June 2006

Technical Update

For Municipal Residential Drinking Water Systems under O. Reg. 170/03 made under the *Safe Drinking Water Act, 2002*

Following public consultation, on June 5, 2006, O. Reg. 170/03 was amended. These technical amendments are designed to safeguard the quality of Ontario's drinking water, while making the regulation more workable and affordable for owners and operators of municipal and non-municipal year-round residential drinking water systems and systems serving designated facilities. They also add clarity and flexibility to the testing and operational regimes set out in O. Reg. 170/03. For full details, please see: http://www.e-laws.gov.on.ca/DBLaws/Regs/English/030170_e.htm

Drinking Water Testing for Microbiological Parameters

The *Safe Drinking Water Act, 2002* requires that owners and operating authorities of regulated drinking water systems ensure that the water provided by the system meets the prescribed drinking water quality standards.

To this end, the Drinking-Water Systems Regulation (O. Reg. 170/03) prescribes the testing of drinking water grab samples for microbiological parameters. The frequency of testing depends on the category of the drinking water system. The categories of drinking water systems are defined in the Regulation. In-line microbiological testing equipment is permitted to meet sampling and analysis requirements but only upon written approval of the Director, Ministry of the Environment.

On October 1, 2003, the *Safe Drinking Water Act, 2002* required that all laboratories performing drinking water analyses, including microbiological, be licensed by the Ministry of the Environment for specific testing. The tests performed by the licensed laboratory must be identified in their Drinking-Water Testing Licence which is publicly displayed at the laboratory site. Laboratory licences are valid for up to 5 years. Drinking water system owners/operators must use a licensed laboratory for all microbiological testing.

When tests for more than one microbiological parameter are required on a sample of drinking water, the licensed laboratory must conduct separate tests for each parameter; and must not infer the result for one parameter from a result obtained for another parameter.

Requirements for taking microbiological samples

O. Reg. 170/03 prescribes three types of microbiological samples (i.e. raw water samples, treated water samples, or distribution samples) that may need to be collected. Distribution samples (i.e. drinking water) must be collected from all systems. Raw water samples must be taken from each well that is supplying water to a small municipal residential system that has a ground water or GUDI source, or to a large municipal residential system. Treated water samples must also be taken from all large municipal residential systems from the point at which water enters the distribution system.

If a treated or a distribution sample is taken for microbiological testing under O. Reg. 170/03, or as a requirement of an approval or order, the owner/ operating authority of the water system shall ensure that a sample is taken concurrently at the same location for the immediate measurement of:

1) free chlorine residual if the system provides chlorination, and does not provide chloramination; and
2) combined chlorine residual if the system provides chloramination.

Microbiological sampling and testing is required for total coliforms and for *E. coli* at the following minimum frequencies:

1) For large municipal residential systems:
    - raw water samples – one per week
    - treated water samples – one per week
    - distribution samples
        a. 100,000 people or less – minimum of eight per month plus one for every 1,000 people with at least one per week
        b. more than 100,000 people – at least 100 per month plus one for every 10,000 people with at least three per week
2) For small municipal residential systems:
    - raw water samples – one per month (only applicable to groundwater and GUDI systems)
    - distribution samples - minimum one per two weeks if treatment equipment has been provided in accordance with Schedule 1 or Schedule 2 of the regulation

Testing for general bacteria population expressed as colony counts on a heterotrophic plate count (HPC) is also required if the system is required to provide secondary disinfection (i.e. chlorine or chloramines residual in the distribution system). HPC testing requirements are as follows:

1) For large municipal residential systems:
    - all required treated water samples, and
    - at least 25% of all required distribution samples
2) For small municipal residential systems providing secondary disinfection:
    - all required distribution samples

HPC Test Results

Where secondary disinfection is required, routine analysis of drinking water from the distribution system using the Heterotrophic Plate Count (HPC) test can provide an indication of the level of the general bacterial population in the system.

HPC test results are a good general indicator of overall water quality, but not of water safety. There are no longer any reporting or corrective action requirements specified in O. Reg. 170/03 following HPC test results so the HPC results should be used towards maintaining and improving the overall water quality and management of your system in order to help prevent other problems from occurring.

HPC test results should be monitored and recorded to determine what the normal or ‘baseline’ levels of HPC measurements are throughout the distribution system. A sudden rise in HPC counts at a site that has traditionally had low level measurements should give

rise to concern even in the absence of *E. coli* or total coliform detection. It may indicate a problem with the water treatment processes, or the 'sloughing-off' (detachment) of biofilm from the inner lining of pipes within the distribution system. A gradual increase in HPC counts can indicate regrowth of microorganisms and an overall decline in the water quality in that part of the system. Operators should make sure the system's maintenance and flushing programs have been rigorously followed and should verify that the proper level of disinfectant residual is present within the system. A second set of microbiological samples should be taken to confirm whether the elevated HPC measurement still exists. If the problem persists, further efforts should be made to inspect the system to determine the cause and identify further remedial actions that may need to be taken.

For more information on the heterotrophic plate count test, see:

http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/doc-sup-appui/heterotrophic-heterotrophes/heterotrophic-heterotrophes_e.pdf

Collection and handling considerations

The licensed laboratory conducting the test is required to provide information to the drinking water system owner/operating authority regarding sample collection and handling. The owner/operating authority is required to follow that direction. If the licensed laboratory does not have specific written instructions, it can provide the owner/operating authority with the Ministry of the Environment document, *Practices for the Collection and Handling of Drinking-Water Samples* (July 2003).

Aerators, hose attachments, filters and strainers may harbour bacteria and should be removed from taps prior to sampling for microbiological parameters. Lines should be flushed for at least 2 to 5 minutes or to minimize the effects of local plumbing. (A dedicated tap or spigot for regulatory sampling purposes is recommended).

Sample collection and handling practices are crucial to obtaining accurate, quality data. Aseptic techniques must be followed when handling the sterile sample bottles used for microbiological sample collection. Failure to do so will compromise results. As it is especially important that the sterile bottles remain closed until the time of sampling, it is recommended that sample bottles for microbiological testing have caps with tamper-proof seals. If the seal is broken the bottle should be discarded. The sampling bottles will have a sodium thiosulphate preservative, and it is important not to rinse these bottles before sampling. The sodium thiosulphate neutralizes chlorine disinfection compounds in the water sample thereby stabilizing the sample in the condition in which it was collected.

Storage and transportation requirements

Samples must be transported to the licensed laboratory in accordance with directions provided by the laboratory. A cooler or foam pack container containing ice or ice packs is recommended. The use of loose ice is not recommended as it may contaminate the sample. If ice packs are not available, the ice should be encased in waterproof packaging or a sealed container. It is also important to ensure that samples for microbiological testing do not freeze during shipment. Some courier companies offer shipping in heated vehicles during winter months. Samples for microbiological analysis are perishable and must be analyzed within the holding time specified by the licensed laboratory. A chain-

of-custody form, which is provided by the licensed laboratory, must accompany samples to the laboratory.

Finding a licensed laboratory

The Ministry of the Environment maintains a contact listing of licensed laboratories and the test classes for which they are licensed on its website at www.ene.gov.on.ca/envision/water/sdwa/lablicensing.htm

For more information contact:
Public Information Centre
Ministry of the Environment
135 St. Clair Avenue West
Toronto, ON M4V 1P5
Tel: 1-800-565-4923 or (416) 325-4000
www.ene.gov.on.ca

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