FACTS ABOUT…

VAPOR INTRUSION

This fact sheet provides general information on vapor intrusion. It is intended to supplement other technical guidance documents prepared by the Delaware Department of Natural Resources and Environmental Control (DNREC).

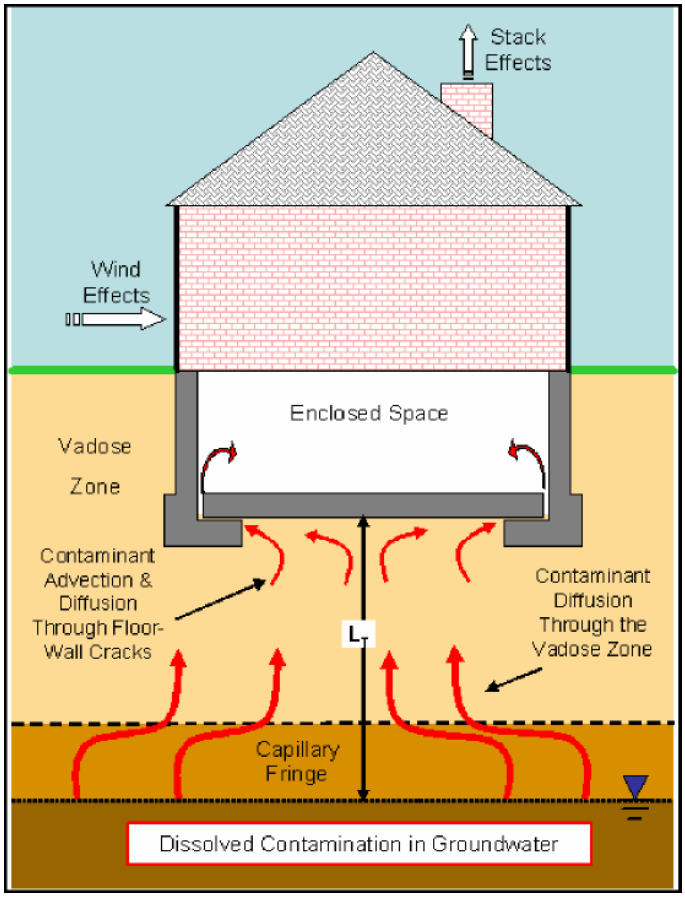
What is vapor intrusion?

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 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?

Volatile organic compounds (VOCs) are one group of chemicals that easily become vapors, which can then 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.

A common vapor intrusion case involves petroleum spilled or leaked from underground storage tanks at gas stations. A petroleum odor is usually associated with this case. Solvents from 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 **common consumer 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, glues and solvents, stored fuels, and dry-cleaned clothing all contain VOCs. **These sources can be a more likely to be a source of indoor air quality problems at your home than vapor intrusion from a contaminated site.** In some unusual 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 should diminish or stop when the person is moved to fresh air. 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, however, the health hazard will be evaluated.

What should I expect if vapor intrusion is a concern near my home?
If you live near a site identified by DNREC with VOC contamination, such as a gas station or dry cleaner where petroleum products or other volatile chemicals have contaminated soil or groundwater, the potential for vapor intrusion should be investigated. You may be contacted by the 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 or in your home. You may ask the person contacting you questions about the work being done, or you can contact the DNREC cleanup project manager. A telephone number and internet address for DNREC are provided below.

How is vapor intrusion investigated?
In most cases, the potential for vapor intrusion can be ruled out by collecting soil vapor or groundwater samples near the contamination site. In some cases, sampling on your property or in your home may be necessary. 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. In some cases, indoor air sampling may be performed, but is usually not recommended for vapor intrusion investigations. Since indoor air conditions change a lot from day to day, and a variety of VOC sources are present in most homes, indoor air testing may not necessarily confirm that VOCs in the indoor air are from VOC contamination in soil or groundwater nearby. For certain conditions, sub-slab samples may be more reliable for assessing vapor intrusion than indoor air samples because sub-slab samples are not as affected by indoor chemical sources.

What happens if a problem is found?
If vapor intrusion is having an effect on the air in your home, a common solution is to install a *radon mitigation system.* This prevents gases or vapors in the soil from entering the home. A radon mitigation system generates a low level vacuum below the foundation. This vacuum collects sub-surface vapors and vents those vapors to outdoor air where they are effectively diluted and dispersed. The system uses minimal electricity and should not noticeably affect heating and cooling efficiency. This mitigation system also prevents radon from entering the home, which is an added health benefit. Usually, the party responsible for cleaning up the contamination is also responsible for paying for the installation of this system. The system typically should remain in place until the contamination is cleaned up and may remain in place permanently.

For more information:

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For questions about this project, please contact:
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Or visit the project website at:
www.awm.delaware.gov/Info/Pages/PetrolUpdate-Rons.aspx