



What is Vapor Intrusion?

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Certain types of contaminants that have been spilled or dumped on the ground may enter groundwater. From there they can evaporate and travel through soil into buildings, where they then may contaminate indoor air. This process is called vapor intrusion.

This fact sheet provides general information about vapor intrusion. Information on vapor intrusion at specific sites can be found at <http://www.pca.state.mn.us/cleanup/sites/index.html>.

What is vapor intrusion?

The term describes the migration of chemicals in a gaseous (vapor) state from their underground sources in contaminated groundwater or soil into the basements or foundations of buildings. The vapors may enter through cracks, around pipes, or through sump or drain systems as they travel toward the surface.

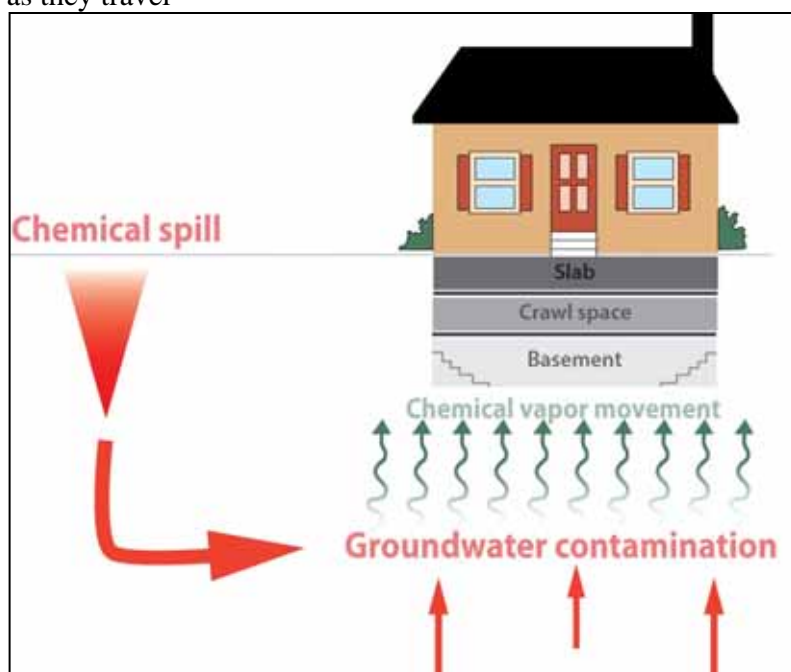
The main chemicals of concern in vapor intrusion are volatile organic compounds, because they can easily evaporate. VOCs are and have been historically found in many petroleum products, industrial chemicals and cleaning solvents, as well as in many common household products.

As a relatively newly discovered

phenomenon, vapor intrusion has become a significant environmental concern at some sites with contaminated groundwater or soil. In the past, contamination of soil or groundwater was viewed mainly in terms of its potential impact on drinking-water supplies, not in terms of contaminating indoor air. But in recent years environmental regulators have learned that vapor intrusion may be an issue even at sites that had been previously investigated and cleaned up.

What are the health risks from vapor intrusion?

If VOC concentrations accumulate within buildings they can degrade indoor air quality and pose a risk to human health. Even relatively low concentrations of VOCs, if breathed over a long period of time, have the potential of posing long-term health risks.



Potential health risks from VOCs in indoor air include eye and respiratory irritation, headache, and nausea. Long-term exposure can in some cases, depending on the chemical, increase the risk of cancer. Health effects can vary depending on the level of exposure, the chemicals involved, and an individual's response to the exposure.

It is important to note, as previously mentioned, that some of the same VOCs that are associated with vapor intrusion can be found in household products stored in your home, such as aerosol sprays, hobby supplies and various cleaners. Indoor air-quality problems not associated with underground contamination may be a result of these types of background contaminants.

Federal and state health agencies, including the Minnesota Department of Health, have developed indoor-air screening levels for the most common VOCs at contaminated sites. These and other screening tools are used collectively to evaluate risks posed by vapor intrusion.

What is the MPCA Superfund Program doing about vapor intrusion and how are these risks investigated?

Due to the newly emerging knowledge of vapor intrusion issues there is a potential that some older sites that were already investigated and cleaned up may have vapor risks that have not yet been fully investigated. As a result, the MPCA's Superfund Program is investigating current sites as well as re-examining those that were closed due to past successful cleanups, but which now may present risks associated with vapor intrusion.

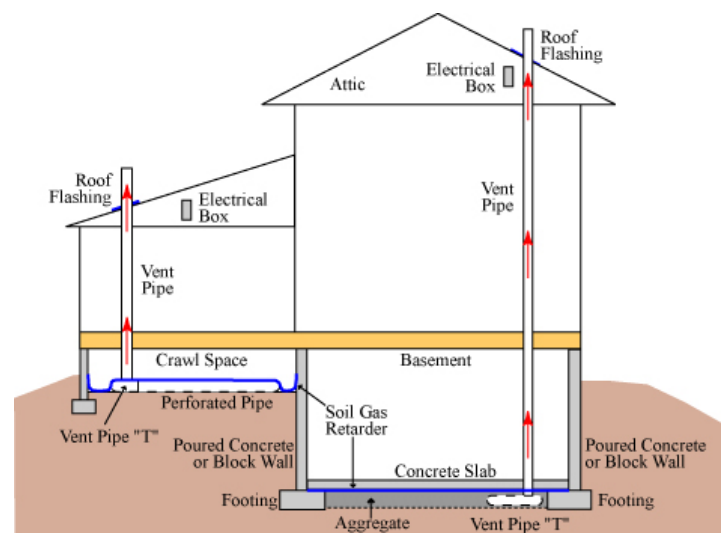
To rule out potential vapor intrusion risks, staff from the Superfund Program take soil and groundwater samples at and near contaminated sites and compare the laboratory results with screening values that have been set for a number of chemical compounds. If laboratory results show the samples exceed their respective screening values, additional investigation will be conducted.

Because vapors can move through the air spaces between soil particles and enter buildings through cracks or other openings in floor slabs or foundations, samples sometimes need to be taken closer to buildings. If soil-gas sampling in the area indicates a risk that vapors may have moved into the soil beneath homes, the MPCA may seek permission from building owners to conduct "sub-slab" sampling in the basement to measure soil-gas levels under the homes' foundations.

Samples then are analyzed in the laboratory using screening values that have been established for contaminants present in soil vapor, sub-slab soil vapor, and indoor air. The screening values become more restrictive as sampling moves from ambient concentrations in the subsurface to the indoor air environment. If sub-slab sampling indicates there is a vapor intrusion risk, indoor air samples are then collected. If indoor sampling shows vapors are present at concentrations exceeding indoor screening values, the home will need a vapor mitigation system.

How does the MPCA Superfund Program clean up vapor intrusion?

In affected homes, vapors are mitigated by installing a sub-slab extraction system. This is the same type of system used to mitigate radon in indoor air. PVC piping is installed through a hole drilled in the basement floor and extended to the roof. A low-volume fan pulls vapors from below the foundation and exhausts them through a roof stack to outdoor air, where they are easily dissipated.



In-home vapor mitigation systems

In some cases the key to cleaning up vapors at their source is to contain or treat the contaminated groundwater at its source. This may include installing a groundwater pumping and treatment system or expanding an existing one. In addition a soil-vapor extraction system may be installed, consisting of a number of extraction “wells” over the source area that feed back to a central extraction fan and carbon-filtration treatment system.

What should I expect if I live near a contaminated site?

The MPCA Superfund Program currently is reviewing new and previously closed sites with soil and/or groundwater contamination to see if they have potential for vapor intrusion risk. If you live near a site that is under investigation you may be asked to provide access to your property for the purpose of sampling. If sampling is conducted and results indicate a problem, the MPCA will offer to conduct further investigation, recommend that response actions be conducted to eliminate vapor intrusion risks, and notify local government and neighborhood groups.

Whom can I contact for more information?

For more information about potential vapor intrusion sites in your area, contact your local government or the MPCA Superfund Program at 651-296-6300.