Operational Guideline for Manitoba Water Suppliers

Monitoring for Manganese in Drinking Water

Purpose

This guideline has been established to ensure public and semi-public drinking water suppliers throughout the Province of Manitoba meet their regulatory requirements with regard to monitoring manganese in drinking water.

Guidelines for Canadian Drinking Water Quality

Health Canada established a health-based maximum acceptable concentration (MAC) for manganese and lowered the aesthetic objective (AO) for manganese in 2019.

The MAC for total manganese in drinking water is 0.12 mg/L (120 µg/L) for water entering and within the distribution system and at the consumer's tap. The MAC was established based on studies that suggest an association between manganese in drinking water and neurological effects in children.

The AO was lowered to 0.02 mg/L (20 µg/L) for treated water entering the distribution system. Manganese in drinking water is often related to discoloured water complaints. The AO of 0.02 mg/L is intended to prevent build up in the distribution system, minimize discoloured water complaints and improve consumer confidence in drinking water.

Legislation

Section 3 of The Drinking Water Safety Act states that every public and semi-public water supplier must comply with the applicable drinking water quality standards specified in the Drinking Water Quality Standards Regulation (MR 41/2007) or in the water system operating licence.

Manganese in Drinking Water

Manganese is found naturally in many groundwater sources and in some surface water sources in Manitoba. Manganese can also be added to a water supply as an oxidizing agent (potassium permanganate) or as an impurity in coagulants (ferric chloride) used in the treatment of drinking water.

The most effective treatment process depends on the form of manganese and its concentration in the source water. It is possible to lower the manganese concentration in drinking water by managing manganese levels in the source water before it enters the water treatment plant.

Routine water quality testing

Public and semi-public water supplies are required to collect water samples for general chemistry analysis as specified in the operating licences. Samples are collected from the raw (source), treated (entering the distribution system) and a total metals analysis from within the distribution at a frequency specified in the operating licence. Total manganese is included in the general chemistry and total metals analysis.

Test methods

Colourimetric methods are available in desktop or handheld units for routine/operational testing of total manganese in drinking water. The colourimetric method provides fast and reasonably accurate results.

Water samples collected for compliance purposes must be submitted to a laboratory for analysis. Colourimetric results are not acceptable for compliance purposes.

Compliance monitoring

The manganese standard applies to the treated water entering and within the distribution system. Locations in close proximity to the treatment plant are expected to have the highest concentrations.

Samples can be collected from hydrants and valves as well as from drinking water taps in public or private buildings.

Samples should also be collected in response to discoloured water events so that an overall assessment of manganese can be determined.

In addition to routine water quality testing (general chemistry and total metal analyses), water suppliers will collect distribution system samples on a quarterly basis (Feb, May, Aug and Nov) at the same frequency as general chemistry and total metals in the distribution system as specified in the operating licence. The number of additional samples required depends on the population served:

Population	Number of quarterly samples
<100	0*
101-500	1
501 – 5000	2
5001 – 10,000	3
10,001 – 50,000	4
50,000+	4 + 1/50,000

*collected as part of the general chemistry samples

Enhanced monitoring is required for water systems that exceed the AO value (0.02 mg/L) entering the distribution. Water systems will collect additional distribution system samples on a quarterly basis (Feb, May, Aug and Nov) on a yearly basis.

Reduced monitoring will be considered if

- the source water is below the standard;
- the treated water is below the AO;
- there is no standard exceedance following three years of yearly testing of the treated water and distributed water; and
- the system services < 10,000 people;

Reduced monitoring must be discussed with your regional drinking water officer beforehand in order to amend the operating licence.

Corrective actions

If conducting routine monitoring using a handheld unit and the test result exceeds the standard, immediately collect a water sample from the same location and send it to the laboratory for analysis to confirm the handheld result.

Follow corrective actions for any result that exceeds the manganese standard such as

- confirming source water concentrations;
- verifying the treatment processes are reducing or removing manganese as designed;
- reviewing distribution system operation and maintenance activity;
- collecting additional distribution water quality samples to determine indicators such as pH, chlorine, turbidity, etc.; and
- continuing to test (handheld) until manganese levels are below the standard.

Based on the success of the corrective actions above, and the significance and extent of the manganese exceedance, corrective actions may also include

- treatment plant optimization or upgrades;
- ice pigging, swabbing or unidirectional flushing; and/or
- public notification.

Notification

Test results that exceed the manganese standard must be reported to the regional Drinking Water Officer. Public notification may be required if manganese levels cannot be effectively controlled through treatment optimization or by conducting targeted distribution maintenance.

Additional Information of manganese in drinking water:

- Manganese in Manitoba Water Supplies
- Manganese in Manitoba Well Water
- Managing Manganese in Drinking Water ODW-OG-19.

Detailed information on manganese in drinking water is available in Health Canada Guidelines for Drinking Water Quality: manganese

Office of Drinking Water

Regional Drinking Water Officers are available for operational and monitoring advice and to provide technical assistance.

After hours, please call the Environmental Emergency Response line at 204-944-4888 and ask for the on-call drinking water officer

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