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VAPOR INTRUSION

This article analyzes a new voluntary standard for assessing potential vapor intrusion risks at contaminated sites. As part of their analysis, the authors look at various regulatory approaches for assessing vapor intrusion and summarize the new ASTM vapor intrusion standard, its intended uses, and its explicit limitations. The article also highlights strategic issues that prospective sellers and purchasers should consider in determining whether a vapor intrusion assessment should be performed and how its results should be interpreted.

New ASTM Standard Provides Limited Tool for Assessing Vapor Intrusion Risks

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Environmental regulators across the country have been scrambling to establish guidance for investigating and addressing an exposure pathway they previously had not considered in setting cleanup standards—vapor intrusion.

Vapor intrusion occurs when volatile contaminants migrate from contaminated groundwater or soil to the indoor air of a building. The most common vapor intrusion cases involve either petroleum contaminants or chlorinated solvents such as tetrachloroethylene and trichloroethylene. These substances may have found their way into soil or groundwater from leaking underground storage tanks, spills, or buried waste. Vapor intrusion does not encompass other instances of indoor air contamination, such as exposure to asbestos, mold, or other potentially hazardous building conditions.

Although regulators agree that developing guidance to address vapor intrusion concerns now is a priority,

they are taking disparate and frequently inconsistent approaches. For example, several key differences relate to the reliability of modeling and sampling techniques, derivation and utility of screening numbers for groundwater and soil vapor, determination of background concentrations of contaminants in indoor air, and quantification of risk resulting from potential inhalation exposures.

The Environmental Protection Agency has tried unsuccessfully for six years to finalize its *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*.¹ In the meantime, more than 26 states have developed guidance documents, some of which establish groundwater or soil vapor screening levels for assessing vapor intrusion.² The Interstate Technology and Regulatory Council, a coal-

¹ 67 Fed. Reg. 71,169 (11/29/02).

² ASTM E 2600-08 *Standard Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions* (ASTM Standard), Appendix X5.

tion of state regulators and other stakeholders, attempted to address the many variations in policy among regulatory agencies in *Vapor Intrusion Pathway: A Practical Guideline*, published in 2007 (ITRC Guidance), which provides a general framework for evaluating the vapor intrusion pathway, rather than prescriptive standards or methods, for use in conjunction with applicable federal or state requirements.³

The new concerns about vapor intrusion, coupled with uncertainties about regulatory responses, can pose serious challenges in assessing and allocating risks in corporate and real estate transactions. Companies that thought they had resolved their liabilities for waste sites are finding in some cases that regulators now are seeking to reopen remedies based on vapor intrusion, creating new concerns in acquisitions or financing transactions. Furthermore, companies addressing contaminated sites in the first instance now are being required to address vapor intrusion concerns in remedy selection, causing similar issues in these companies' transactions.

In an effort to respond to these transactional challenges, ASTM International (formerly the American Society for Testing and Materials) (ASTM) formed a task group to develop a consensus vapor intrusion screening standard to facilitate transactions in much the way that ASTM's E 1527 standard facilitated transactions by establishing an industry standard for Phase I environmental site assessments (Phase I's).⁴ ASTM now has issued E 2600-08 *Standard Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions* (ASTM Standard). Although the ASTM Standard, like the ITRC Guidance, outlines a phased approach to vapor intrusion assessment (VIA), its purpose is uniquely limited. The objective of the ASTM Standard is to establish a screening standard for evaluating the potential for vapor intrusion on a property as part of environmental diligence conducted by a prospective buyer, investor, or lender. The ASTM Standard states that it may be used as a voluntary supplement to a Phase I, but evaluation of vapor intrusion remains outside the scope of ASTM E 1527 and the requirements it establishes for satisfying the "all appropriate inquiries" standard under CERCLA.⁵

This article opens with a brief discussion of the various regulatory approaches for assessing vapor intrusion. It then summarizes the ASTM Standard, its intended uses, and its explicit limitations. It also highlights strategic issues that both prospective sellers and purchasers should consider in determining whether a vapor intrusion assessment should be performed and how its results should be interpreted.

Regulator Disagreements Regarding Vapor Intrusion Assessment

Even though the ASTM Standard is intended for use throughout the United States, it recognizes that federal and state regulators disagree on issues that are fundamental to assessing and addressing vapor intrusion

risk, including when and how soil vapor or indoor air data must be collected, to what benchmarks modeled or measured indoor air concentrations should be compared, and to what extent such concentrations must be abated.⁶

■ *Reliability of modeling.* Regulators disagree on the proper role of modeling for extrapolating vapor intrusion impacts from groundwater and soil vapor sampling data, such as the widely used Johnson-Ettinger model first published in 1991 and later incorporated, with certain refinements, into EPA's draft guidance. Where sampling data already exist for a site, the use of models as part of a tiered screening process can be a cost-effective means to evaluate a potential vapor intrusion pathway without indoor air sampling. Modeling indoor air concentrations from groundwater or soil vapor data also permits environmental professionals to assess potential vapor intrusion risks without disturbing tenants and other building occupants, and it avoids the potential ambiguity inherent in all reported indoor air sampling results, because they represent the combined contributions of all sources of each compound, including background sources. However, many states, including Indiana, Massachusetts and New York, have determined that modeling alone is an unacceptable means of screening or closing sites for regulatory purposes, and EPA itself has stated that successful modeling requires a robust set of sampling data and site parameters that may not be available.

■ *Derivation and use of screening numbers for groundwater and soil vapor.* Regulators also do not agree on the appropriate use of screening values as a threshold for identifying or eliminating vapor intrusion as a risk requiring further investigation. Some states have adopted "look-up tables" with generic screening values for groundwater and soil vapor. Others require site-specific demonstrations. In states that do allow resort to generic numbers, the numbers in use vary widely, with divergent underlying assumptions regarding building construction, geological conditions, and acceptable risks. In Massachusetts, any concentration of a compound in indoor air in a residence or school that results from a release of hazardous substances or oil is considered a "critical exposure pathway" that must be addressed, to the extent feasible, without regard to risk.⁷

■ *Background concentrations of contaminants in indoor air.* No matter how extensive the mitigation measures, indoor air concentrations may never reach risk-based cleanup standards in certain cases because of the many other sources of contaminants in indoor air. Such contributing sources commonly are referred to as "background." Background is a concept that is inconsistently defined and applied. Regulators disagree on whether it is possible or appropriate to determine background indoor air concentrations given site-specific variations in building materials, heating methods, and ventilation. Those that do accept that background may play an important role in determining "how clean is

³ The document is available at http://www.itrcweb.org/gd_VI.asp.

⁴ See ASTM E 1527-05 *Standard Practice for Environmental Assessments: Phase I Environmental Site Assessment Process* (ASTM E 1527).

⁵ ASTM Standard Section 1.1.

⁶ See *id.*, Appendix X5 (noting that the environmental professional must review state and local guidance applicable to each site because states differ significantly "in the degree of conservativeness built into their respective guidance documents, including the screening and action levels for various compounds").

⁷ 310 Mass. Code Regs. 40.0411(3).

clean” disagree on whether “background” must be determined on a site-specific basis or whether generic values can be ascertained (and if so, which sampling data sets of the many in circulation provide valid reference points). The ASTM Standard includes, solely for informational purposes, a limited compilation of such data in Appendix X7.

■ *Assessing risks resulting from potential inhalation exposures.* The scientific community has not reached definitive conclusions on the human health risks associated with exposure through inhalation, particularly at very low concentrations, of volatile contaminants. For example, although tetrachloroethylene has been one of the major focuses of regulatory attention for cancer risk, EPA and states have adopted different values for the “unit risk factor” used in calculating indoor air concentrations that pose unacceptable cancer risk. EPA’s own review of the toxicological evidence is continuing; EPA’s most recent draft assessment for tetrachloroethylene was published for peer review purposes only in June 2008.⁸ Similarly, EPA’s current toxicity assessment for trichloroethylene, another volatile compound commonly associated with vapor intrusion sites, identifies a range of cancer slope factors for assessing its potential risks, without any guidance for selecting the most appropriate factor from that range.⁹

The ASTM Standard does not purport to resolve or reconcile these differences but rather directs the environmental professional and user of any report prepared based on the ASTM Standard to review federal, state, and local vapor intrusion guidance documents. The ASTM Standard includes a full index of references to the various state guidance documents, with relevant Web addresses, in Appendixes X5 and X9.

These divergent and changing regulatory approaches mean that the reach of legal liability for vapor intrusion under the Comprehensive Environmental Response, Compensation, and Liability Act; Resource Conservation and Recovery Act; analogous state laws; and the common law also is highly uncertain. ASTM acknowledges the myriad overlapping liabilities that vapor intrusion conditions (VICs) may present for property owners and operators in the ASTM Standard’s extensive Appendix X1, “Legal Background on Federal and State Liability for Vapor Intrusion.” As Appendix X1 emphasizes the legal framework for addressing human health risks from vapor intrusion still is developing. Fundamental jurisdictional issues—including whether a “release” of hazardous substances as defined under CERCLA includes migration of vapors into buildings, and whether the Occupational Safety and Health Administration (rather than EPA) retains exclusive jurisdiction over worker exposure to compounds in indoor air regardless of their source – await resolution.¹⁰ It is within this unsettled technical and legal environment that ASTM has taken the initial step of defining a vapor intrusion screening standard to facilitate transactions.

⁸ Toxicological Review of Tetrachloroethylene (Perchloroethylene) (External Review Draft) EPA/635/R-08/011A, available on the Web at <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=192423> See also 73 Fed. Reg. 36321 (6/26/08) (notice of public comment period).

⁹ Gregory Bibler and Elizabeth Mason, *Scrutiny of Indoor Air Pathway Affects Standards for Investigation and Cleanup*, (217 DEN B-1, 11/10/05).

¹⁰ See ASTM Standard Section X1.9.8.

Overview of the Standard

The ASTM Standard’s purpose is to “define good commercial and customary practice in the United States of America for conducting a vapor intrusion assessment on a property parcel involved in a real estate transaction with respect to chemicals of concern (COC) that may migrate as vapors into existing or planned structures on a property due to contaminated soil and groundwater on the property or within close proximity to the property.”¹¹ Like ASTM E 1527, the ASTM Standard focuses on identifying potential conditions resulting from historical releases of hazardous substances to the environment that may give rise to liability or affect the value of a property that is the subject of a proposed transaction.

The primary objective of a vapor intrusion assessment under the ASTM Standard is to determine whether a property may be impacted by vapor intrusion, that is, whether a “potential Vapor Intrusion Condition” (pVIC) exists. The ASTM Standard defines a “Vapor Intrusion Condition” (VIC) as “the presence or likely presence of any COC in the indoor air environment of existing or planned structures on a property caused by the release of vapor from contaminated soil or groundwater either on the property or within close proximity to the property, at a concentration that presents or may present an unacceptable health risk to occupants” (emphasis added).¹² Accordingly, a VIC or pVIC does not include “de minimis conditions” that pose no “unacceptable health risk” and that would not be subject to enforcement action by regulators.¹³

Another aim of the ASTM Standard is to clarify the scope of ASTM E 1527, which EPA regulations deem sufficient to meet the “all appropriate inquiries” requirement established by the 2002 Brownfield Amendments to CERCLA.¹⁴ Under ASTM E 1527, “indoor air quality” expressly is excluded as “non-scope.”¹⁵ The Phase I standard, however, also defines a “recognized environmental condition” (REC) as including hazardous substances released “into structures on the property.” The ASTM Standard makes clear that vapor intrusion issues are not within the scope of a Phase I and should be addressed instead through a vapor intrusion assessment conducted under the ASTM Standard. The ASTM Standard also says, however, that it is not intended to preclude an environmental consultant from opining in a Phase I regarding “the impact of potential vapor migration onto a target property if deemed necessary to satisfy ‘all appropriate inquiry.’”¹⁶ Moreover, where a vapor intrusion assessment is undertaken as a supplement to a Phase I, the ASTM Standard explicitly states that the source of any pVIC must be identified as a REC, and the pVIC must be discussed, in the Phase I report.¹⁷

Overall, the clear intent of the ASTM Standard is to provide a prospective purchaser, lender, or other user with a quick and inexpensive process for screening out properties with a low risk of vapor intrusion, together

¹¹ *Id.* at Section 1.1.

¹² *Id.* at Section 3.2.55.

¹³ *Id.* at Section 1.1.1.

¹⁴ 40 CFR 312.11(a).

¹⁵ ASTM E 1527 Section 13.1.5.

¹⁶ ASTM Standard Section 5.1 (emphasis added).

¹⁷ *Id.* at Section 8.7.1.

with a framework for investigating further should it elect to do so. The ASTM Standard establishes a four-tiered process. The process progresses from a reasonably conservative screening process for determining whether there is a potential vapor intrusion condition to more complex methods of assessment involving increasingly greater use of site-specific data. As they become more site specific, the assessment methods become less and less detailed and prescriptive. Only the first two tiers, which are limited to screening, are considered “in-scope.” The second two tiers, which include full-scale assessment and mitigation, are non-scope considerations described for informational purposes only.

Tier 1: Initial Noninvasive Screening Similar to a Phase I, the first tier of the ASTM Standard requires screening the target property for vapor intrusion warning signs, through noninvasive means such as government records review. Specifically, Tier 1 screening requires the application of three “tests” to the collected site information. If detailed information is available for contaminated sites in the property’s vicinity, it is more likely a Tier 1 vapor intrusion assessment will be conclusive regarding pVICs that may affect the property.

■ First, the “search distance” test identifies any sites known to be contaminated with petroleum or hazardous substances, within a “primary area” near the property and a “secondary area” hydrogeologically upgradient of the property.¹⁸ Search distances are shorter for identifying sites contaminated only with petroleum.¹⁹

■ Second, the “chemical of concern” test determines whether substances that may result in vapor intrusion impacts are present at any contaminated sites located in the course of the “search distance” test.²⁰ If a site or sites identified during the search distance and chemical of concern tests are hydrogeologically upgradient of the property and are contaminated with, or suspected to be contaminated with, any COCs and there is no further information available regarding the extent of the contamination, a pVIC is presumed.²¹

■ Third, the “plume” test evaluates the potential vapor intrusion threat of any known plume of petroleum or hazardous substances (in vapor phase in soil gas or, more likely, in groundwater) in the property’s vicinity, if information is available that delineates or characterizes the plume. The plume test determines whether the plume’s boundaries (or, if the contamination is downgradient from the property, any off-site source of contamination) are within a “critical distance” of structures on the property (or the lot boundary of the property, if there are no structures).²² “Critical distance” is defined as a lineal distance of less than 30 feet for petroleum hydrocarbons and less than 100 feet for other hazardous substances (including petroleum present as non-aqueous phase liquid or NAPL). The environmental consultant conducting the vapor intrusion assessment may use a different “critical distance,” however, in his or her discretion based on site-specific conditions, or as required by state regulations or policy. If a plume extends into the critical distance, the test results

in a presumption that a pVIC exists. If not, the test deems a pVIC unlikely.²³ Where the available information shows a plume extending into the critical distance but also demonstrates that the plume’s contaminants do not exceed the locally applicable “risk-based concentrations” for assessing vapor intrusion risk (typically identified in Tier 2 screening), a pVIC is presumed unlikely.²⁴

Tier 2: Site-Specific Numeric Screening The second tier of the ASTM Standard requires comparing the results of environmental sampling at the target property or nearby sites with screening concentrations for vapor intrusion risk. In effect, Tier 2 screening is an expanded Tier 1 plume test, with the benefit of additional site-specific data. As with Tier 1 screening, if the site-specific data show a plume that exceeds a risk-based screening concentration within a critical distance of the target property, a pVIC is presumed. If not, a pVIC is unlikely.²⁵

To assemble the additional data, Tier 2 screening may involve either or both of (1) noninvasive analysis of existing sampling data in prior Phase II environmental investigation reports or remediation status reports and (2) invasive investigations, including direct environmental sampling to assess vapor intrusion risks. The invasive component may be considerably more difficult when offsite sampling is necessary based on the nature and extent of the contamination.

Inherent in Tier 2 screening (and in Tier 1 screening that yields sufficient data) is identification of applicable “risk-based concentrations” or RBCs. The ASTM Standard establishes an order of preference: first, “state generic RBCs” if available; then, either “federal generic RBCs” taken from EPA or another federal agency’s guidance, or “site-specific RBCs” developed by the environmental consultant.²⁶ As mentioned at the outset, many states have published vapor intrusion guidance documents, which differ considerably. Because the ASTM Standard requires the environmental consultant to look to state RBCs first, Tier 2 screening may yield different conclusions about pVICs at identically situated properties located in different states.

Tier 3: Comprehensive Vapor Intrusion Assessment Tier 3 assessment is intended to provide a full evaluation of any pVIC at the target property identified in Tier 1 or Tier 2 screening, with one of three outcomes: a confirmed VIC, no VIC, or a pVIC with “narrowed uncertainty” regarding its existence, but which is neither a confirmed VIC nor is ruled out by the assessment.²⁷ In essence, a Tier 3 assessment is focused on proving the negative—i.e., that a suspected or presumed vapor intrusion condition does not exist.

The ASTM Standard describes several “alternative approaches for data collection” in a Tier 3 assessment including direct indoor air sampling or groundwater, soil gas, and/or sub-slab soil gas sampling accompanied by the use of a site-specific “conceptual site model” that allows extrapolation of indoor air impacts.²⁸ As the ASTM Standard notes, data collection methods often

¹⁸ *Id.* at Section 8.5.2(1).

¹⁹ *Id.* at Sections 8.3.2, 8.3.3.

²⁰ *Id.* at Section 8.5.2(2).

²¹ *Id.* at Section 8.6

²² *Id.* at Section 8.5.2(3).

²³ *Id.* at Section 8.5.3.

²⁴ *Id.* at Section 9.5.

²⁵ *Id.* at Sections 9.5, 9.6.

²⁶ *Id.* at Sections 9.2.2, 9.2.3.

²⁷ *Id.* at Section 10.2.1.

²⁸ *Id.* at Section 10.3.

are prescribed by applicable regulatory and technical guidance, references to which are included in the ASTM Standard's Appendixes.²⁹

The ASTM Standard states that a health risk assessment using indoor air sampling data can definitively eliminate a VIC from further consideration. In addition, a pVIC identified through Tier 1 or Tier 2 screening may only become a confirmed VIC if the assessment demonstrates attribution of elevated indoor air concentrations to a vapor intrusion pathway from subsurface contamination, rather than background levels and other indoor sources of contaminants, such as smoking or off-gassing consumer products.³⁰

Tier 4: Mitigation The ASTM Standard expressly states that “[s]election, design and implementation of appropriate mitigation is beyond the scope of this practice.”³¹ It also contemplates, however, that prospective purchasers or sellers of a property with a pVIC may elect to proceed directly to “pre-emptive mitigation measures” rather than undertaking a detailed evaluation to confirm the presence or absence of a VIC. Mitigation may be more economical than further investigation in some cases.³² Such an approach may be appropriate, for example, where no duty to report a release of hazardous substances to regulatory authorities has yet been triggered, and a mitigation system can be readily incorporated into the building design as part of a new construction project.

The ASTM Standard describes mitigation as falling into one of three categories: (1) institutional controls, such as deed restrictions; (2) engineering controls, such as source removal or treatment, vapor barriers and venting, pressurization of buildings, or indoor air treatment; and (3) “intrinsically safe building design” for new structures, such as well-ventilated underground or first-floor parking facilities or vapor barrier systems. The ASTM Standard lists some general advantages and disadvantages of these mitigation approaches based on relative cost, effectiveness, and appropriateness to particular site conditions.³³

Strategic Considerations

Among the most important considerations to bear in mind are the limited purposes and scope of the ASTM Standard. It is intended primarily as a tool for prospective purchasers, investors, and lenders to supplement their Phase I evaluations with a conservative screening methodology for identifying potential vapor intrusion conditions. The ASTM Standard is not intended as a guide for complying with regulatory requirements for site investigations, so it does not prescribe a systematic methodology for quantifying or resolving an identified vapor intrusion concern. Likewise, it does not address the prospective seller's interests, for example, in preserving the value of its property or managing any risks arising from the assessment process.

The following are additional practical issues that prospective buyers and sellers should consider before commissioning, permitting, or interpreting a vapor intrusion assessment under the ASTM Standard.

- *Retain environmental consultants with specialized vapor intrusion experience to conduct vapor intrusion assessments.* In Appendix X2, the ASTM Standard stipulates that, in addition to the requirements stated in ASTM E 1527, “the environmental professional conducting a VIA should be knowledgeable and/or experienced specifically in the conduct of vapor intrusion investigations.”³⁴ The ASTM Standard also emphasizes that the environmental professional must identify and apply any applicable state or local guidance before scoping and conducting a vapor intrusion investigation.³⁵ If vapor intrusion is likely to be an issue, both the prospective seller and buyer have an interest in ensuring that the consultant conducting the vapor intrusion assessment has completed successfully vapor investigations and mitigation measures in comparable circumstances and is well aware of current regulatory guidance and practice in that state.

- *Define and plan how to respond to the results of the vapor intrusion assessment.* The ASTM Standard states specifically that the vapor intrusion assessment need not proceed sequentially through the four tiers of potential investigation and mitigation activities.³⁶ The prospective seller and buyer have an interest in determining at the outset what the scope and sequence of activities will be and how the interim and final conclusions will be reached and communicated. It may be preferable, for example, to include soil vapor testing as part of a planned Phase II investigation rather than rely on the Tier 1 and 2 screening measures outlined in the ASTM Standard. Issues of particular sensitivity to a prospective seller will be whether indoor air testing will be conducted and whether the results of any testing conducted will become reportable to regulatory authorities, tenants, or employees.

- *Tier 1 and Tier 2 are conservative screening methods that may result in a presumption of a potential vapor intrusion condition at a property where there is no real vapor intrusion condition.* The ASTM Standard is useful as a screen to eliminate concerns regarding the many properties with no potential vapor intrusion issues, but not as a tool to make difficult cost judgments for properties with potential problems. Accordingly, the ASTM Standard casts a wide net in Tier 1 screening, requiring consideration of most contaminated sites within one-third of a mile from the target property and other contaminated sites up to one mile hydrogeologically up-gradient from the target property. Once a contaminated site is identified in these areas of concern, a pVIC is presumed unless proven not to exist through more burdensome investigations. To reach the conclusion that a pVIC is unlikely, Tier 2 or 3 work must generate sufficient data, potentially including offsite sampling results, to determine that there is no likely pathway from the offsite property to the target property.

- *The ASTM Standard does not establish a protocol for completing an investigation that complies with applicable regulatory standards.* The ASTM Standard repeatedly cautions the user and the environmental professional that “available regulatory and technical guidance documents for vapor intrusion contain disparate and often conflicting recommendations for data needs, data collection methods, and screening or evaluation

²⁹ *Id.* at Section 10.2; Appendixes X5, X8, X9.

³⁰ *Id.* at Section 10.3.4.

³¹ *Id.* at Section 11.1.

³² *Id.* at Section 7.2.5.

³³ *Id.* at Section 11.3.

³⁴ *Id.* at Section X2.1.1.

³⁵ *Id.* at Appendix X.5.

³⁶ *Id.* at Section 7.2.5.

criteria.”³⁷ It is not the intent of the ASTM Standard to reconcile those requirements. The ASTM Standard likewise states that it is not intended to be used as a basis for determining whether a vapor intrusion exposure pathway is complete or may pose an unacceptable risk to human health, as those also are questions that can be determined only with reference to applicable regulatory standards.³⁸

■ *Be aware of the ASTM Standard’s express limitations.* The ASTM Standard creates some protection for environmental consultants against claims that they failed to identify and disclose potential vapor intrusion risks during a Phase I or that a limited vapor intrusion assessment failed to meet “good commercial and customary practice.” Tier 3 assessments and Tier 4 mitigation are expressly outside the scope of the ASTM Standard and require separate scopes of work based on applicable regulatory requirements.³⁹ In negotiating access terms with prospective sellers or terms of engagement with environmental professionals, therefore, it is not enough simply to prescribe a “vapor intrusion assessment completed in accordance with ASTM E 2600.”

³⁷ See *id.* at Section 10.2.1.3.

³⁸ *Id.* at Section 4.1.

³⁹ *Id.* at Sections 10.2, 11.1.

Conclusion

The ASTM Standard creates a new category of environmental assessment—the ASTM-compliant vapor intrusion assessment. Users of such VIAs now can point to an ASTM standard practice as evidence that they followed a standard of reasonable care in assessing potential vapor intrusion issues at the property they are selling, purchasing, or financing. The scope and intended purposes of the ASTM Standard, however, are narrowly circumscribed. Before commissioning or permitting any work to assess potential vapor intrusion, it is imperative that a prospective buyer or seller carefully consider the kind and extent of the investigation to be conducted, the results that will be generated, and the lasting economic and legal ramifications that any such results may entail.

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