MARYLAND
Department of the Environment

Facts About...

Maryland's Indoor Air Initiative

Maryland's Indoor Air Initiative is a multi-year project designed to define the locations of sites contaminated with volatile compounds and rank their potential to create indoor air issues. The U.S. Environmental Protection Agency (EPA) requested that Maryland Department of the Environment (MDE) document the numbers and locations of these sites and assess the need for further investigations of select facilities. The objective was to collect information concerning environmental conditions sufficient to determine the presence of human health risks and whether further investigations are warranted. The information collected for this initiative will be used to target areas for future study and hazard evaluation.

Site Location

The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) lists 580 potential Superfund sites that are located in Maryland. Eighty-six of these listed sites are documented to have a volatile organic component to their waste streams and will require further screening. This does not mean that the eighty-six are the only CERCLIS sites that might present an indoor air issue, but that these are documented as presenting a potential for indoor air issues due to identified contaminants. In addition to the CERCLIS sites, there are 128 miscellaneous Voluntary Cleanup Program, Leaking Underground Storage Tank and not otherwise classified sites that have volatile organic contaminant issues. There is some overlap between the CERCLIS and miscellaneous sites.

Preliminary site screening for indoor air issues is designed to help identify sites where a potential exists for subsurface vapor intrusion. If a potential exists, then a determination must be made as to whether immediate action is warranted. Criteria for making these determinations are:

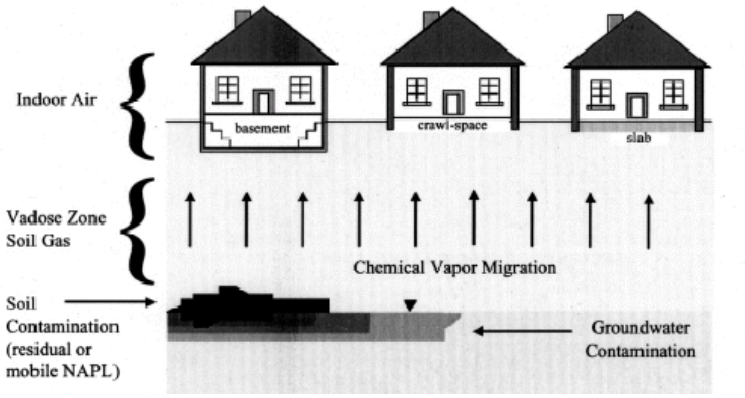
1) Are documented contaminants of sufficient volatility and toxicity to present a potential risk;
2) Are inhabited buildings in close proximity to subsurface contamination; and
3) Do current conditions warrant immediate action?

Environmental Setting

Localized geology, geo-hydrology, building construction and the age of individual disposal sites are a factor in determining if contaminants might impact area structures. Sandy loam presents the greatest potential for VOC migration from the water table through the vadose zone to surface structures. Clay and silt lenses act to concentrate vapors and can target select surface structures. Volatile organic vapors resulting from contaminated soil, groundwater and buried waste materials can enter engineered structures through cracks in foundations, pipe or utility penetrations through concrete slabs, and through foundation drainages or sump pumps. The wastes associated with indoor air issues are common industrial solvents including benzene, chloroform, chloromethane, 1,2-dichloroethane, methylene chloride, PCE, TCE, and vinyl chloride. These eight contaminants are known carcinogens.

Environmental Investigations
Environmental assessments at the 86 CERCLIS sites and 128 miscellaneous sites have documented volatile organic contamination in soils, groundwater and/or surface water and sediments. The CERCLIS sites were investigated under the CERCLA Pre-Remedial Program. The miscellaneous sites were investigated under MDE oversight of the Voluntary Cleanup Program.

Current Status
Vapor intrusion is the migration of volatile chemicals from the subsurface into overlying buildings. Volatile chemicals in buried wastes and/or contaminated groundwater can emit vapors that may migrate through subsurface soils and into indoor air spaces of overlying buildings in ways similar to that of radon gas seeping into homes, as shown below. As the figure illustrates, this vapor intrusion pathway may be important for buildings both with and without a basement.



In extreme cases, the vapors may accumulate in dwellings or occupied buildings to levels that may pose near-term safety hazards (e.g., explosion), acute health effects, or aesthetic problems (e.g., odors). Typically however, the chemical concentration levels are low or, depending on site-specific conditions, vapors may not be present at detectable concentrations. In residences with low concentrations, the main concern is whether the chemicals may pose an unacceptable risk of chronic health effects due to long-term exposure to these low levels.

Conclusions/Recommendations
The adverse health effects from long-term, chronic exposure to low levels of VOCs in indoor air may include effects on various organs such as the liver, kidneys, or nervous system, potential effects on the immune system, and possibly an increased risk of developing cancer. The potential for adverse health effects to occur is dependent on many factors including the type of contaminants, their concentrations, the extent of exposure, and individual sensitivity. Further investigation of sites with potential indoor air issues is required to document levels of contamination and protect human health.

For additional information please contact the Land Restoration Program at (410) 537-3440.

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