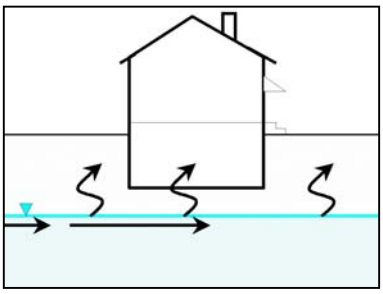
Human Health Hazards

State of Wisconsin
Department of Health and Family Services
Division of Public Health

Vapor Intrusion

What is vapor intrusion?



Vapor intrusion is a way that chemicals in soil or groundwater can get into indoor air. (see figure at right) Sometimes, chemicals are spilled on the ground at a factory or leak from an underground storage tank. These chemicals can seep down into the soil and groundwater. Some chemicals can also travel through soil as vapors. These vapors may then move up through the soil and into nearby buildings, contaminating indoor air. Homes in the same neighborhood and right next to each other can be affected differently by vapor intrusion. Vapor intrusion is similar to how radon, a naturally occurring radioactive gas, can enter a home through cracks in the foundation. Vapor intrusion is uncommon, but should be considered whenever there is a known source of soil or groundwater contamination nearby.

What chemicals might be entering my home, and where would they come from?

VOCs (volatile organic compounds) are one group of chemicals that easily become gases which can migrate through the soil and enter buildings. Some examples of VOCs are petroleum products such as gasoline or diesel fuel, and solvents for dry cleaning and industrial uses.

The most common vapor intrusion cases involve petroleum spilled or leaked from underground storage tanks at gas stations. These cases are usually accompanied by a petroleum odor. Solvents from other commercial sites and industrial sites are usually not accompanied by an odor. In many cases, chemical and petroleum releases are not immediately discovered. By the time they are discovered, the contamination has had time to migrate through the soil.

Some of these same solvents are also found in **household products** which may be stored in your home. 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 dry-cleaned clothing all contain VOCs and **are more likely to be a source of indoor air quality problems at your home than vapor intrusion from a contamination site.** In some extreme cases, health symptoms can be experienced as a result of exposure to chemicals stored in the home.

What are the health concerns with vapor intrusion?

The health effects from chemical exposures vary based on the individual exposed and the chemical involved. When chemicals build up in indoor air (at levels high enough to cause a strong petroleum odor, for example), some people will experience eye and respiratory irritation, headache, and/or nausea. These symptoms are temporary and should go away when the person is moved to fresh air. Usually, health officials are most concerned about low level chemical exposures over many years, as this may raise a person's lifetime risk for developing cancer.

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 that posed by radon or by chemicals owned and used by the resident. Even though the risk is quite low, the Wisconsin Department of Health Services (DHS) considers these risks to be unnecessary and avoidable.

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

If you live near a site with VOC contamination, such as a gas station or dry cleaner where petroleum or chemicals have contaminated soil or groundwater, you should expect that the potential for vapor intrusion is also being investigated. You may be contacted by the cleanup site owner or others working on the

cleanup with information about the project. Your cooperation and consent would be requested before any testing/sampling would be done on your property. You may ask the person contacting you any questions about the work being done, or you can contact the DNR cleanup project manager, or a DHS employee. Telephone numbers and internet addresses for DHS and DNR are provided below.

How is vapor intrusion investigated?

In most cases, the potential for vapor intrusion can be ruled out by collecting soil gas or groundwater samples near the contamination site. In some cases, sampling closer to your property and/or home may be necessary. DHS and DNR do 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 even though sampling a day later might show contamination. Since a variety of VOC sources are present in most homes, testing will not necessarily confirm that VOCs in the indoor air are from VOC contamination in soils nearby. Instead, soil vapor samples are taken from areas outside of the home to see if vapors are near the home. Samples may also be taken from beneath the home's foundation (called sub-slab samples), to see if vapors have reached the home. Sub-slab samples are more reliable than indoor air samples and are not as affected by other indoor chemical sources. If no odors are present at a petroleum cleanup site, additional testing may not be necessary as long as the site is being cleaned up effectively.

What happens if a problem is found?

If vapor intrusion is having an effect on the air in your home, the most common solution is to install a *radon mitigation system*. This prevents gases in the soil from entering the home. A low amount of suction is applied below the foundation and the vapors are vented to the outside. The system uses minimal electricity and should not noticeably affect heating and cooling efficiency. This mitigation system also prevents radon from entering the home, an added health benefit. Usually, the party responsible for cleaning up the contamination is also responsible for paying for the installation of this system. Once the contamination is cleaned up, the system should no longer be needed. In homes with radon problems, DHS suggests that these systems remain in place permanently.

What else can I do to improve my air quality?

There are other sources of indoor air problems. Consider these tips to improve air quality:

- Do not buy more chemicals than you need at a time. Be aware of what products contain VOCs.
- Store unused chemicals in appropriate containers in a well-ventilated location.
- If you smell a chemical odor that does not seem to be from an indoor source, contact your local health department. For very strong odors, your local fire department can determine if there is a fire hazard.
- Don't make your home too air tight. Fresh air will help prevent both build up of chemicals in the air and mold growth.
- Fix all leaks promptly, as well as other moisture problems that encourage mold growth.
- Make sure all major appliances and fireplaces are in good condition. Have them checked annually by a professional.
- TEST YOUR HOME FOR RADON!

For more information

For health related questions, contact your local health department or DHS at (608) 266-1120. More information on this and related topics is available on the DHS website at: http://www.dhs.state.wi.us/eh/Air. For an on-line DNR database of sites with environmental contamination, click on the "BRRTS on the Web" button at http://www.dnr.state.wi.us/org/aw/rr/.

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