Is Vapor Intrusion a "Next Big Thing" in Environmental Law?

By Edward V. Walsh, III

Introduction

If, as predicted, the State of New York is the bellwether for the approach environmental regulators will take nationally on the increasingly prominent issue of "vapor intrusion," then there will be a lot of disgruntled property owners who have completed what they thought were final environmental cleanups, only to find out otherwise. If the New York approach is an indication of things to come elsewhere, vapor intrusion (VI), the migration of contamination in a gaseous state into the indoor air environment from contaminated soil or groundwater, could be a "next big thing" in the environmental area. This is because the New York State Department of Environmental Conservation (NYSDEC) has confirmed that it has "reopened" for VI investigation 421 sites where it had made "final" remedial decisions, prior to 2003. Many of the reopened sites were subsequently deemed by NYSDEC to require additional "mitigation." Litigation has resulted at one such site where, although groundwater contamination was known to have existed for nearly 2 decades, a vapor intrusion threat was discovered only during an assessment done in 2004. In ruling for the plaintiffs on a motion to dismiss the lawsuit as untimely, the court ruled that the case filing complied with the 3 year statute of limitations.

Reopening closed sites presents new legal issues, including who is liable for a previously closed site that has since changed hands, but now must be revisited? Perhaps more daunting is the prospect of lawsuits based on alleged exposures. Many of the guidance documents issued by the various states have public notice requirements for VI sites, possibly providing a class action road map for the plaintiffs’ bar. In the context of negligence law, one must consider whether the duty of care requires an assessment of the increasingly publicized VI threat at previously closed sites, even in the absence of government prodding. For many developers, particularly of Brownfield sites, who took on cleanup duties as “volunteers” and had nothing to do with the original pollution, the VI reopener is a real game changer in its potential to disrupt reasonable investment-backed expectations.

New York is not alone in addressing the VI issue. The United State Environmental Protection Agency (USEPA) issued draft guidance on VI in 2002, and since that time a number of states have issued their own guidance. At present, at least 21 states have issued guidance on VI and more are expected to do so. Because many of the regulatory guidance documents set screening levels for constituents of concern, mostly volatile organic compounds (VOCs), at very low thresholds, complex investigatory challenges, in addition to thorny legal questions, can arise. The regulators defend the low thresholds by arguing that they are more likely to reveal a VI problem, notwithstanding the flip side of this argument, that a “false positive” might also result. This can occur when screening levels are set so low that they detect background conditions, from sources such as paint, glue or adhesive vapors from indoor use, and not a true VI problem. Experts say that either a false negative or positive result may readily occur if the technical investigatory approach at a site is inadequate.

The silver lining, if there is one, is that mitigation of a VI problem is generally not overly expensive. The most common fix is to retrofit existing threatened structures with “radon-type” mitigation systems, essentially robust ventilation systems. The real costs are likely to be incurred in connection with the investigation of VI concerns in the first instance, in connection with lawsuits over responsibility for such costs where expended and/or in connection with “exposure” claims that may arise where a VI problem exists.
Nature of the Problem

VI as an exposure pathway should not be confused with the direct inhalation pathway already considered in most site closure programs. The direct inhalation pathway generally deals with higher concentrations of VOCs or other substances present in a "breathing zone," such as a construction excavation, and is more directed at acute conditions. In contrast, the VI exposure pathway generally addresses a more subtle, long term exposure threat to building occupants as a result of the off-gassing (evaporation) of chemicals from polluted soil or groundwater and infiltration of vapors at relatively low, usually imperceptible, concentrations. This "soil gas" can enter into a structure through cracks and seams in a floor slab, utility connections, sump pits and the like, by way of “advection,” the movement of air due to differences in pressure. Because pressure is generally higher under a building than within it, "depressurization" can occur, resulting in vapors moving into a building from a contaminated sub-surface. In addition, because vapors can move laterally or vertically from a source of contamination to a structure, current USEPA guidance generally requires at least 100 feet of lateral/vertical separation from a known impacted area, in order to rule out a VI threat.5

There is, of course, no "typical" VI site. However a site impacted by chlorinated VOCs, such as perchloroethylene (PCE)(widely used in dry-cleaning), trichloroethene (TCE)(a common degreaser), or by gasoline and petroleum constituents (e.g., benzene), is a prime candidate for VI impacts.6 Because soil gas can migrate, as noted, VI problems can arise from an off-site source and greatly confuse whether some known impact at a site is actually the source/cause of a VI problem, a mere contributor, or entirely blameless. The widespread presence of VOCs in consumer products presents additional technical challenges in VI investigations because of background interference and the difficulty in isolating the real culprit.

Regulatory Guidance

As noted above, both the USEPA and nearly half of the states have issued regulatory guidance on VI. Many of the states essentially incorporate the USEPA guidance by reference while others, such as New York, have adopted their own quite detailed VI standards. At present the various regulatory guidance documents are not considered enforceable rules or regulations. New York specifically disclaims that its guidance document constitutes an enforceable rule or regulation.7 Nonetheless, such guidance can become binding when the regulator is holding other cards, such as the ability to void a previously issued no further action letter based on information that a threat to public health remains. Moreover, one should anticipate that current guidance will eventually be incorporated into binding regulations. In Illinois, for example, although a VI guidance document has yet to be issued, VI amendments have been proposed to Illinois’ TACO (tiered approach to corrective action) regulation which applies to cleanups under the state’s voluntary site remediation program, as well as to its mandatory leaking underground storage tank and RCRA closure programs.8

Like many environmental programs throughout the United States, there is a patchwork of approaches to the VI issue. At the federal level, the USEPA guidance calls for the sampling of various media (e.g., soil gas, groundwater, etc.) and allows for the use of mathematical models, such as the “Johnson & Ettinger” model, to estimate vapor concentrations that may be expected in indoor air. Another guidance document, designed to distill an investigatory approach from the various state and federal guidelines issued to date, has been issued by the Interstate Technology & Regulatory Council (ITRC) and proposes a “multiple lines of evidence” approach to evaluating the potential for VI.9 New York’s 82 page guidance document covers sample collection, data evaluation and specifies in matrix format, “action levels” for various chemicals.10 Illinois’ draft regulation uses a catchall definition of “volatile chemicals,” including elemental mercury, rather than a list of chemicals with “look up” concentrations. Under this draft regulation, Illinois will allow pathway exclusion, consideration of site specific factors, etc., and the use of the “. . . modified Johnson and Ettinger (J&E) model to develop remediation standards:. . . this modified J&E model
used in TACO contains 18 equations and 56 parameters." Clearly, under all or any of the various approaches, a solid technical understanding of the science and site specific variability of VI will be required.

**Technical Challenges**

At first blush it would appear relatively straightforward to determine whether indoor air is affected by VI by simply sampling it. For both legal and technical reasons this is usually not the best initial approach. The most obvious legal reason for not conducting such sampling is to avoid producing discoverable data that shows exposures to building occupants. Because indoor air sampling may not be required at all under some programs, particularly those allowing for the use of mathematical modeling, undertaking such sampling may be avoided altogether. Indeed, in order to avoid indoor sampling and the cost of substantial investigation, it may be cheaper to move directly to mitigation. Such mitigation may involve the installation of ventilation/pressurization systems, where VI concerns are a real potential at a site, not unlike the systems designed to vent radon gas infiltration.

The most prominent technical reason for not undertaking indoor air sampling is the ubiquitous presence of VOCs in consumer products, building materials, and even in ambient air. As such, the sampling of indoor air may simply reveal a background condition unrelated to sub-surface VI. For example, VOCs are present in paints, glues and adhesives, cleaners and solvents (e.g., nail polish remover), among other items commonly used in residential and work environments. In addition, the literature suggests that in some areas of the country ambient air concentrations for a variety of chemicals exceed the screening levels established for the same chemicals under many of the guidance documents discussed above. Thus, where indoor air samples are ultimately taken, one must take care to account for and explain background interferences. One way to do this is to introduce “tracers” into the sub-surface at a suspect site. If the tracers are not detected in subsequent indoor air samples, the source of any VOCs detected is likely to be from a background condition, not the site’s subsurface. Other factors may also need to be taken into account, such as when the sampling occurs, e.g., during the heating season versus non-heating season, or when air conditioning and ventilation systems are operating, because such factors can make indoor air results confusing or unreliable.

For the above reasons, sampling in the first instance typically will focus on the sub-surface environment, and to protect against either false positives or negatives, will employ a multiple lines of evidence approach. Most of the guidance documents specify the type of sampling to be conducted, but if the results are ambiguous, additional sampling approaches should be considered. As the USEPA points out, each sampling approach has its pro and cons, including relative reliability, site disruption and, of course, cost. New York’s guidance specifies four types of sampling that can be conducted depending on site specific considerations, including: (1) subsurface vapor samples, both soil vapor (deeper) and sub-slab vapor samples (immediately below the floor slab); (2) crawl space air samples; (3) indoor air samples; and (4) outdoor air samples. New York’s guidance also calls for sampling to be done during the heating season, unless the need for immediate sampling is indicated, “... because soil vapor intrusion is more likely to occur when a building’s heating system is in operation and doors and windows are closed.” Other sampling strategies focus on groundwater and bulk soil sampling, including for use in mathematical models.

Whatever sampling strategy is adopted or required, VI investigations are rife with data quality considerations. This is particularly true given the very low screening thresholds and often relatively high background levels that can exist at a site. Equipment considerations can play a crucial role in sampling, from assuring that tubing used in soil vapor collection is clean and inert to establishing that canisters and other collection equipment are not leaking. By and large, VI sampling requires specialized expertise, because of the collection techniques employed, equipment used and the wide site-to-site variability in conditions encountered. The goal is an
investigation that is fully reliable and defensible to the regulators, and perhaps to third parties should a site wind up in private litigation.

Legal Issues

Any number of legal issues can arise from the reopening of previously closed sites for VI investigations. In those instances where a property, previously closed, has since been sold, financial responsibility for investigation or mitigation of a VI problem will likely be determined by the sale contract between the parties. Most sale contracts include indemnity provisions covering breaches of representation, such as that the site complies with environmental law or is free of hazardous materials. Some contractual representations are limited to “known environmental conditions,” providing specific indemnification for losses resulting from claims arising out of such conditions. But for how long do the representations survive? What are the dollar limits and after what thresholds? For representations based on “knowledge,” can there be a breach at all where the government makes a “new” demand based on VI or where the underlying pollution was disclosed to a buyer, but VI was not on either party’s radar screen? Does the indemnity apply at all in the absence of a “claim,” i.e., a lawsuit or some other coercive demand? Who bears the risk of a change in law creating new legal duties with respect to VI? Questions with respect to compliance with loan covenants and the availability of insurance coverage are likely to arise as well.

The VI threat may also change the attractiveness or utility of the monitored natural attenuation approach to groundwater cleanup. It is one thing to exclude an ingestion exposure pathway by demonstrating that no one will use the groundwater, but this approach does not necessarily address potential VI concerns. Such concerns may also make more compelling any claims for property value diminution, medical monitoring, and the like.

Conclusion

Time will bring clarity on whether VI will become one of the “next big things” in environmental law. In the meantime it seems a sure bet that some major headaches are in store. Some of the headaches can be avoided with a solid technical and legal approach in this relatively new area. Meanwhile, environmental practitioners should plan on adding vapor intrusion to the long list of issues to consider at any known or suspected pollution site, particularly in the purchase or sale of such a site.

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5 See USEPA Draft Guidance, supra note 3.
6 Typically impacts by inorganic contaminants, such as metals, are not a VI concern with the exception of elemental mercury; USEPA’s guidance lists 115 typical chemicals of concern in connection with VI. See, USEPA Draft Guidance, supra note 3, Table 1.

8 See In the Matter of Proposed Amendments to Tiered Approach to Corrective Action Objectives (35 IAC 742), Docket R09-009, before the Illinois Pollution Control Board.


10 See Table 3-1.

11 See TACO Amendments, supra note 8, 35 IAC 742.200.

12 See Brownfields Technology Primer, supra note 4, at 13.

13 See New York Guidance, supra note 7, at 12.