Overcoming Vapor Intrusion Concerns

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Vapor intrusion is the migration of volatile chemicals from the subsurface into overlying buildings. These chemicals may be volatile organic compounds (e.g., benzene and solvents), or some other compounds, such as mercury vapors (the silver liquid we played with as children) and hydrogen sulfide (landfill gas). These chemicals may be risks to building occupants and may present the developer or builder with potential liability. From a regulator's standpoint, contamination that is left on a property can have a long-term effect on a building's indoor air quality.

In the past, environmental studies from a development standpoint focused on soil and groundwater. However, with the wide acceptance of site capping with asphalt and concrete and similar restrictions to avoid contacting contamination, vapor intrusion is becoming a common regulatory hurdle for many impacted properties. Vapor intrusion from contaminated soil and groundwater can create significant liability and reduce property value. Because of this, accurately determining whether a property has vapor intrusion issues is important for property owners, prospective purchasers, and environmental professionals conducting due diligence studies.

In March 2008, ASTM International (ASTM) approved a new standard, E 2600, *Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions*, which provides industry guidance for vapor intrusion testing. This standard defines good commercial and customary practice for conducting a vapor intrusion assessment on a property involved in real estate transactions. The primary goal of the new ASTM standard is to define the environmental risk and liability and can be used as a voluntary supplement to E 1527, *Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. In general, the evaluation process consists of four tiers. The first two screening tiers assess the potential for a vapor intrusion issue to exist, so that properties with a low risk can be screened out quickly and inexpensively. The third and fourth tiers provide for more site-specific and comprehensive investigations and remedial plans, if needed.

Most Mid-Atlantic States have adopted some type of formal guidance for evaluating and remediating the risks associated with vapor intrusion. The following is a success story at a residential community that recently obtained regulatory closure under Maryland Department of the Environment's (MDE) Voluntary Cleanup Program. After the standard environmental studies and "hot spot" remediation of soil and groundwater, the remaining environmental impacts beneath a future 16-unit townhouse development were addressed with an MDE approved Response Action Plan (RAP). The RAP specified that the future developments in the contaminated area should be constructed with measures to restrict vapor infiltration from the contaminated soil and groundwater. During construction of the townhouse-building pad, a spray-on synthetic vapor barrier was installed as part of a passive vapor mitigation system to eliminate vapor infiltration into the buildings. After construction, indoor air samples documented that the vapor remediation systems worked. Impacted soil was addressed using health and safety measures during the construction of the townhouses, along with impervious capping and an excavation restriction to prevent contact by future residents. Impacted groundwater was addressed through a deed restriction to prevent use of the groundwater, an excavation restriction in the homeowner association's bylaws, and impervious capping to prevent direct contact by future residents.

A synthetic barrier with the application of a spray-on impermeable sealer within a townhouse's foundation.

Many Brownfields/in-fill projects, former industrial sites, and/or properties with historic petroleum use (e.g., underground storage tanks) are prone to potential vapor intrusion issues. These issues need to be characterized during the site investigation phase of the redevelopment to fully understand potential design issues due to vapor intrusion. Clients should seek advice from an experienced environmental consultant to assist with potential vapor intrusion issues or your state's Brownfield program. ■

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