

Vapor intrusion services



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Areas of Expertise

- Regulatory analysis
- Field investigation/sampling
- Chemistry/data validation
- Modeling
- Risk assessment
- Public communication
- Mitigation and remediation

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Overview

Vapor intrusion is a growing environmental concern for anyone who owns, leases, operates, or occupies a building. Vapor intrusion occurs when chemicals present in soil or groundwater volatilize, migrate through the soil and enter an overlying building or structure. This process may pose health risks to people living or working in the building. The issue generally needs to be addressed for buildings at the point of the original release and for any nearby or downgradient buildings. Therefore, it can be a concern for both current and future buildings, and can involve industrial, commercial, and/or residential buildings. Vapor intrusion presents a substantial challenge for site managers and can be a high-profile issue with implications for an organization's reputation.

We have 25+ years of experience assisting our clients at hundreds of sites to solve their vapor intrusion challenges in a technically-sound, cost-effective manner. Our scientists and engineers are leaders in the vapor intrusion field and present at technical conferences and in leading journals. In addition, our staff have worked through organizations such as the Interstate Technology & Regulatory Council (ITRC) and ASTM International to develop vapor intrusion guidance documents and standards.

Areas of expertise

Regulatory analysis. Vapor intrusion regulations in the U.S. consist of a complex mix of federal and state documents. We excel in summarizing and interpreting the diverse guidance and standards related to vapor intrusion. We offer our clients strategies to help them make informed decisions that balance regulatory compliance with meeting portfolio-wide risk management objectives.

Field investigation/sampling. We design and execute field investigations that generate defensible data for vapor intrusion pathway assessment and provide a full range of environmental sampling services. Prior to collecting indoor air samples, we conduct targeted building surveys to document relevant building information, such as construction details and uses; heating, ventilation, and air conditioning (HVAC) systems; and potential indoor sources of volatile organic compounds (VOCs). Our field teams install sub-slab sampling points, perform leak tests, and verify sample integrity to obtain reliable sub-slab vapor data. We use calibrated, hand-held screening instruments, such as photoionization detectors (PID) and portable gas chromatograph/mass spectrometers (GC/MS), to comprehensively assess indoor areas and locate potential vapor entry points.

Our experience includes various innovative approaches, such as using radon as a tracer to develop site-specific attenuation factors, performing high-volume sub-slab vapor sampling to minimize the number of monitoring locations, sampling/analysis of potential confounding indoor sources that are unable to be removed prior to indoor air sampling, and using compound-specific isotope analysis to differentiate among potential sources.

Our experience ranges from single-building investigations to large-scale investigations of residential neighborhoods and commercial/industrial areas involving extensive multi-building measurements. We tailor each investigation to site conditions, stakeholder goals, and regulatory expectations to support confident decision-making.

Chemistry/data validation. Our chemistry team has extensive analytical laboratory experience and draws on that expertise when developing quality assurance plans, evaluating laboratories, and coordinating with field teams and analytical laboratories to ensure the appropriate analytical methods are used, ensuring that analytical data meet all data quality objectives (DQOs). Once the laboratory results are received, our chemists validate the data in accordance with National/Regional EPA, state-specific, or Department of Defense (DoD) protocols as appropriate to project requirements. At the conclusion of the project, the chemistry team generates a comprehensive data usability assessment, evaluating the overall sampling program and analytical results against project DQOs to determine if project objectives were met or if data gaps exist.



Vapor intrusion services *continued*



Modeling. Regulators have moved away from relying upon modeling as the primary line of evidence for evaluating vapor intrusion at existing buildings. Nonetheless, modeling remains a useful tool, particularly for undeveloped land or future use scenarios. We apply fate and transport modeling with appropriate conservatism, transparent inputs, and sensitivity/uncertainty analysis to produce defensible outputs for consideration in decision-making.

Risk assessment. Our risk assessors work closely with field teams to align investigation and assessment strategies with project DQOs and ensure the appropriate data is collected. We perform vapor intrusion assessments in accordance with applicable state and federal guidelines, serving both private and public sector clients. Our risk assessment services range from simple screening-level evaluations to complex site-specific assessments in which multiple lines of evidence are evaluated to determine if there is a complete vapor intrusion pathway, quantitatively estimate the associated potential cancer risk and noncancer hazard, and determine whether the vapor intrusion pathway poses a health concern for current and/or future building occupants. We deliver findings and recommendations to support risk management and regulatory acceptance.

Public communication. No single test confirms or rules out vapor intrusion; multiple lines of evidence must be gathered, weighed, and clearly explained. We clearly communicate complex findings to regulators, building owners and occupants, and other stakeholders. Our team develops practical communications plans and materials that explain investigation options, sampling plans, results, and mitigation recommendations to the public, both in written updates, such as letters and fact sheets, as well as at public meetings. Where vapor intrusion study areas encompass communities that speak diverse languages, we adapt materials and communication approaches to engage and inform all community members.

Mitigation and remediation. When an investigation concludes the presence of a complete vapor intrusion pathway that poses a health concern, our remediation experts design, install, operate and maintain mitigation systems matched to site conditions. Solutions include temporary air purification units; sealing of cracks, joints, and floor penetrations (e.g., utilities, piping, sumps); full-service retrofit membranes/coatings; and passive or active sub-slab depressurization systems. Where a larger-scale site remediation is appropriate, we implement remedial technologies such as air sparging and soil vapor extraction. With these more complex approaches, our field team is adept at conducting pilot tests prior to system installation to tailor the design to resolve site-specific challenges. For existing large industrial buildings, we evaluate building-wide versus targeted mitigation to minimize cost and disruption. When feasible, we modify existing

HVAC systems to mitigate the vapor intrusion pathway. For new construction, our design-build expertise ensures that the proposed environmental solution integrates seamlessly with the building design to avoid project delays or impacts to site operations.

Key AECOM attributes

- We are a global leader in environmental services, ranked #1 environmental engineering/design firm on ENR's Environmental Firms list in 2025.
- We bring a mix of national experts and local teams to deliver cost-effective, compliant solutions tailored to the site.
- Our interdisciplinary vapor intrusion teams include expertise in geology, hydrogeology, risk assessment, air measurements, data validation and laboratory audits, industrial hygiene, building design, and mitigation system design/operation.

