

Nitrate

High nitrate levels in drinking water pose a risk to infants in that they may cause methemoglobinemia or “blue babies”. Normal body processes of some infants are interrupted by high nitrates. The toxicity of nitrate occurs due to the reduction of nitrate to nitrite, a process that can occur in the stomach as well as in the saliva. Nitrite acts in the blood to change the hemoglobin to methemoglobin, which reduces the capability of the blood to perform as an oxygen carrier to the tissues. Thus, the “blue” condition results.

Nitrate content in surface and ground waters varies. In ground waters, nitrate content does not appear to be related to any geologic formation. Several sources cause nitrate build up in soils. These include; nitrogen fixation from plants (such as alfalfa), animal wastes, nitrate fertilizers and sewage wastes. As a result, high nitrate conditions in well water may be due to direct flow of surface water into the well or to percolation of contaminated waters into the aquifer from the overlapping soil zones. Accordingly, a high nitrate content in the ground water might indicate impact from contaminated sources.

Nitrate nitrogen is the most highly oxidized form found in wastewaters. Nitrite nitrogen, while unstable and easily oxidized to the nitrate form, is an indicator of recent contamination.

The maximum contaminant level (MCL) for nitrate is 10 mg/l. When analysis results of a water sample taken from a private water supply indicates the presence of nitrate greater than 10 mg/l, it is recommended that a second sample be taken as soon as possible. This sample will serve two purposes; (1) It will determine the validity of the first sample analysis and (2) whether the problem still exists.

If a permanent alternate source is not available or accessible, other factors must be considered concerning the future use of the supply. The primary consideration is to determine, if well construction, isolation and operational problems exist that may be contributing to the high nitrate analysis. This determination can most reasonably be carried out by the local health department and or a Michigan registered well driller. If during the evaluation of the water well system, problems are found and corrected, the system should first be disinfected (see department’s well disinfection procedures available on website), and then another sample taken and submitted to the laboratory for analysis.

If during the evaluation of the water well system no well problems are found, the nitrate results remain between 10 and 20 mg/l and no other permanent alternative water source is available, the system owner may choose to use the system. **However, any child under the age of 6 months should not consume the water, as they could become very ill or even die.**

For more information pertaining to nitrate in drinking water contact the department.

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Quality (1)	Concentration (2)	Effect (3)	Significance (4)	Treatment (5)	Disclosure
Good	0-5 mg/l	Below recommended limit. No known health risk.	No known health impact	None required	1, 2, or none
Marginal	5-10 mg/l	Below recommended limit.	Should monitor closely (recommend resampling annually)	None required	1, 2, or none
Poor	greater than 10 mg/l	Health risk possible.	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	No practical treatment	1, 2, 3, 4, 5