Nitrate at Transient Non-Community Water Systems

What is nitrate?

Nitrate is a compound made up of nitrogen and oxygen. Nitrate is an essential nutrient for plant growth and occurs in plants at varying concentrations. It is naturally found in groundwater at low levels. Higher levels of nitrate may be found near farm fields, barnyards, feedlots, septic tanks, septic fields/mounds, municipal wastewater treatment systems or “sludge” spreading sites. Wells located near these land use activities may produce drinking water with elevated concentrations of nitrate.

Why should I be concerned?

Nitrate poses a significant health risk in drinking water at concentrations of 10 milligrams per liter (mg/L) and above. In infants under 6 months of age ingestion of nitrate can reduce the blood's ability to carry oxygen. This may result in an infant’s skin turning to a bluish or gray color. In more serious cases the infant may experience weakness, increased heart rate, fatigue and dizziness. Some scientific studies have found a link between exposure to high nitrate levels in drinking water during the first weeks of pregnancy and neural tube defects (a type of birth defect). Consuming high levels of nitrate in drinking water may also increase the risk of thyroid disease, and certain types of cancer.

What levels of nitrate are found in Wisconsin public wells?

For information on nitrate trends in drinking water in Wisconsin public water systems click here.
Monitoring for nitrate

Due to the acute health risks associated with nitrate in drinking water, all public water systems, including transient non-community (TN) systems, are required to sample for nitrate at least annually. Nitrate samples should be taken from the entry point to the distribution system (the first available tap after treatment). If the water system does not have any treatment (sediment filter, water softener, etc.), the sample can be taken at the well sample tap near the pressure tank.

What happens if a TN facility has a high nitrate result?

If the results of the nitrate sample are reported by the laboratory to have a concentration of 10 mg/L or above, a confirmation or check sample is required. In contracted counties, this sample will be taken by the contract county staff. If your facility performs its own sampling, you will be contacted by the DNR staff and a sample kit with bottle and lab slip will be sent to your facility. If the confirmation sample cannot be taken within 24 hours of notification, a tier 1 Public Notice template will be provided by DNR staff and must be posted at the facility. The water supplier must take the confirmation sample as soon as possible, but no later than 2 weeks after notification of the results of the first sample.

Click here for nitrate sample site information.

Click here for nitrate sample collection directions.

Click here for a sample public notice.
Nitrate Maximum Contaminant Level (MCL) violations and continuous posting

The results of the original sample and the check sample are averaged to determine compliance. If the average of the two samples is above 10 mg/L, the facility will have a nitrate MCL violation and must post Public Notices at all water outlets.

Click here for a nitrate placard.

Click here for a sample nitrate post notice.

The department may allow a TN water system to continue to use water with nitrate levels above 10 mg/L, but not exceeding 20 mg/L according to section NR 809.11(3), Wis. Adm. Code. The following conditions must be demonstrated to the satisfaction of the department for a TN public water system to continue to serve this water.

1. Such water will not be available to children under 6 months of age or any female who is or may become pregnant.

2. There will be continuous posting at all water outlets of the fact that nitrate levels exceed 10 mg/L and the potential health effects of exposure. In restaurants and taverns where tap water is served, a notice shall be posted at each table or in menus.

3. Local and state public health authorities will be notified annually of nitrate levels that exceed 10 mg/L.

4. A supply of low nitrate (containing less than 10 mg/L nitrate), bacteriologically safe drinking water shall be provided for any female who is or may become pregnant and infants under 6 months of age.

5. No adverse health effects will result. The Department has been advised by the Wisconsin Department of Health Services that there is evidence of an association between exposure to high nitrate levels in drinking water during the first weeks of pregnancy and certain birth defects. Females who are or may become pregnant should not consume this water.
Plans to require compliance with the nitrate standard

In response to the most recent health effect data, and to a request by the US EPA, DNR is now initiating a long-range work plan that would bring all TN public water systems back into compliance with the nitrate standard of 10 mg/L. TN systems exceeding the Nitrate MCL will be given time to evaluate their options for returning to compliance – a minimum of 3 years. The DNR will be available throughout the process to help systems evaluate installing a new well or connecting to another water supply. Systems must consult with DNR and receive Department of Safety and Professional Services (DSPS) approval before installing any treatment.

Nitrate over 20 mg/L

If nitrate is reported to be equal or greater than 20 mg/L, the facility must immediately post a DO NOT DRINK water advisory and take a check sample as soon as possible. The results of the original sample and the check sample will be averaged, and if it is greater than 20 mg/L, the facility must take immediate actions to address the nitrate violation. Actions include providing an alternative safe source of water to all consumers of water within 24 hours of receiving the results and taking actions to return to compliance with the nitrate standard. The nitrate sampling schedule will increase to quarterly sampling. This increased monitoring schedule will be required until nitrate results are reliably and consistently below the nitrate MCL, with at least four consecutive quarterly samples below 10 mg/L.

Click here for an example of the nitrate public notice required when a sample is reported to be greater than 20 mg/L nitrate.

Figure 7 - Public Notice for > 20 mg/L
How can a TN water system return to compliance?

TN public water systems that have an ongoing nitrate MCL exceedance should consider options for returning to compliance. These options might include constructing a replacement well, reconstructing an existing well, connecting to a neighboring well or water supply that is properly constructed and provides safe water, or installing treatment.

Department staff can assist in evaluating options. The first step should be to evaluate the feasibility of drilling a new well or connecting to another public water system with safe drinking water. Local geology, well construction reports and nitrate levels in nearby wells may help determine what casing requirements and well depth would most likely supply water below the nitrate MCL at a specific location. Treatment for a primary drinking water contaminant can only be considered after it’s been determined that other options are not feasible. Any treatment installed must be approved by the Department and by the Department of Safety and Professional Services. System owners that install treatment without approval may be subject to additional corrective actions and escalated enforcement actions.

Additional Nitrate Information

- WI DNR - Nitrate in Drinking Water  
  [Click here]

- WI DHS - Nitrate in Private Wells [Exit DNR]  
  [Click here]