

Operational Guideline for Manitoba Water Suppliers

Turbidity

PURPOSE

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

Turbidity

Turbidity is a measure of the clarity of the water. It is made up of fine suspended particles of clay, silt, organic and inorganic matter, including microorganisms.

Water suppliers using surface water or groundwater under the direct influence of surface water (GUDI) as their source are more likely to have elevated turbidity than water systems using a secure groundwater source.

Turbidity is measured in nephelometric turbidity units (NTU). Water suppliers using surface sources must ensure a minimum treatment of filtration and disinfection is applied. Water suppliers using GUDI sources must ensure a minimum treatment of filtration or equivalent and disinfection is applied.

Turbidity indicates different things and has different implications for water quality and treatment depending on the sampling location and the type of suspended particles that make up the turbidity.

Water suppliers should ensure that they maintain turbidities as low as reasonably possible. The [Guidelines for Canadian Drinking Water Quality: Turbidity](#) suggests that well designed and operated water systems should have no problem achieving a treated water turbidity of less than 0.1 NTU.

The turbidity standard applied depends on the filtration technology. Properly installed and operated filtration systems that meet the applicable turbidity standard will generally meet the system protozoa removal requirements, as well, although additional conditions may apply.

Legislation

Section 6(1) of the [Drinking Water Quality Standards Regulation](#) states all public water systems that use surface water or GUDI as its source water must ensure that the water entering the treated water reservoir meets the following treatment standards:

(a) For water treatment facilities using chemically assisted rapid gravity filtration (i.e. the use of coagulants or polymers upstream of the filters), turbidity levels must:

- (i) be less than or equal to 0.3 NTU in at least 95% of the measurements made in a month
- (ii) not exceed 1.0 NTU at any time

(b) For water treatment facilities using membrane filtration, turbidity levels must:

- (i) be less than or equal to 0.1 NTU in at least 99% of the measurements made in a month
- (ii) not exceed 0.3 NTU at any time

(c) For water treatment facilities using slow sand filtration, turbidity levels must:

- (i) be less than or equal to 1.0 NTU in at least 95% of the measurements made in a month
- (ii) not exceed 3.0 NTU at any time

(d) Turbidity standards associated with filtration technologies other than those described above will be determined by the Office of Drinking Water.

Water suppliers can determine which standards apply to their water system by reviewing *Table 1: Water Quality/Treatment Standards* of their operating licence.

Monitoring Requirements

In general, water suppliers are to monitor the filter effluent of each operating filter on a daily or continuous basis. Turbidity monitoring can be accomplished using portable, bench-top or on-line turbidimeter.

Turbidity measurements are to be taken when the plant is operating and the filters are running.

Water systems using filtration only to meet the microbial standard must demonstrate continuous compliance with the turbidity standard associated with the water system's filtration process. In order to demonstrate this, the water system must have:

- an on-line turbidimeter for each filter or microfiltration or ultrafiltration membrane train; and
- a data management system that allows continuous reporting at a minimum every 5 minutes; and
- a control system that ties turbidity readings into an alarm to immediately notify the operator of excursions.

Water systems that use particulate filtration as a physical barrier must also ensure that effective backwash processes including air scour and filter to waste are in place.

Water systems that use membrane filtration technology as a physical barrier must also ensure that daily direct integrity testing occurs and is reported.

Water systems with a population greater than 5000 or if specified in the operating licence, are required to monitor turbidity on continuous basis and are required to maintain a portable unit as back up and for monitoring distribution system turbidities.

Water suppliers can determine which monitoring requirements apply to their water system by reviewing *Table 2: Monitoring Schedule* of their operating licence.

Recording and Reporting Requirements

As with disinfectant residuals, turbidity levels must be tested at specified intervals and the test results recorded and reported.

Water suppliers must record and report the results on a [Monthly Turbidity Monitoring Report Form](#).

Water system information, turbidity measurements and compliance calculations must be entered in the form in the proper locations.

At the end of each month, the Monthly Turbidity Report Monitoring Form must be submitted to the Regional Drinking Water Officer.

Emergency Reporting Requirements

Water System Operators must immediately notify the Office of Drinking Water of any condition that may affect the ability of the water system to produce or deliver safe drinking water. Refer to Emergency Reporting Guideline (ODW-OG-04) on when to report exceedances of the applicable turbidity standards.

Compliance

Water suppliers must ensure that all treated water meets the turbidity standard; monitoring and reporting requirements are met to ensure compliance.

Improperly completed forms, missing days and not submitting the forms will result in non-compliance with the monitoring and reporting requirements as well as not meeting the specified standard.

Additional Information

ODW-OG-15 Continuously Monitoring Membranes

ODW-OG-24 Continuously Monitoring Chemically Assisted Filtration

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 more information related to Manitoba's drinking water and how it is regulated visit:

www.manitoba.ca/drinkingwater.