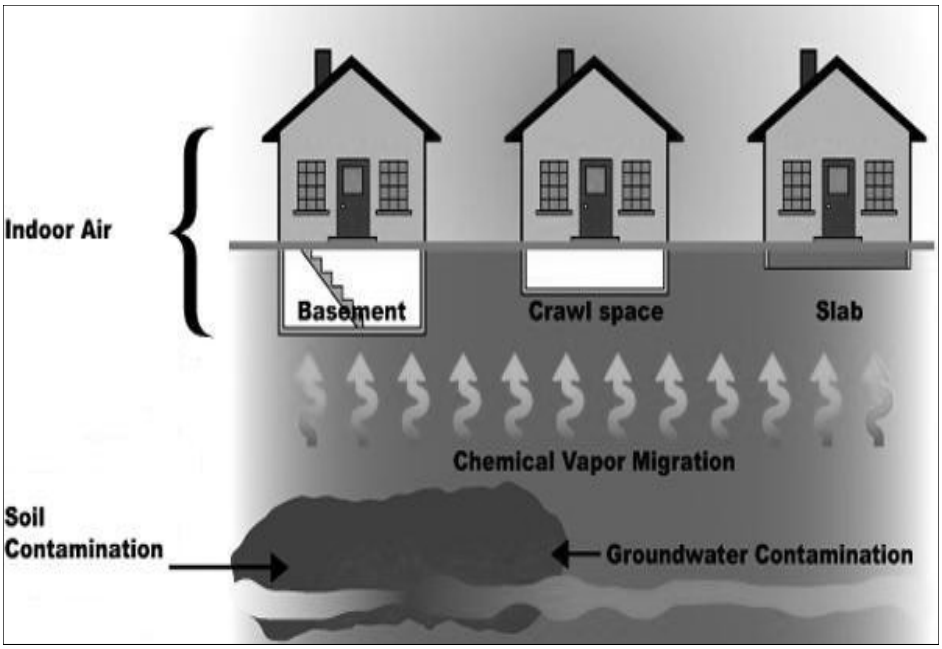
FACTS ABOUT...

VAPOR INTRUSION

What is vapor intrusion?

Vapor intrusion is a way in which chemicals in the ground can get into the air in your home (see figure at right). Chemicals are released to the soil and groundwater from various sources including: chemical spills at a factory, chemical dumping, leaks from underground storage tanks, or buried wastes. Certain types of chemicals evaporate and may travel as vapors through the soil and groundwater and into nearby buildings, contaminating indoor air.



A variety of factors can influence whether vapor intrusion may occur at a building located near a source of soil or groundwater contamination including: soil type, depth to groundwater, the construction of the building, and the condition of the foundation and existence of underground utilities that can create pathways for vapors to travel. Homes in the same neighborhood and even next door to each other can be affected differently by vapor intrusion.

Why is vapor intrusion a concern?

Vapor intrusion is a concern because chemical vapors affect indoor air quality and can build up to a point where the health of occupants in affected buildings could be at risk. In general, exposure to any chemical does not necessarily mean that health effects will occur. Whether or not a person experiences any health effects depends on several factors, including the toxicity of the chemical, the length and amount of exposure, and the health and sensitivity of the individual exposed. If chemical levels build up in indoor air high enough, individuals may temporarily experience eye and respiratory irritation, headache, and/or nausea. Low-level chemical exposures over many years may increase an individual's risk of developing cancer or chronic disease.

What types of chemicals are associated with vapor intrusion?

Only "volatile" chemicals that readily evaporate are a concern with vapor intrusion. The most common class of chemicals associated with vapor intrusion are volatile organic compounds (VOCs). VOCs are widely used and are found in petroleum products such as gasoline and solvents for dry cleaning and industrial uses.

Can vapors be in my home from other sources?

VOCs also are found in many household products and can affect indoor air quality. Paints, paint strippers and thinners, cigarette smoke, aerosol sprays, moth balls, air fresheners, new carpeting or furniture, hobby supplies (glues and solvents), stored fuels, and clothing that has been dry-cleaned all contain VOCs. Such household sources are more likely to be a cause of indoor air quality problems in your home than vapor intrusion.

In addition, indoor air quality may also be affected by outdoor air. VOCs are present in outdoor air from a combination of sources such as vehicle exhaust and various industries.

Both indoor and outdoor sources are taken into account when evaluating whether vapor intrusion is contributing to unhealthy indoor air.

What happens if vapor intrusion is a concern near my home?

If you live near a site with VOC contamination, the potential for vapor intrusion may be investigated. To determine whether vapor intrusion may be a concern, samples of groundwater and soil gas may be collected near your home. If this sampling indicates a potential problem, sampling on your property and in your home may be necessary.

If such sampling is necessary, you would be contacted by the site owner or others working on the investigation and cleanup with information about the project. Your cooperation and consent would be requested before any testing or sampling is done on your property. Additionally, such sampling would be done at no cost to you.

Soil gas samples collected beneath the foundation are often the most reliable method to determine if vapors are present that could cause a problem. Indoor and outdoor air sampling may also be collected. A comparison of all the data is conducted to determine whether vapor intrusion is a concern.

Depending on the investigation results, additional sampling or monitoring may be recommended. Additional sampling may be performed to determine the extent of vapor contamination and to verify results. Monitoring (sampling on a recurring basis) may be conducted if there is a potential for vapor intrusion to occur should conditions change.

What happens if a vapor intrusion problem is found?

If testing confirms vapor intrusion is affecting the air in your home, measures can be taken to address the problem. Mitigation steps may be taken to minimize exposures associated with vapor intrusion. Mitigation steps may include sealing cracks in the building's foundation, adjusting the building's heating, ventilation, and air-conditioning system to maintain a positive pressure to prevent infiltration of subsurface vapors, or installing a subsurface depressurization system. This system prevents vapors from entering the building by continuously venting the vapors from beneath the building to the exterior of the structure. Subsurface depressurization systems are also used throughout the country to reduce levels of naturally-occurring radon gas. This system uses minimal electricity and should not noticeably affect heating and cooling efficiency. Usually, the party responsible for cleaning up the contamination is also responsible for paying for installation of this system. The system typically remains in place until the contamination is cleaned up and may remain in place permanently.

What can I do to improve my indoor air quality?

Household products and other factors, such as mold growth, carbon monoxide, and radon, can degrade the quality of air in your home. Consider the following tips to improve indoor air quality:

- Be aware of household products that contain VOCs. Do not buy more chemicals than you need at a time. Store unused chemicals in tightly-sealed containers in a well-ventilated location, preferably away from the living space in your home.
- Fix all water leaks promptly, as well as other moisture problems that encourage mold growth.
- Don't make your home too air tight. Fresh air helps prevent build-up of chemicals in the air as well as mold growth.
- Check all appliances and fireplaces annually. Make sure they are properly vented and in good condition.
- Install carbon monoxide detectors in your home; take immediate actions to reduce carbon monoxide levels if needed. These detectors are available at hardware and home improvement stores.
- Test your home for radon; take actions to reduce radon levels if needed. Test kits are available at hardware and home improvement stores or you can call the DHSS Radon Program at (573) 751-6160 or (866) 628-9891.

For more information:

For health-related questions regarding vapor intrusion, please contact:

Missouri Department of Health and Senior Services, Health and Risk Assessment Program (573) 751-6102

Additional information about vapor intrusion is available at the following Web sites:

- U.S. Environmental Protection Agency—www.epa.gov/epawaste/hazard/correctiveaction/eis/vapor.htm
- Interstate Technology and Regulatory Council—www.itrcweb.org/guidancedocument.asp?TID=49

Additional information on indoor air quality is available at the following Web sites:

- DHSS—www.dhss.mo.gov/IndoorAir
- U.S. Environmental Protection Agency—www.epa.gov/iaq

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