ii) the screening data and criteria at locations where VOC-impacted groundwater is infiltrating a sewer, iii) CSM development tools to evaluate whether VI in structures is associated with subsurface sewers, and iv) techniques to mitigate the sewer gas to indoor air migration pathway. Additionally, a site-specific case study will be presented where the VI pathway is being solely sourced from impacts within a sewer. The data set from the site includes multiple data points from the sewer as well as the structures connected to that sewer.