



Volatile Organic Compounds in Drinking Water

The term “volatile organic chemicals” or “VOCs” refers to a group of chemicals that include solvents used in many industrial and household products. Gasoline and fuel oil are also common mixtures of many VOCs. The presence of VOCs in groundwater is cause for concern. Improper handling or disposal of VOCs can affect the quality of our groundwater and drinking water. Wisconsin has groundwater standards in place to protect this important groundwater and drinking water resource.

This brochure explains how VOCs can contaminate drinking water, how they affect our health, and how to remove them from drinking water. In addition, the brochure provides information on assistance that is available to families whose private wells are contaminated with VOCs.

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Wisconsin Department of Natural Resources
Bureau of Drinking Water & Groundwater

What are VOCs and how are they used?

VOCs are a group of chemicals commonly used in industrial, commercial and household applications. The most abundant source of VOCs are fossil fuel products such as gasoline and fuel oil. Since they also make excellent solvents, VOCs are used as cleaning and liquefying agents in fuels, degreasers, solvents, polishes, cosmetics, and dry cleaning solutions. VOCs can be found at service stations; machine, print and paint shops; electronics and chemical plants; dry cleaning establishments; and in homes.



How do VOCs enter groundwater?

When VOCs are spilled or disposed of on or below the land the VOC contaminants can migrate through soil and into the groundwater. Once they enter groundwater, VOCs can remain there for years. These chemicals move with the groundwater and pose a threat to nearby drinking water wells.

What makes a well vulnerable to VOC contamination?

Several factors can affect a well’s vulnerability to VOC contamination. These include:

- 💧 **Location.** Typically VOC-contaminated wells are located near industrial or commercial areas, gas stations, landfills, or railroad tracks.
- 💧 **Quantity.** Larger spills tend to affect a wider geographic region and can result in higher levels of contamination than small spills.
- 💧 **Well depth and construction.** Since contaminants are seeping from the ground surface, shallow wells are more likely to be affected than deep wells.

💧 **Soil type.** Areas with highly porous or sandy soils, and shallow depths to groundwater, are most vulnerable to contamination. Clay soils can adsorb and slow down the movement of some contaminants. This is helpful because slow groundwater movement can allow for natural attenuation and break down of the harmful VOCs.

💧 **Time.** Groundwater usually moves very slowly. It can take years for VOCs to reach a well. Wells that are safe today may eventually become contaminated by a spill that happened in the past. This is why it is very important to test water supplies regularly.

What are the health risks of VOCs?

VOCs include hundreds of different chemicals. Some VOCs are quite toxic, while others pose less risk. Several commonly used VOCs have been studied in biological experiments and in occupational settings.

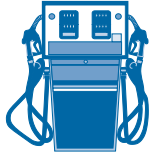
State and federal agencies are responsible for ensuring the safety of our drinking water. To do this, they set limits of how much of a contaminant can be in drinking water. These limits are called “Maximum Contaminant Levels” (MCLs) and groundwater “enforcement standards” (ESs). Limits are set at levels that protect against short-term and long-term exposures and are cost effective to implement.

Public water supplies are tested regularly to ensure that they meet the safe drinking water standards. Private well owners are responsible for the safety of their own water supply. All wells located near a source of VOCs, such as a landfill, airport, industrial site, or service station, should be tested periodically. If you notice a solvent-like or gasoline taste or odor in your water, you should use an alternate, safe source of drinking water until your water can be tested for VOCs.



Health risks vary depending on the type of VOC. Generally, effects of short-term exposure include symptoms of intoxication (dizziness,

headache, confusion, nausea), anemia and fatigue. Effects of long-term exposure can include cancer, liver damage, spasms, and impaired speech, hearing and vision.



You can protect yourself and the environment from direct VOC exposure in your everyday life by carefully handling gasoline when you pump gas for your car or any type of motor. In addition, you should not use gasoline as a cleaning solvent for mechanical equipment. Contamination of VOCs from gasoline is one of the greatest threats to our air and water quality.

What can be done when a community well is contaminated with VOCs?



If a community well is contaminated with VOCs, consumers will be notified of the problem by the water system owner and given instructions on what to do. Typically, the water system will be required to drill a new well in an uncontaminated area. Communities can also opt to treat the water by aeration or filtration. These methods are highly effective in reducing VOC levels. However, the cost of equipment, operation and maintenance can be very high. Water quality must also be monitored regularly to assure that the treatment continues to work.

What solutions are available for private well owners?

Private well owners should have their water tested if they suspect contamination. Owners whose wells have VOCs above health advisory levels should contact the DNR for assistance. In most cases, they will be advised to replace the well with a new, safe water supply. Sometimes, a temporary solution can be used. These typically involve the use of bottled water, connecting to a neighboring well, or installing a home treatment system.

Because treatment systems vary in their ability to remove different types of contaminants, well owners should be wary of sales claims. The Department of Safety and Professional Services can provide information about approved home treatment systems for removing select contaminants. If the well serves the public, a restaurant for example, then DNR approval is required for the specific installation. Low-income well owners may be eligible for a grant to pay a portion of the costs of establishing a safe water supply. Eligibility guidelines and applications are available online at dnr.wi.gov. Search: Well Compensation Grants.

What can you do to protect your drinking water supply?

The most important action you can take is to prevent contamination. Pouring dirty or spent solvents or paint thinners onto the ground causes environmental contamination that can potentially affect your drinking water supply.

- 💧 Dispose of solvents properly. Waste VOCs should be taken to a hazardous waste collection facility.
- 💧 Use less toxic alternatives like borax, ammonia, vinegar, and baking soda whenever possible.
- 💧 Never flush solvents into your septic system. That actually injects them directly into the ground.
- 💧 Report spills immediately to Wisconsin's 24-hour emergency hotline at 1-800-943-0003.
- 💧 Start a "Clean Sweep" hazardous waste collection/exchange in your community.
- 💧 Order a free copy of **Better Homes and Groundwater** PUB-DG-070 from the DNR for more household tips to protect your groundwater.

For the most part, Wisconsin's groundwater is in good shape. With a little care and common sense, we can keep it that way for future generations.

Contact Us

Customer Service Staff are here to assist you.

How may we help you?

Call Toll Free 1-888-WDNRINFO (1-888-936-7463)

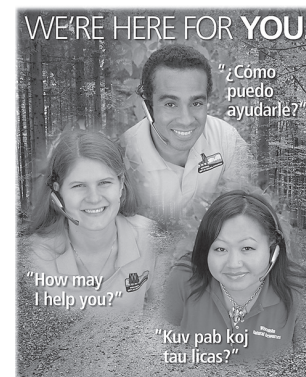
Or, go to dnr.wi.gov, Search: Contact

Click on one of the following options:

Chat with customer service.

Call a representative.

Email your question.



**Toll free hotlines
Violation Hotline:**

1-800-TIP-WDNR or
phone 1-800-847-9367

Confidentially report
suspected wildlife,
recreational and
environmental
violations.

**Emergency
Spill Hotline:**

1-800-943-0003 phone

**Bilingual Services are available
Drinking Water & Groundwater Program**

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For more information, go to dnr.wi.gov,
Search: Drinking Water

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