

Vapor Intrusion Business Should Be Aware of Exposure Risk

By Andy Bowman

Over the last few years, vapor intrusion (VI) of contaminants into homes, as well as commercial and industrial buildings, has received increasing attention from regulators, health officials and businesses. VI is the migration of volatile chemicals from below the ground into overlying buildings. Volatile chemicals can originate from buried wastes or contaminated groundwater.

Common volatile chemicals of concern include trichloroethylene (TCE), tetrachloroethylene (Perc or PCE) and benzene. TCE is a common solvent used as an industrial degreaser, but it can also be found in commercial adhesives and cleaners. PCE or Perc is used in dry cleaning and also as a degreaser. Benzene is a constituent of gasoline and also may be used to manufacture pharmaceuticals, plastics and pesticides.

Exposure to TCE, PCE or benzene vapors can, at high enough levels, cause acute health effects. VI, however, often involves lower levels that cannot be smelled but which can pose an unacceptable risk of chronic health effects due to long-term exposure. Such long-term exposures to TCE, PCE, benzene or other volatile chemicals may increase the risk of cancer.

Growing concern

VI often was not considered as an exposure pathway by regulators. Recent discoveries of contaminated vapors in homes and businesses have caused more attention to be given to this complex area. A plume of contaminated groundwater can extend a considerable distance from the source of a spill or leak. Chemicals in the plume can rise through the soil as a vapor and enter a building through a porous concrete slab, cracks in the foundation, untrapped drains and utility conduits. VI is affected by a number of factors, including soil type and moisture content, depth to groundwater, contaminant levels, building materials, location and macropores. The interaction of these and other factors is not well understood.

The U.S. EPA issued a draft guidance (www.epa.gov/correctiveaction/eis/vapor) in 2002 for the evaluation of VI to indoor air. This draft guidance has not been finalized and has been subject to criticism as being overly conservative. The National Exposure Research Laboratory issued a report in September 2005 that identified limitations in the approach used in the guidance and called for further research. At the same time, Indiana and several other states are moving forward to develop their own VI guidance.

What does all this mean for a business owner? If your business is located in an area with historical volatile chemical contamination in soil or groundwater, vapor intrusion screening should be considered. If you are considering purchasing or leasing property to locate or expand your business, it may be prudent to consider performing a screening to determine

whether VI is a potential risk. The past practice of relying only on a Phase I environmental site assessment may no longer be sufficient.

Case study

Let me illustrate by means of a recent example. An Indiana company had a Phase I environmental site assessment conducted on property that had previously been farmland and an orchard. The Phase I report identified a former factory within one-half mile that had a reported spill of TCE 15 years ago. The consultant concluded that due to the location of the former factory, the apparent groundwater flow direction (no groundwater testing was conducted) and the availability of water from a utility that the past spill was of no concern and further investigation was not warranted.

The property was purchased and buildings constructed. Months later the company discovered that the location of the former factory had been erroneously described in the Phase I report and that a plume of TCE contaminated groundwater extended under several of the buildings it had constructed and sold. Testing revealed that TCE levels were elevated inside some of the buildings. The buyers of the buildings have filed lawsuits against the company alleging loss of property value and health impacts.

Even though the science of VI is still emerging, VI screening can help reduce the risk of encountering the problems confronting the company in the example. It is critical that the VI screening be conducted by a qualified, experienced consultant to make certain that samples are collected at appropriate locations and depths using the proper protocols to ensure that useful data is generated in a cost-effective and timely manner.

Additionally, the consultant must be able to properly interpret and report the results. Make certain that the consultant is knowledgeable of current VI developments, including U.S. EPA's March 2006 report providing guidance on VI sampling procedures developed at a large scale site in Connecticut.



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