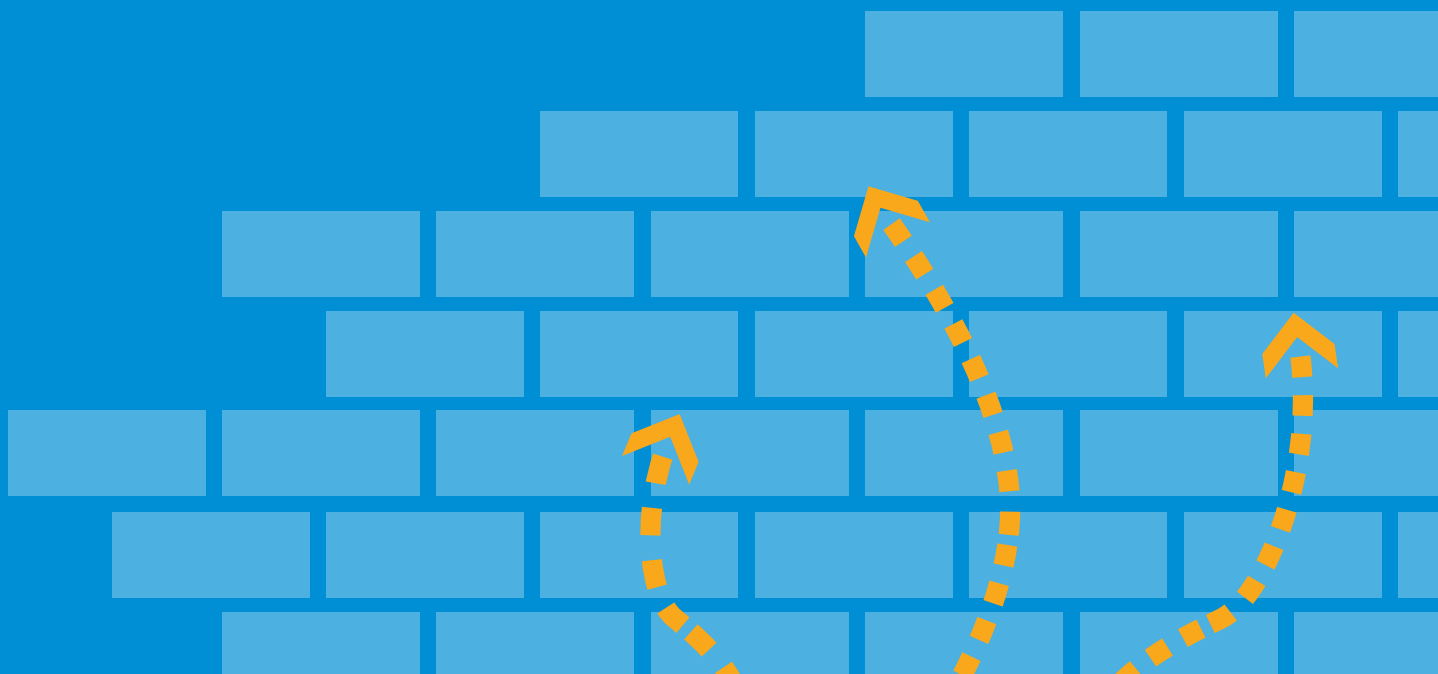
What is **Vapor Intrusion** and How is it Investigated?

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

MDHHS Michigan Department of Health and Human Services



What is vapor intrusion?

Vapor intrusion sometimes occurs where chemicals were spilled, leaked, or dumped and not cleaned up. For example, properties such as gas stations, dry cleaners, or businesses operating metal parts degreasers use chemicals like gasoline or solvents that can cause vapor intrusion. If these chemicals are mishandled and get into the ground, they can move through the soil and groundwater. Although the chemicals are often released as liquid, they easily evaporate, becoming a vapor in the air that you often cannot see or smell. At some point, the vapors may come in contact with your home or business – usually around your basement or your floor. These vapors may get into your home through openings such as cracks, or other openings around pipes and sumps. This is a concern because you may breathe in these harmful vapors without knowing.

Why does vapor intrusion matter to me?

Vapor intrusion can cause the air in your home to be unsafe to breathe. These chemicals can harm your health at levels well below what people can see or smell. Depending on the amount and type of chemicals, even a short time of breathing them can cause long-term and serious health problems.

Once you know you have vapor intrusion issues, there are simple things that can be done to keep you and your family safe. For example, a vapor mitigation system may need to be installed. This will keep unsafe levels of chemicals from getting into your home and the air you breathe. Most of the time, these systems are very similar to what is used to prevent radon from getting into homes.

Why have I not heard of this before?

What we know about vapor intrusion has been increasing over the years. The potential risks from these chemicals that are linked to vapor intrusion are better understood today. Before, our biggest concern with underground chemicals was the safety of drinking water. But we know that some of these chemicals can get into buildings through the air. Because of our increased knowledge of the risks, vapor intrusion has become a more urgent issue. Vapor intrusion is a national problem, and state and federal agencies across the country are continuing to learn more about it.

How do I know if I am being exposed to these vapor intrusion chemicals?

You cannot always see or smell the chemicals at harmful levels that are common with vapor intrusion. The Michigan Department of Environmental Quality (MDEQ) or the person responsible for the chemical release will have samples taken of the soil or groundwater from the areas around your home or business to see if these chemicals are found at levels that cause concern. If levels of concern are found, vapor samples may be taken from under your basement floor or building.

If the vapor under your home or business is high, indoor air samples may be taken to determine how much of the chemical is entering the indoor air. There are other sources of these chemicals that you may have in your home or garage, like paint or gasoline. When possible, these common household sources are removed from the home before testing begins.

The chemicals most often causing vapor intrusion only stay in your body for a short time so blood tests may not be effective at determining if you have been exposed unless your exposure to levels of concern is constant and ongoing. If you are told you have vapor intrusion issues in your home, your local health department or the Michigan Department of Health and Human Services (MDHHS) can help you determine next steps and the potential health effects that you should talk about with your doctor.

What is the government doing about vapor intrusion?

Information on the type, the amount, and the location of chemicals spilled or leaked at a site may suggest that vapor intrusion is a problem. The MDEQ will work to have additional samples collected or possibly implement measures to prevent further exposure from occurring. If vapor intrusion is confirmed, the MDEQ and the MDHHS will work with your local health department to protect your health and those living with you. If the chemical levels are a concern, the responsible person or the MDEQ may offer to install a vapor mitigation system in your home or business. In some cases, it may be recommended that you move elsewhere until this work can be done. If this happens, funding may be available to help with your expenses.

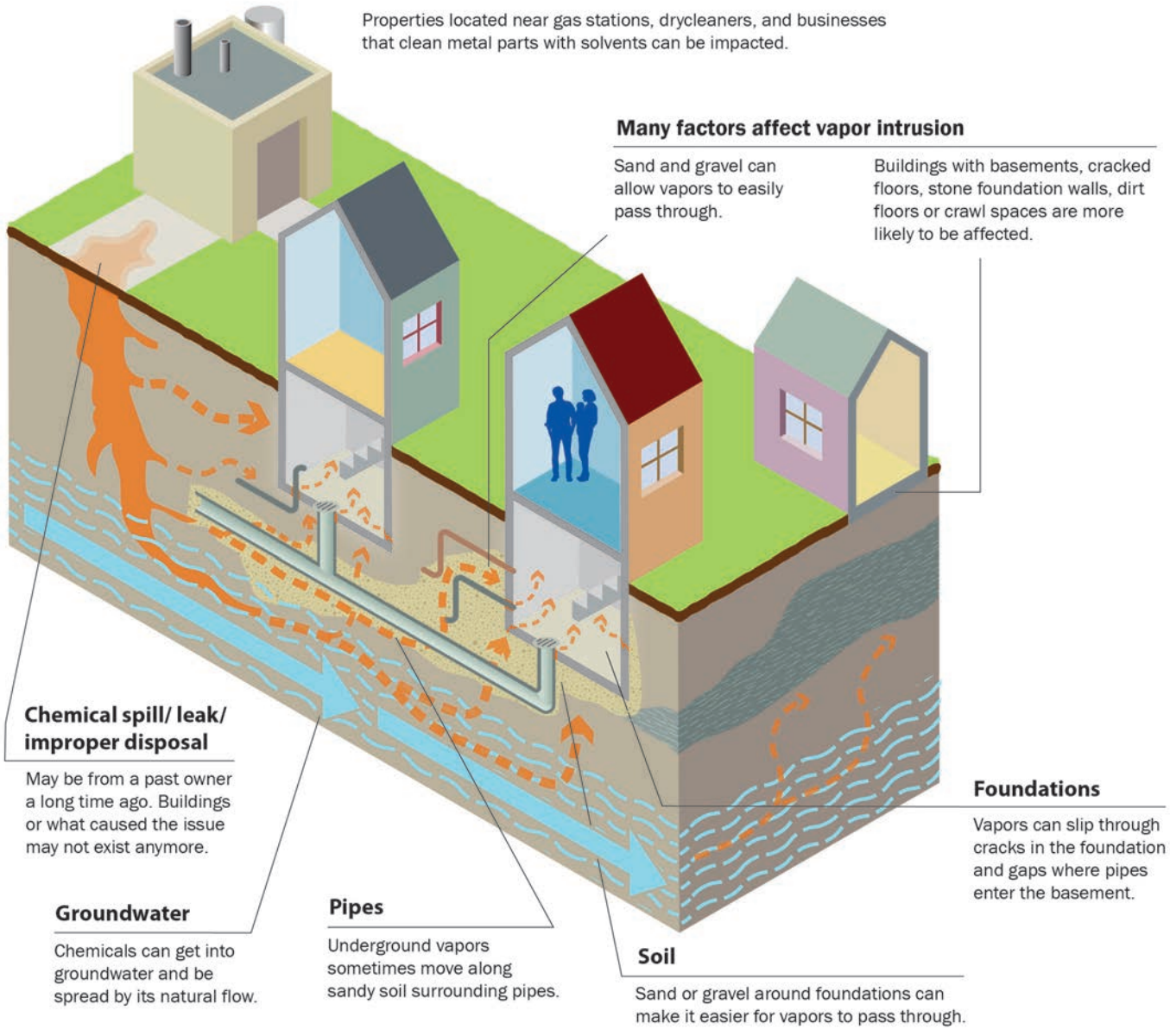
How are samples collected?

If sampling is needed, you will always be asked for permission to enter your home or property. Sampling the vapor under a building is the best way to learn if chemical vapors may be entering a building. This is called collecting a "sub-slab vapor sample." Sub-slab sampling involves drilling a small hole in a discrete location through the floor, installing an air valve similar to a tire valve, and collecting an air sample from beneath your home. If the test results show there may be a problem, indoor air samples may also be collected.

How do you control vapor intrusion?

If the sampling shows that vapor intrusion may be a problem, a common solution is to install a system of piping and fan(s) to pull vapors from under the building and vent them outside. This type of "vapor mitigation system" has been used for many years to prevent radon, a naturally occurring gas, from entering buildings. Sometimes sealants and liners are installed on the inside of a foundation and floor to improve the performance of a vapor mitigation system. The exact type of vapor mitigation system installed in a building will vary depending on the design of the building and the chemicals found.

How Vapor Intrusion Happens: A Complex Path



What happens when a chemical spill, leak or improper disposal becomes a vapor intrusion risk?

1. Volatile chemicals are identified in the soil, groundwater, or vapors coming from the soil.

- There is a chemical release to the environment.
- It is a chemical known to volatilize – or go into the air easily.
- There are homes/buildings and people in the area.
- Vapors travel into the home or building.

Chemical Discharge Location

Chemical used by dry cleaners and businesses that used degreasers to clean metal parts may cause vapor intrusion. These types of chemicals can have harmful vapors and may pose a potential risk if the chemicals are spilled, leaked, or intentionally dumped onto the ground. Another potential source is gas stations that have had a release of petroleum products from their underground storage tanks.

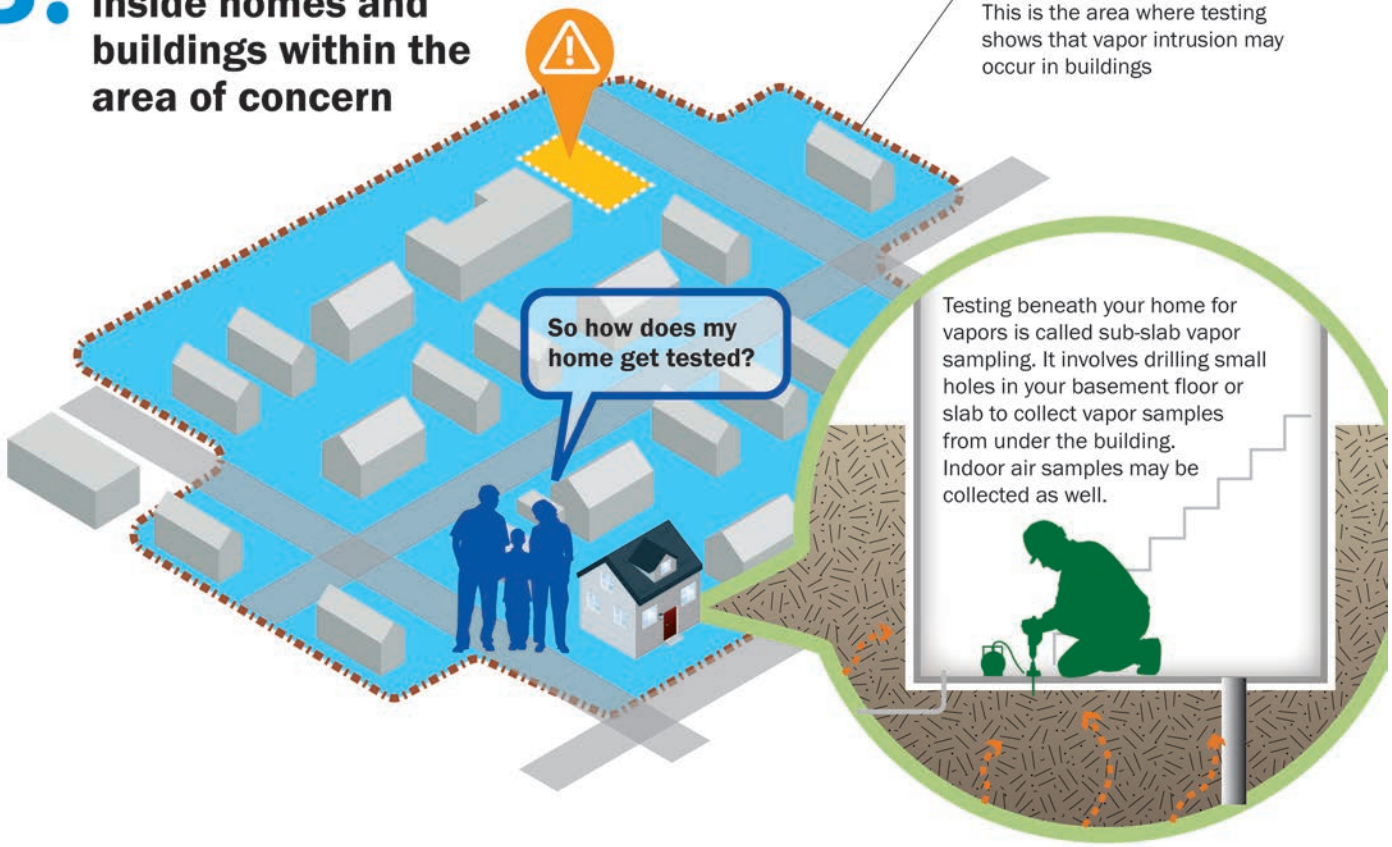
2. Sample for vapors underground to determine the area of concern

Crews drill into the ground to collect soil, groundwater, and vapor samples.

Sampling Area

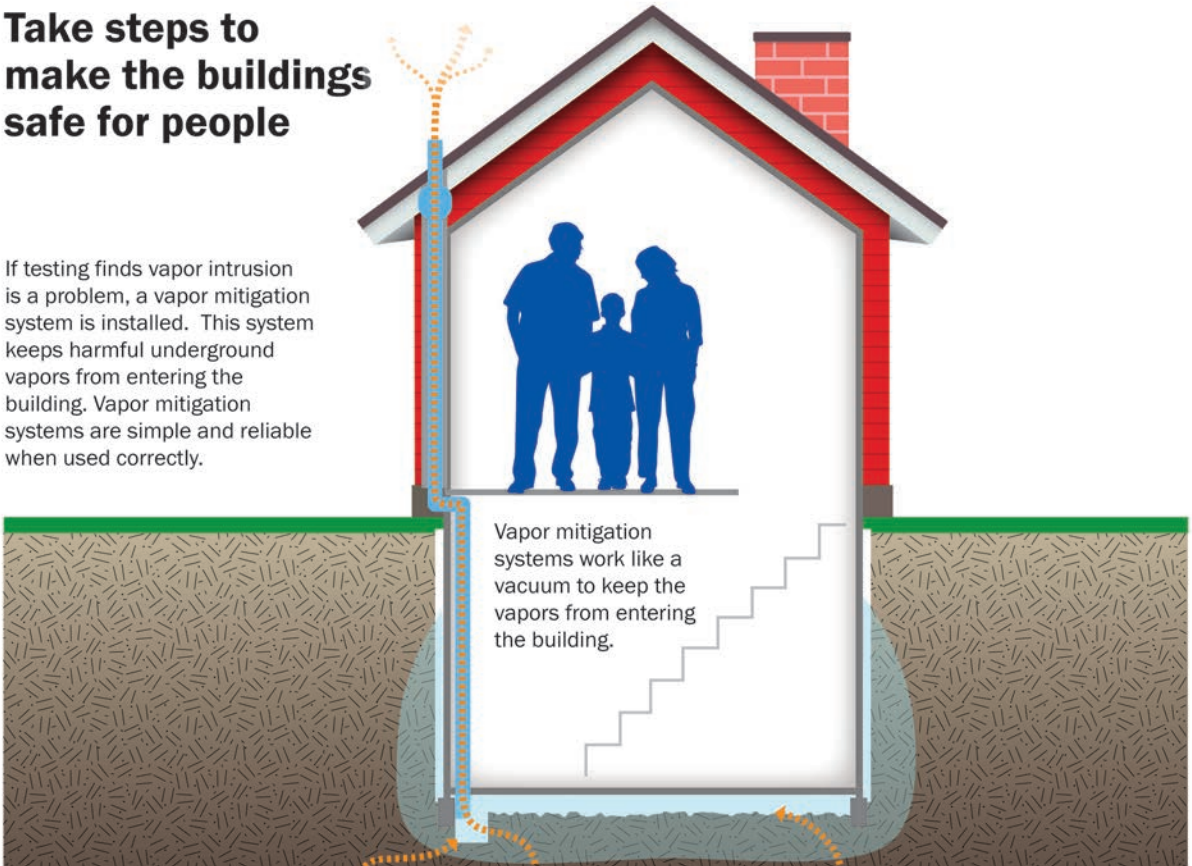
The sampling area may grow or shrink based upon test results.

3. Test for vapor intrusion inside homes and buildings within the area of concern



4. Take steps to make the buildings safe for people

If testing finds vapor intrusion is a problem, a vapor mitigation system is installed. This system keeps harmful underground vapors from entering the building. Vapor mitigation systems are simple and reliable when used correctly.



5. Determine the long-term solution

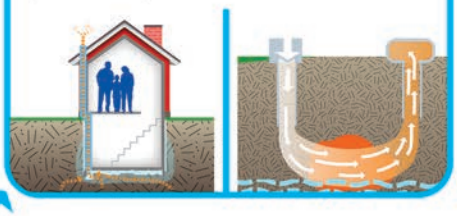
Review Chemical Release Data

Review data to determine if cleanup of the chemical release is possible. If so, what is the best way to do it?

Work with and share information with local governments and affected parties.

Solution

Vapor mitigation systems are the short-term solution to manage risks while the long-term feasibility of cleaning up the release is studied, and when possible, implemented.



Follow-up

Some mitigation systems require visits from trained staff to assure they are working as they should be.

Where Can I Find More Information?

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Michigan Department of Environment, Great Lakes, and Energy
Environmental Assistance Center, 800-662-9278
egle-assist@michigan.gov
Michigan.gov/vaporintrusion

MDHHS Michigan Department of Health and Human Services

Michigan Department of Health and Human Services
Toxicology and Response Section, 800-648-6942

Graphics provided courtesy of the Minnesota Pollution Control Agency