Operational Guideline for Manitoba Water Suppliers

Interpreting Drinking Water Quality Results

PURPOSE

This guideline has been established to provide private, public and semi-public drinking water suppliers throughout the Province of Manitoba assistance with interpreting their drinking water test results.

For efficiency purposes the guideline only covers water quality parameters that are of a common concern to Manitoba water suppliers.

Information on drinking water parameters not covered in this document can be obtained from Health Canada Guidelines for Canadian Drinking Water Quality.

USING THIS GUIDELINE

This guideline provides a brief summary of each parameter and relies on web site links to direct readers to more detailed information. The parameters are divided into two categories, one that deals with parameters that are based on health concerns (ex. bacteria) and one that deals with parameters that are based on aesthetic concerns (ex. hardness).

For each parameter listed there is a threshold concentration above which science and/or experience have demonstrated that problems may occur.

These thresholds are identified in brackets following the parameter name. For example, **Arsenic (0.010 mg/L)** indicates that the arsenic concentration should not exceed a concentration of 0.010 milligrams per liter (mg/L).

HEALTH BASED PARAMETERS

Bacteria (0 cfu/100mL or <1 mpn/100mL)

Your bacterial test results will provide a value for Total Coliform (TC) bacteria and *E. coli* (EC) bacteria. Depending on the test method used, the concentration of bacteria may either be expressed as coliform forming units (cfu) per 100 ml, or most probable number (mpn) per 100 mL.

Coliform bacteria, measured as TC, are a group of naturally occurring bacteria commonly found in nature. Though the presence of TC in water does not necessarily indicate that there may be disease causing organisms present, it is an indicator that there may be a pathway allowing contaminants to enter the drinking water.

E. coli bacteria are a member of the coliform group that live in the intestines of warm blooded animals. Their presence in drinking water is a strong indicator of recent sewage contamination and the disease causing organisms that may accompany it. **Do not drink water that has EC in it.**

As indicated, coliform bacteria should not be present in drinking water. If coliform bacteria are present, the water is considered unsafe.

A series of Well Water Fact Sheets and videos have been developed to assist owners and operators of wells in identifying and correcting contamination problems, and provide direction on how to properly collect a sample and disinfect a well water system.

Trace Elements

Groundwater naturally contains dissolved elements that are typically found in very low concentrations. Most of these trace elements are essential elements; required by plants and animals (and humans) for continued health. Some trace elements have a limit or threshold, to which, if consumed over a specific amount over a specific period of time, the element can be a risk to health. If your drinking water test results indicate levels above the limits for the following trace elements please refer to the fact sheets. The fact sheets contain information on health effects and treatment options for each trace element. For additional information refer to Health Canada's technical documents.

Arsenic (0.010 mg/L)

- "Arsenic in Manitoba Well Water"
- "Arsenic in Manitoba Water Supplies"
- Health Canada Technical Document - Arsenic

Barium (2.0 mg/L)
- "Barium in Manitoba Well Water"
- Health Canada Technical Document - Barium

Boron (5.0 mg/L)
- "Boron in Manitoba Well Water"
- Health Canada Technical Document - Boron

Fluoride (1.5 mg/L)
- "Fluoride in Manitoba Well Water"
- "Fluoride in Manitoba Water Supplies"
- Health Canada Technical Document - Fluoride

Manganese (0.12 mg/L)
Most groundwater wells and municipal water supplies in Manitoba contain various levels of manganese. This naturally occurring element is an essential nutrient that is more easily absorbed when present in drinking water than food. Water with manganese levels at or above the acceptable limit will likely be discoloured, stain laundry and plumbing fixtures and may have a bitter metallic taste. Manganese at higher levels may harm brain development in infants and young children.

Fact sheets have been developed that provide information specific to the health effects and treatment options of manganese.
- "Manganese in Manitoba Well Water"
- "Manganese in Manitoba Water Supplies"

For additional information on manganese see Health Canada's technical document - Manganese

Nitrate (10.0 mg/L as N or 45 mg/L as NO3)
Some groundwater wells in Manitoba contain nitrate at levels above the acceptable limit. Elevated nitrate is a particular concern for pregnant or nursing women, or infants under the age of one. Fact sheets have been developed that provide information specific to the health effects and treatment options of nitrates.

- "Nitrate in Manitoba Well Water"
- "Nitrate in Manitoba Water Supplies"

For additional information on nitrates see Health Canada's technical document – Nitrate and Nitrite

Uranium (0.02 mg/L)
- "Uranium in Manitoba Well Water"
- "Uranium in Manitoba Water Supplies"
- Health Canada Technical Document - Uranium

Your drinking water results may contain results for other health related parameters. In most cases if the result is over the limit it will be highlighted in some way. For information on those parameters that are not listed above visit Health Canada Canadian Drinking Water Guidelines

Lead (0.005 mg/L)
Most groundwater wells and municipal water supplies in Manitoba do not contain lead at levels above the acceptable limit. Elevated lead is a result of a chemical reaction between the water and service lines, internal plumbing (solder) and fixtures that contain lead. Lead is a particular concern for children 6 years and younger.

Fact sheets have been developed that provide information specific to the health effects and treatment options of lead.

- "Lead in Manitoba Water Supplies"
- "Lead in Manitoba Schools, Private Schools and Commercial Daycare Centres
- Lead in Drinking Water

For additional information on lead see Health Canada's technical document – Lead

*****If you are boiling your water due to bacterial contamination, please note that boiling is only effective on bacteria and does not remove trace elements, nitrates or any other parameter in this guideline.***

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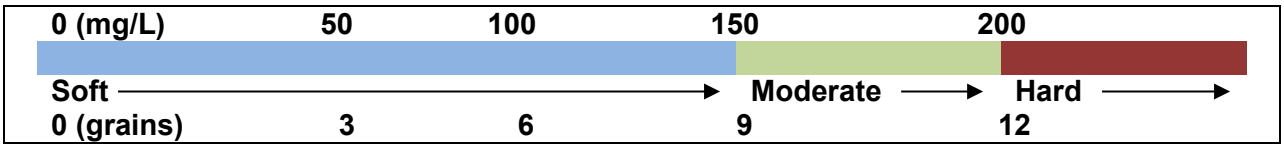
AESTHETIC PARAMETERS

Hardness



Hardness is a test of the general overall water quality of the well water. Hardness measures the amount of calcium and magnesium in the well water.

Some laboratories report hardness in mg/L, grains or simply report “soft, moderate or hard”. There are no health effects related to hardness and, although calcium and magnesium are essential elements, drinking hard water is not considered a significant source of either element to meet dietary needs. Well water requires a certain amount of hardness. Hard water is undesirable because it can deposit a build-up or lime scale in pipes, kettles and hot water tanks; whereas soft water can corrode pipes, create pinholes in pipes or dissolve metals from the pipes into the water.

For more information, and the most effective means of reducing or increasing hardness, see Health Canada’s technical document for hardness.

Iron (≥ 0.3 mg/L)
Iron is a common element found in most groundwater supplies. There are no health effects associated with iron in drinking water mainly due to the unpleasant taste iron causes at high concentrations. At concentrations above 0.3 mg/L iron can stain laundry and plumbing fixtures. Iron at concentrations above the guideline can promote the growth of iron bacteria.

For more information on iron and the most effective means of reducing iron in your water, see Health Canada’s technical document for iron.

Sulphate (≥ 500 mg/L)
Sulphate is typically found in combination with magnesium (Epsom salts) or sodium (Glauber’s salt). High levels of sulphates affect the taste of the water (bitter, medicinal) and can form a hard scale in boilers and heat exchangers. There are no health effects linked to elevated sulphate, however, some individuals may experience a laxative effect if unaccustomed to the water. These effects vary among individuals and appear to last only until they become accustomed to the water.

For more information on sulphate and the most effective means of reducing sulphate in your water, see Health Canada’s technical document for sulphate.

Chloride (≥ 250 mg/L)
Chloride is naturally occurring in most groundwater supplies, typically found in combination with sodium or potassium as a salt. As a result water with elevated chloride generally has a high sodium concentration. There are no health effects linked to elevated chloride. A good level of chloride is 10 mg/L, above that concentration the water may taste salty. High concentrations of chloride in the water may also speed up corrosion in household plumbing and hot water tanks.

For more information on chloride and the most effective means of reducing chloride in your water, see Health Canada’s technical document for chloride.

Sodium (≥ 200mg/L)
Sodium is naturally occurring element found in most soil types throughout western Canada. When the sodium content in soil is high, the sodium concentration in the groundwater is also usually high. Sodium is not considered to be a toxic element; however, persons on a sodium-restricted diet should be aware of sodium levels in their drinking water. Sodium at levels above the guideline is offensive to most people.

For more information on sodium and the most effective means of reducing sodium in your water see Health Canada’s technical document for sodium.

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Potassium
Potassium levels in groundwater are typically very small. Although elevated amounts of potassium can have a laxative effect, Health Canada has not established a maximum limit. Potassium (chloride) is used as a replacement for salt (sodium chloride) in water softeners for people who wish to reduce their salt intake or are on sodium-restricted diets.

Ammonia
Ammonia occurs naturally in groundwater supplies. There are no health related effects associated with ammonia; however, if your drinking water has elevated ammonia, you should consider testing for nitrates as ammonia can be a source of nitrates.

Ammonia can interfere with the disinfection processes in water systems that disinfect with chlorine. Ammonia concentrations of 35 mg/L NH_3 or greater has an offensive odor.

For more information on ammonia and the most effective means of reducing ammonia in your water, see Health Canada's technical document for ammonia.

Testing Requirements:
Private water suppliers are encouraged to take water samples for bacteriological testing at a minimum once per year, following maintenance and when experiencing changes in water quality such as increases in colour, taste or odours. Trace element and nitrate testing should be conducted every 5 years.

Public and Semi-public water suppliers must test according to the frequency specified in their operating licence. Testing should also occur following any maintenance and when experiencing changes in water quality such as increases in colour, taste or odours.

When to consider additional testing:
Installing and maintaining a water treatment device.
Test for: any contaminant that you are concerned about removing. Knowing the level of contaminate present will assist in choosing the best water treatment device. Always test for bacteria following any maintenance activity.

Expecting or new mothers
Test for: bacteria, nitrate, manganese and lead prior to conceiving or prior to the infant beginning to drink water. *Bottled water should be used to reconstitute infant formula.*

Family illness (gastrointestinal illness)
Test for: bacteria and nitrate (you may wish to consult your doctor for medical and additional testing advice)

Neighboring well is contaminated
Test for: the same contaminates found in the neighbors' well

Well is near agricultural chemical or petroleum storage or spills
Test for: bacteria, nitrate, volatile organic chemicals (VOCs); and suspected pesticides

Well is near agricultural fields where fertilizers are applied (within 30m or 100 ft)
Test for: bacteria, nitrate and a pesticide scan (if the crop is corn, consider testing for atrazine, a common corn herbicide)

Well is near an old underground fuel storage tank
Test for: bacteria, oil, gasoline, and VOCs

If you suspect your well of being contaminated, avoid consuming the water until testing indicates the water is safe.

If you have health-related questions, please contact your family doctor or Health Links Info Santé at toll free number 1-888-315-9257.

Visit Health Canada's *Guidelines for Canadian Drinking Water Quality* for more information.

Office of Drinking Water
Regional Drinking Water Officers are available for operational and monitoring advice and to provide technical assistance for public and semi-public water systems.

Private water system owners may contact 204-948-1351 for advice and technical assistance.

For more information related to Manitoba's drinking water and how it is regulated visit: www.manitoba.ca/drinkingwater