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Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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Fact Sheet: Vapor Intrusion & Indoor Air Contamination from Waste Sites

Reformatted December 2017

What is Vapor Intrusion?

Vapor intrusion is a way that contamination in soil or groundwater can get into the indoor air. Contaminants that are spilled onto the ground or leak from underground storage tanks can seep down through the soil and dissolve into the groundwater. Certain contaminants can evaporate from the groundwater into air pockets in the soil and travel upwards. In undeveloped areas, the contaminants disperse into the air. However, in developed areas, vapors can enter buildings and impact indoor air quality. This movement of contaminants into a building is called vapor intrusion.

How do vapors get into buildings?

When contaminated vapors are present directly next to or underneath the foundation of a building, vapor intrusion is possible. Warm air rising in the building can draw vapors through cracks, holes for utilities, or other openings in the foundation. This is often more likely to occur in the winter months when the frost layer, operation of furnaces, and closed windows increase the potential for vapor intrusion. Vapors can also travel through the permeable gravel used to backfill utility line installations, and be drawn into nearby buildings.

What contaminants might be entering my home?

Only certain contaminants are a concern. Metals like lead or chromium do not cause indoor air vapor problems because they do not evaporate or volatilize. Volatile organic compounds (VOCs) are a group of contaminants that can easily become vapors. VOCs are found in petroleum products such as gasoline or fuel oil and solvents used for dry cleaning and industrial uses.

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Are there other sources of indoor air contamination?

Yes. VOCs are found in many household products including paints, paint strippers, thinners, glues, cigarette smoke, aerosol sprays, mothballs, air fresheners, new carpeting or furniture, fuels, and recently dry cleaned clothes. These products can be a source of VOCs found in indoor air. MassDEP does not regulate VOCs in indoor air from household products.

Why is vapor intrusion a concern?

Exposure to VOCs can cause an increased risk of adverse health effects. Whether or not a person experiences any health effects depends on several factors, including the amount and length of exposure, the toxicity of the chemical and the individual's sensitivity to the chemical. When the vapor intrusion is the result of environmental contamination, MassDEP requires that steps be taken to eliminate the exposure as much as possible.

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

For sites with VOC contamination, where petroleum or solvents have contaminated soil or groundwater, MassDEP requires that the potential for vapor intrusion be investigated. You may be contacted by the site owner or others working on the cleanup. Your cooperation and consent would be requested before any testing/sampling is done on your property. You may ask the person contacting you questions about the work being done, or you may contact MassDEP.

How can you tell if VOCs are from chemicals in my home or from vapor intrusion?

To determine if vapor intrusion is a concern, samples of the groundwater and soil gas near your home may be taken. Soil gas samples collected beneath the foundation are often the most reliable method to determine if vapors are present under the building and could cause a problem. Indoor and outdoor air samples may also be collected. A comparison of all the data is conducted to determine whether vapor intrusion may be occurring.

What happens if a problem is found?

If vapor intrusion is affecting the air in your home, measures can be taken to address the problem, including sealing cracks in the foundation, covering sumps, adjusting the building heating, ventilation and air-conditioning systems or installing a sub-slab depressurization system.

What is a sub-slab depressurization system?

One of the more reliable solutions to address vapor intrusion is to install a sub-slab depressurization system or SSDS. A SSDS is very similar to a radon mitigation system. The system 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 through a pipe. The system is operated until it is no longer needed.