What You Should Know About Vapor Intrusion

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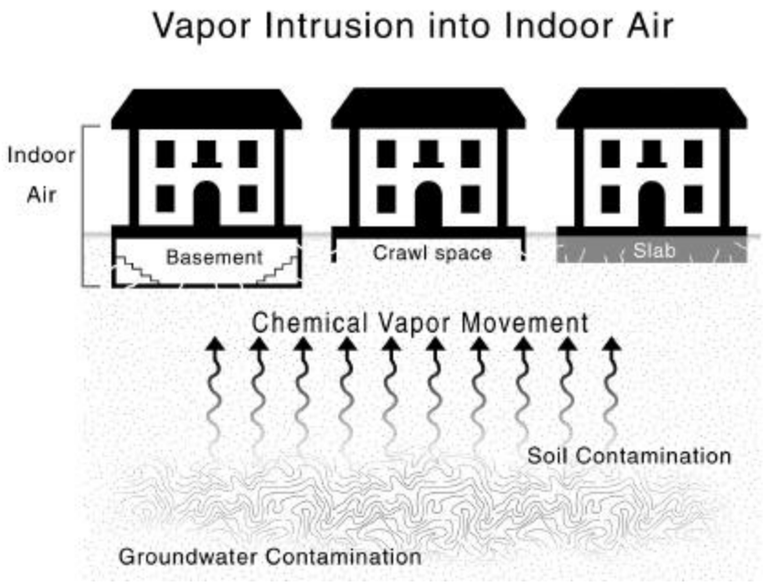
What is vapor intrusion?

Vapor intrusion occurs when liquid chemicals give off gases that seep into buildings through cracks in basement walls, foundations, sewer lines or other openings. Sometimes these liquid chemicals are spilled on the ground or leak from underground storage tanks. They trickle down into the soil and groundwater, and the gases they give off travel through soil particles as vapors. These vapors then move up through the soil and into nearby buildings, contaminating indoor air.



Homes in the same neighborhood, even right next door, can be affected differently by vapor intrusion. The effects can be dependent upon the condition of the home. For instance, a home with more cracks in its foundation could be more prone to vapor intrusion. Vapor intrusion is similar to the process that occurs when radon, a naturally occurring radioactive gas, enters a home through cracks in the foundation. Vapor intrusion from chemicals is uncommon, but should be considered when there is a known source of soil or groundwater contamination nearby.

What chemicals might be entering my home, and how would they get there?

One group of chemicals that easily gives off gases are known as volatile organic compounds, or VOCs. Some well-known examples of VOCs are petroleum products, such as gasoline or diesel fuel, dry cleaning solvents and industrial de-greasers.

One of the most common ways that vapor intrusion occurs is when petroleum that has leaked from underground storage tanks at gas stations gives off vapors that enter people's homes. This occurrence is usually accompanied by a petroleum odor. Solvents from other commercial and industrial sites are not usually accompanied by an odor. In many cases, underground chemical and petroleum leaks are not discovered until contamination has had time to travel through the soil.

When the EPA investigates possible vapor intrusion, we also take into account VOCs found in household products stored in your home. Paints, paint strippers and thinners, cigarette smoke, aerosol sprays, moth balls, air fresheners, new carpeting or furniture, glues, solvents, stored fuels and dry-cleaned clothing all contain VOCs. These household products are more likely to be a source of indoor air quality problems than vapor intrusion from a chemical spill.

What are the health concerns with vapor intrusion?

The health effects from chemical exposures vary, based on the person who is exposed, the amount of exposure and the type of chemical. When chemicals build up in indoor air at high levels, some people may experience eye and respiratory irritation, headaches and/or nausea. These symptoms are temporary and should go away when the person moves to fresh air. Usually, health officials are more concerned about low-level chemical exposures over many years. Long-term exposure to some chemicals may raise a person's lifetime risk of developing cancer or other chronic diseases.

The likelihood of indoor air contamination by vapor intrusion is low at most cleanup sites. When vapor intrusion does occur, the health risk will often be lower than the risk posed by radon or by household chemicals used by the residents. Even though the risk is quite low, the EPA and many health agencies consider these risks to be unnecessary and avoidable.

What should I do if vapor intrusion is a concern near my home?

If you live near a cleanup site where petroleum or other VOCs have contaminated soil or groundwater, you should ask the officials overseeing the cleanup if the potential for vapor intrusion is being investigated.

You may be contacted by the cleanup team working on the site. They may provide information about the project or request assistance from you. Your cooperation and consent may be requested, so that testing can be done on your property.

How is vapor intrusion discovered?

In most cases, the potential for vapor intrusion can be ruled out by collecting soil gas or groundwater samples near the contamination site. If contamination can be ruled out near the site, then it may be unnecessary to look any farther out. If contamination is found near the site, the search may be widened to include sampling closer to, or even on, your property. EPA does not usually recommend indoor air sampling for vapor intrusion.

Indoor air quality changes a lot from day to day. Therefore, sampling one day may not show a problem, and the next day it will. A variety of VOC sources are present in many homes and in outside air, which replaces indoor air constantly. Therefore, testing will not necessarily confirm that the VOCs in the indoor air are entering the home from outside underground sources.

Instead, soil vapor samples are taken from under the home's foundation, called sub-slab samples. Sub-slab samples are more reliable than indoor air samples and are not affected by other indoor chemical sources. If no soil vapors are detected outside the home, additional indoor air sampling may not be necessary as long as the site is being cleaned up effectively. If sub-slab vapors are detected outside the home above EPA's projected health concern levels, additional indoor air sampling should be done to determine if those vapors are present inside and at what levels.

What happens if a problem is found?

The most common solution is to install a radon mitigation (reduction) system. This system prevents gases in the soil from entering the home. A low level of suction is applied below the foundation, and the vapors are vented outside. The system uses minimal electricity and should not noticeably affect heating or cooling efficiency. This system also would prevent radon from entering the home – an added health benefit. Once the contamination is cleaned up, the system should no longer be needed. In homes with radon problems, these systems should remain in place permanently.

What can I do to improve my indoor air quality?

Consider these tips to improve indoor air quality in your home:

- Do not buy more chemicals than you need. Be aware of which products contain VOCs.
- Store unused chemicals in appropriate containers in well-ventilated areas.
- Don't make your home too air tight. Fresh air helps prevent chemical build-up in the air and mold growth.
- Fix all leaks promptly, as well as other moisture problems that encourage mold growth.
- Make sure all appliances and fireplaces are in good condition. Have them checked annually.
- Test your home for radon.
- Install carbon monoxide monitors in your home.

For more information:

For health-related questions regarding vapor intrusion, contact your local health department or the Agency for Toxic Substances and Disease Registry at **1-888-422-8737** or visit their website at www.atsdr.cdc.gov. For more detailed information on EPA's vapor intrusion policies, visit the EPA's website at: www.epa.gov/correctiveaction/eis/vapor/guidance.pdf. For more information on indoor air quality, visit EPA's website at: www.epa.gov/air/topics/comoria.html or call the Indoor Air Quality Information hotline at **1 800-438-4318**.

EPA Update on Site Progress

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