



DIVISION OF PUBLIC HEALTH

1 WEST WILSON STREET
P O BOX 2659
MADISON WI 53701-2659

Scott Walker
Governor

Dennis G. Smith
Secretary

State of Wisconsin

Department of Health Services

608-266-1251
FAX: 608-267-2832
TTY: 888-701-1253
dhs.wisconsin.gov

December 4, 2012

John Holdredge
Chairperson, Town of Hull Board
4550 Wojcik Memorial Drive
Stevens Point, WI 54482

Dear Mr. Holdredge:

Thank you for your letter of November 15th requesting a summary of the scientific basis for our recommendation regarding the consumption of water containing high levels of nitrate. As you indicate in your letter, our agency's health advice regarding nitrate addresses two different populations: (a) infants under six months of age and pregnant women, and (b) older children and adults. The DHS policy has been that those on private water supplies should receive the same protective advice as those on municipal water. The U.S. Environmental Protection Agency (EPA) and Wisconsin municipal drinking water standard for nitrate is 10 parts per million. Although the same standard applies, the health outcomes of concern in different populations differ. I will summarize our recommendations to these two populations separately.

- **Infants under six months of age and pregnant women.** For these two populations, it is our recommendation that individuals in these groups who are consuming water with nitrate levels above the state and federal standard of 10 parts per million (ppm) stop consuming water from this source immediately and find an alternate source of drinking water. This recommendation is based on observations that drinking water with elevated levels of nitrate has caused a condition called *methemoglobinemia* in infants under six months of age. In this population, nitrate can interfere with the transfer of oxygen between the bloodstream and tissues. This condition can be fatal if not identified quickly and treated. The onset of this condition does not require long-term exposure to nitrate; as such, the recommendation is formulated to be protective of exposures of short duration. In 1951, 248 methemoglobinemia cases were reported from 14 states. In July of 2000, we reported on two cases investigated in Wisconsin (*Knobeloch L, Salna B, Hogan A, Postle J, Anderson H. Blue babies and nitrate-contaminated well water. Environ Health Perspect 108:675-678, 2000*). While there is not an abundance of cases of this condition involving exposure to pregnant women, the fact that the mechanism by which this condition can arise is active in the fetus is sufficient to warrant the expansion of this advisory to pregnant women.
- **Older children and adults.** For populations other than the two described above, it is our recommendation that people avoid long-term exposure to nitrate at concentrations in

excess of 10 ppm. This recommendation is based on several considerations. First, the fact that short-term exposure to elevated nitrate levels can be dangerous for infants under six months of age makes it prudent to address elevated levels even in homes that do not serve as an established primary residence for such infants so as to limit the likelihood that a vulnerable child might be at risk of exposure. Secondly, there is an increasing abundance of studies in the published epidemiological literature on the effect of long-term exposure to nitrate and a range of health effects such as thyroid dysfunction in exposed adults. Because of this growing body of research related to health effects in non-infants, our advisory is more broad. Because of the anticipation that health effects that may be observed in these research studies are likely to result from ongoing long-term exposure, this portion of the advisory is not as immediate in nature.

Thank you for the opportunity to describe our position on the risks associated with nitrate exposure. Please feel free to contact me if you have any additional questions about nitrate or about our health-based recommendations regarding drinking water and groundwater.

Sincerely,



Chuck O. Warzecha, Director
Bureau of Environmental and Occupational Health
Division of Public Health