

Nitrate and Nitrite in Drinking Water for Well Owners

What are nitrate and nitrite?

Nitrate (NO_3) and nitrite (NO_2) are forms of nitrogen in the environment, both natural and human-made. Large amounts of nitrate in drinking water can be harmful to a person's health because nitrate can change into nitrite in the human body.

What health problems can nitrate and nitrite cause? Swallowing high amounts of nitrate and/or nitrite can cause a condition called methemoglobinemia (met-he-mo-glo-bi-ne-mia). This condition affects the blood's ability to carry oxygen. Infants younger than six months of age and pregnant women are more at risk of developing this condition. Others can develop this condition too, such as those with genetic conditions or reduced stomach acidity. It's important to talk with your doctor or your child's doctor if you have concerns about methemoglobinemia.

Pregnant Women and Infants

During pregnancy, the blood's ability to carry oxygen changes. When combined with high amounts of nitrate, a pregnant woman's chances of developing this condition increases. Methemoglobinemia is commonly called blue baby syndrome in infants younger than six months of age. Infants can develop this condition when given water or formula made with water that has high amounts of nitrate. Infants have less acid in their stomach, resulting in more bacteria that change nitrate to nitrite. Having too much nitrite in the body affects the blood's ability to carry oxygen. This causes the skin around the eyes and mouth to turn a bluish color. Methemoglobinemia can cause death if not addressed. Immediately stop using the water and contact your child's doctor if you notice these symptoms.

How does nitrate get into your well water?

When nitrate seeps into the ground it can get into drinking water. Nitrate is more likely to enter your water if you have a shallow well, damaged well casings and fittings, a well not within a clay barrier underground, or nearby unplugged or abandoned wells. Nitrate found in drinking water is often from:

- Fertilizers
- Livestock waste
- Failing septic tanks, drainfields and drywells

How do you know if nitrate or nitrite is in your well water?

Testing for nitrate and nitrite is the only way to know if they are in your water. They have no taste, color or odor. The Casper-Natrona County Health Department (CNCHD) recommends testing your water every year.

What do your water test results mean?

The Maximum Contaminant Level, or MCL, for nitrate is 10 milligrams per liter (mg/L) and nitrite is 1.0 milligrams per liter (mg/L). If your test result is above the MCL for nitrate or nitrite, follow the recommendations below. Laboratory reports may give the units of measurement as mg/L or parts per million (ppm). Mg/L is the same as ppm. Below is an example of laboratory test results and a description of what the test results mean.

Result Example	Result Description
Not detected (ND)	The lab did not detect, or find, nitrate/nitrite in your water sample at or above the amount they can reliably report.
Number	If the test result listed is a number, the lab found nitrate/nitrite in your water sample.

Recommendations

CNCHD recommends testing your water every year for nitrate and nitrite.

If your results for nitrate, nitrite, or both are below the MCLs, you can use your water for drinking, cooking, bathing, and all other water-related activities.

If your test results for nitrate, nitrite, or both are above the MCLs, call the Casper-Natrona County Health Department Environmental Health Division to identify and fix the problem.

- Until the problem is fixed, use another source of water such as bottled water for drinking, cooking, and preparing infant formula. You cannot remove nitrate or nitrite by boiling the water. Boiling will increase the amount of nitrate or nitrite in the water that's left.

- Install a reverse osmosis, ion exchange, or distillation filtration system. These systems require regular maintenance and testing to make sure they are working correctly. If the system is not installed, operated, or maintained correctly, it could let nitrate and/or nitrite pass through the filter.

- Drill a new well.