

Improved Investigation Methods to Distinguish Between Vapor Intrusion and Indoor Sources of VOCs

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Indoor sources of volatile organic chemicals (VOCs) are ubiquitous, resulting in detectable concentrations in indoor air, often at concentrations above regulatory screening levels. At VOC contaminated sites with potential vapor intrusion concerns, the presence of indoor VOC sources significantly complicates the exposure pathway investigation. Because of these indoor sources, the detection of a site-related VOC in a potentially affected building at a concentration above the regulatory screening level does not necessarily indicate a vapor intrusion impact. Instead, additional analysis is required to determine the sources of the detected VOCs. We have developed several approaches to distinguish between vapor intrusion and indoor sources of VOCs including: i) use of a field-portable gas chromatograph/mass spectrometer (GS/MS) to evaluate the distribution of VOCs within a building and to identify specific indoor sources of VOCs, ii) collection of indoor air and sub-slab soil gas samples under controlled negative building pressure conditions designed to maximize vapor intrusion and controlled positive building pressure conditions designed to inhibit vapor intrusion, and iii) use of compound-specific stable isotope analysis to determine the original source of VOCs detected in indoor air samples. Each of these methods has been applied to one or more buildings potentially impacted by vapor intrusion and has proved useful to distinguish between vapor intrusion and indoor sources of VOCs.