

Andover Private Well Investigation

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Minnesota Department of Health (MDH) and Minnesota Pollution Control Agency (MPCA) are working together to investigate groundwater contamination in the Red Oaks neighborhood of Andover. 1,4-dioxane and perfluoroalkyl substances (PFAS) were detected during routine monitoring of private wells near the Waste Disposal Engineering (WDE) Landfill. Information about site activities including sampling of private wells and results can be found on the MPCA website at [Protecting Andover residents from contaminated drinking water \(www.pca.state.mn.us/waste/protecting-andover-residents-contaminated-drinking-water\)](http://www.pca.state.mn.us/waste/protecting-andover-residents-contaminated-drinking-water).

About 1,4-dioxane and Perfluoroalkyl Substances

1,4-dioxane

1,4-dioxane is a clear liquid that easily dissolves in water. It can move through soil and, once in groundwater, can travel long distances. The main use of 1,4-dioxane was as a stabilizer for the chlorinated solvent 1,1,1-trichloroethane, which was commonly used for industrial purposes. 1,4-dioxane can also be found in products, including some cleaners, detergents, adhesives, inks, automotive fluids, etc. Groundwater contaminated with 1,4-dioxane is largely found where improper management and disposal of chlorinated solvent waste occurred.

PFAS

PFAS are a large class of surfactants (more than 5,000 chemicals) with unique properties that make some of them extremely persistent and mobile in the environment. They have been in use since the 1940s. Because they are chemically and thermally stable, PFAS have been used in a wide range of consumer and industrial applications such as coatings that resist grease, stains, and water. They are also found in products such as firefighting foam, non-stick pans, and waterproof rainwear.

How people are exposed to 1,4-dioxane and PFAS

Because 1,4-dioxane and PFAS do not easily evaporate into air from water, they will remain dissolved in water in most situations.

The main ways people are exposed to both 1,4-dioxane and PFAS is drinking beverages or eating food made with contaminated water. Drinking and cooking with bottled water eliminates this exposure.

Exposures that are expected to be minor include:

- exposure through skin contact because absorption through skin is low.

- exposure through breathing in fine water droplets is expected to be infrequent, short, and involve small amounts.

Health risks for 1,4-dioxane and PFAS

What we know about health risks when exposed to 1, 4-dioxane

It is likely to be a carcinogen, based on animal studies. There is, however, no evidence that it causes cancer in humans. Animal studies have also shown some effects such as changes in the liver, kidney, and respiratory system. The health effects identified in animal studies occur at concentrations many times greater than the concentrations found in the groundwater investigation.

MDH has developed Health Risk Limits (HRLs) for 1,4-dioxane

- 1 µg/L - protects against a maximum risk of not more than one additional cancer in 100,000 people who consume water on a daily basis for a lifetime (70 years) and is adjusted to be protective of early life.
- 100 µg/L - protects all people from noncancer effects (liver, kidney, respiratory) when exposed up to a lifetime.

HRLs are the level of a contaminant that can be present in water and pose little or no health risk to a person drinking that water – they are developed to be protective of most people, including sensitive populations.

What we know about health risks when exposed to PFAS

Several different PFAS have been detected in Andover. Health effects are slightly different for each one.

- Animal studies have shown effects including changes in development, liver and thyroid function, immune response, increased kidney weight, and cellular changes.
- MDH developed HRLs for PFAS to protect developing fetuses and infants born to mothers who have been exposed to PFAS for a long time (8+ years). For more information about HRLs for PFAS, see the MDH website - [Safe Levels of PFAS in Drinking Water \(www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html#safelevels\)](http://www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html#safelevels).
- The health effects identified in PFAS animal studies occur at concentrations many times greater than the concentrations found in the groundwater investigation.

How health risk is assessed when more than one chemical is present in drinking water

A Health Risk Index (HI) calculation is used to evaluate the combined risk from chemicals that have similar health effects. Chemicals are grouped by health effect and a HI is calculated for each chemical. These HI values are added together. If a total HI calculation results in a value greater than 1, that exceeds the allowable risk level and preventative action is recommended.

- Cancer risks for each chemical in a mixture are added together for a cancer HI
- Non-cancer risks for each chemical are grouped by health effect (liver, kidney, nervous system, etc.) are added together; for example, as a liver effect HI

More information can be found on the MDH website - [Evaluating Concurrent Exposures to Multiple Chemicals](http://www.health.state.mn.us/communities/environment/risk/guidance/gw/additivity.html)
(www.health.state.mn.us/communities/environment/risk/guidance/gw/additivity.html).

Frequently Asked Questions

Can I use my shower?

Yes, you can use your well water for showering or bathing. The exposure we are most concerned about is drinking beverages or eating food made with contaminated water. Drinking and cooking with bottled water eliminates this exposure.

Exposures while showering or bathing at the concentrations found in the Andover private well investigation area are not a health risk. Because 1,4-dioxane and PFAS will remain dissolved in water and the concentrations are low, the chemicals will not be absorbed by the skin. Because these chemicals do not easily evaporate into air from water, exposure through breathing in contaminated mist or water is expected to be low.

For people who are concerned about potential exposure from breathing in contaminated well water, consider the following:

- Reduce potential exposure by running exhaust fans while boiling water or bathing.
- Limit time spent in areas that generate water mist such as showers, dishwashers, boiling water and washing machines.
- Use bottled water for humidifiers.

Should I get tested for exposure to 1,4-dioxane or PFAS? Should I see my doctor?

1,4-dioxane breaks down in the body and is eliminated quickly – on the order of hours. Tests to measure 1,4-dioxane, PFAS and metabolites are not readily available to doctors.

MDH advises people who have health concerns to see their doctor. However, there are no recommendations for any increased screening for cancer or other health effects.

Is it okay for my dogs/cats to drink the well water?

Dogs and cats are expected to have similar health risks as people.

Can I water my garden vegetables with my well water?

We expect most 1,4-dioxane to pass through plants. It is possible that plants watered with well water may be a very minor source of exposure, but this has not been well studied.

Watering gardens with PFAS-contaminated water can increase levels of PFAS in the soil and plants. Unless a person consumes high amounts of homegrown produce throughout the year, this is not likely to be a major contributor of PFAS exposure for adults or children. Nevertheless, people can lower the level of PFAS in garden produce. For more information, see [PFAS and Homegrown Garden Produce \(PDF\)](https://www.health.state.mn.us/communities/environment/hazardous/docs/pfas/pfasgardproduce.pdf) (www.health.state.mn.us/communities/environment/hazardous/docs/pfas/pfasgardproduce.pdf).

More information about 1,4-dioxane and PFAS

[1,4-Dioxane in Water \(PDF\)](https://www.health.state.mn.us/communities/environment/hazardous/docs/dioxanewater.pdf)

(www.health.state.mn.us/communities/environment/hazardous/docs/dioxanewater.pdf)

[Perfluoroalkyl Substances \(PFAS\)](https://www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html#MDHresources)

(www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html#MDHresources)

Regularly test your drinking water well

Private well owners are responsible for regularly testing their water. MDH recommends testing for coliform bacteria every year, nitrate every other year, and at least once for arsenic and lead. If you have young children or babies, MDH recommends testing for manganese before using the water for children.

[Water Quality/Well Testing/Well Disinfection](https://www.health.state.mn.us/communities/environment/water/wells/waterquality/index.html)

(<https://www.health.state.mn.us/communities/environment/water/wells/waterquality/index.html>)

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