

**VAPOR INTRUSION - EMERGING GUIDANCE, INVESTIGATIVE METHODS,
AND SAMPLING ISSUES**

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The current flux of subsurface vapor intrusion (SVI) regulations and guidance has the potential to impact thousands of petroleum sites across the nation. Most federal, state, and industry SVI guidance documents recommend a phased investigative approach, including: 1) developing a conceptual site model (CSM); 2) conducting exterior investigations (i.e., outside the buildings); and 3) if needed, performing interior building investigations (e.g., sub-slab soil gas and/or indoor air sampling). Statistically based external stratified grid soil gas sampling was conducted using 25-100 ft grid spacing, which resulted in up to a 100-percent probability that at least one sample will have been collected beneath a future building. Exterior near-slab petroleum hydrocarbon soil gas results were shown to statistically correlate with interior sub-slab results (N=36 per chemical). Exterior soil gas samples analyzed using a mobile laboratory were comparable (>90-percent correlation) with samples analyzed by a fixed laboratory. Additional case-study results and lessons learned will be presented to emphasize the importance of considering vapor leak testing, indoor and outdoor air sources, temporal and spatial variability, and future land use during SVI investigations. Recent data and efforts to account for bioattenuation of petroleum hydrocarbons during vapor intrusion investigations will also be summarized.