

Providing Safe Drinking Water to the Public

What are my responsibilities to ensure safe drinking water under the Safe Drinking Water Act, 2002 and O. Reg. 170/03?

A guide for owners and operators of

NON-MUNICIPAL YEAR-ROUND RESIDENTIAL DRINKING WATER SYSTEMS

These drinking water systems include privately owned systems that serve:

- apartment buildings with 6 or more residential units
- private subdivisions with 6 or more houses
- condominium or townhouse complexes with 6 or more residential units
- mobile home parks with 6 or more homes
- trailer parks supplying water year-round to 6 or more sites with water service hookup

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An on-line version of this guide can be found at
www.ene.gov.on.ca/envision/water/sdwa/dwsr.htm

A: Introduction

Under the *Safe Drinking Water Act, 2002* and the Drinking-Water Systems Regulation (O.Reg. 170/03), owners and operators of drinking water systems that supply water to the public have responsibilities to ensure the water is safe to drink. This guide outlines the responsibilities of owners or operators of drinking water systems that supply water to certain non-municipal year-round residential developments. Following this guide and ensuring compliance with the regulation will help to ensure that public health is protected and that drinking water standards are maintained.

Remember, this guide is only a summary

To be clear about your specific legal requirements, you must refer to the text of the Drinking-Water Systems Regulation (O. Reg. 170/03) and the *Safe Drinking Water Act, 2002*. You can access these at: www.e-laws.gov.on.ca or by calling our Public Information Centre at: 1-800-565-4923

Summary of requirements

This chart gives a summary of your drinking water system requirements. The guide gives further details.

System Registration	All non-municipal year-round residential drinking water systems must register with the Ministry of the Environment. This information is stored in the ministry's Drinking Water Information System (DWIS).
Microbiological sampling/testing of the raw water	Only for systems with a source that is ground water or ground water under the direct influence of surface water (known as a GUDI source). Collect samples every month from each well in the system, prior to any form of treatment, and submit to a licensed laboratory for testing (E. coli and total coliforms only).
Microbiological sampling/testing of the drinking water in the distribution system or plumbing	Collect and submit samples to a licensed laboratory for testing every 2 weeks if the system is providing treatment in accordance with the regulation, or weekly if no such treatment is installed. Testing for E. coli and total coliforms is required for all systems - heterotrophic plate count (HPC) must also be tested if the distribution system is required to have secondary disinfection (chlorine residual).
Chemical sampling/testing	Collect and submit samples from the point where water enters the distribution system or plumbing (unless otherwise specified) and submit to a licensed laboratory. Testing frequencies range from once every three months to once every 60 months depending on the chemical, but most chemicals are sampled once every 60 months.
Water treatment	Ensure that treatment equipment is installed and operated in accordance with the regulation, unless the conditions for a regulatory exemption have been met.
Operational checks	Routine maintenance and operational checks are required to be carried out, and monitoring for chlorine residual and for turbidity may be required, depending on your system. A person under the supervision of a certified operator can perform chlorine residual and turbidity testing, but equipment adjustments and maintenance checks must be done by a certified operator.
Engineering evaluation reports	A professional engineer (P.Eng) must prepare a report on installed treatment equipment that includes a maintenance schedule and a statement confirming that all equipment is being installed in accordance with the regulation. Subsequent reports are only required if alterations are carried out to the system.
Annual reports	Must be prepared every year and a copy kept on-site to be made available to the public and the Ministry of the Environment upon request. A copy may also need to be sent to each designated facility served by the system and the interested authority for each such designated facility if there are any designated facilities (e.g. schools, day nurseries, nursing homes, etc.) served by the system.
Adverse test results and other problems	Report adverse test results and other problems related to improper disinfection to authorities and take corrective action.

B: Does this guide apply to my drinking water system?

This guide APPLIES to you if you own or operate a non-municipal year-round residential drinking water system.

A non-municipal year-round residential system is a drinking water system that supplies water on a year-round basis to:

- a residential development with six or more private residences (e.g. apartment buildings, private subdivisions, condominiums, townhouse complexes, mobile home parks) or
- a trailer park that is supplying water year-round to six or more sites with water service hookup.

This guide DOES NOT apply to you IF:

- your drinking water system does not serve a residential development or trailer park described above
- you operate a seasonal drinking water system (a non-municipal seasonal residential system which does not operate for at least 60 days at a time to supply water to a major residential development or to a trailer park or campground with six or more service connections) or
- your drinking water system is connected to, and obtains all of its water from, a municipal residential drinking water system or another system that meets the testing and treatment requirements of O. Reg. 170/03.

Note: If your system is connected to and receives all of its water from another regulated system that meets the treatment requirements of O. Reg. 170/03, please refer to section 5 of the regulation for more details about specific requirements that apply to your system.

C: Determining Your Drinking Water Source

All drinking water systems draw from raw water supplies, such as ground water or surface water, unless they are receiving treated water from another regulated system. This guide describes specific requirements that apply to the various drinking water sources:

1. Ground water (secure wells)
2. Ground water under direct influence of surface water (GUDI – wells which may be subject to surface water contamination)
3. Surface water (lakes, rivers and streams)
4. Transported water (treated water brought in from other regulated systems and stored on-site, e.g. cisterns).

GUDI (Ground Water Under the Direct Influence of surface water) refers to a well which may be subject to surface water contamination

D: Nine steps to providing safe drinking water

Step 1: Register your drinking water system

- **All non-municipal year-round residential drinking water systems must be registered with the Ministry of the Environment.** Registration information helps meet our shared commitment to safe clean water for the people of Ontario.
- To register, complete the *Drinking Water System Categorization Questionnaire* and the *Drinking Water System Profile Information* forms available at www.ene.gov.on.ca/envision/water/sdwa/forms.htm. Once complete, email them to: Reg170_formsubmission@ene.gov.on.ca
- Once you have registered, you will be sent a letter with your drinking water system number (DWS#) and category. Use this DWS# for reference purposes when contacting the registration team.
- While the Ministry of the Environment requires electronic registration, you may be authorized to make paper submissions at the director's discretion under special circumstances. Call the Registration Help Desk at: 1-866-793-2588 for more information about paper submissions.
- If your drinking water system was in operation before June 5, 2006, the day the amendments to the regulation came into force, you must register within 60 days of that date, unless you had already registered. If you started operation on or after the day the amendments came into force, you must register within 30 days of beginning operations.
- Any changes to your drinking water system information must be submitted via email to Reg170_formsubmission@ene.gov.on.ca within 10 days of the change.

Step 2: Select a licensed laboratory

- Regulated drinking water systems must have their water tested on a routine basis. Drinking water samples must be sent to a laboratory licensed by the Ministry of the Environment for specific testing of microbiological and/or chemical parameters. (See box on next page for information about finding a licensed laboratory.)
- It is important that you contact the licensed laboratory directly to arrange for testing PRIOR to submitting samples to them.
- Before sending your samples to a licensed laboratory for the first time, you must submit the *Laboratory Services Notification* form to the ministry (available online at: www.ene.gov.on.ca/envision/water/sdwa/forms.htm) which identifies the licensed laboratory(ies) that you have hired and the specific testing they will be performing.
- It is extremely important that your registration information is fully completed and up to date at all times. Test results will not be considered by the ministry unless all of this information is included in laboratory submissions.
- It is strongly recommended that you provide the name of a back-up licensed microbiological laboratory on your *Laboratory Services Notification* form in case the primary laboratory encounters equipment or testing problems. As an owner you are required to submit a *Laboratory Services Notification* form to the Ministry of the Environment each time you change or hire new laboratories for testing.
- Your licensed laboratories must send a written report of all results to you within 28 days of approving the results. Your results are also submitted electronically to the ministry.
- If the licensed laboratory finds an adverse test result, they must notify you, the Ministry of the Environment, and the local Medical Officer of Health immediately by telephone. The laboratory must then fax the adverse test results to the Ministry of the Environment and the local Medical Officer of Health within 24 hours. Pages 14-17 of this guide explain the procedures you must follow if this happens.

Finding a licensed laboratory

- To hire a licensed laboratory for testing, view the list of licensed laboratories on the ministry's web site: www.ene.gov.on.ca/envision/water/sdwa/licensedlabs.htm; or contact the Public Information Centre at 1-800-565-4923, or contact a laboratory directly. Be sure to ask them if they are appropriately licensed by the Ministry of the Environment for specific testing of your drinking water.
- While some of the larger laboratories may be licensed for all of the required tests under the regulation, some licensed laboratories only test microbiological parameters (*E. coli*, total coliforms and HPC) while others test only chemical parameters (e.g. arsenic or benzene, etc.).

Step 3: Take drinking water samples for testing

- Licensed laboratories must provide you with sample containers, and instructions about how to collect, transport, and store the samples taken from your drinking water system. Common instructions include: removing screens/filters at any taps, allowing the water to run for at least 2 minutes, not touching or otherwise contaminating sample bottles, capping bottles immediately, leaving airspace so that the bottle does not overflow, and preventing splashing.
- Pay particular attention to the instructions for sample temperature. Do not freeze samples. Make sure that if samples are being transported in a vehicle that they are kept in a cooler with ice packs or other means to keep them cool.
- Whenever a sample is collected, the person taking the sample must record the date and time the sample was taken, the location where the sample was taken and the sampler's name on the *Chain of Custody* form. (This form can be obtained from your laboratory). The laboratory's *Chain of Custody* form will be

customized for your drinking water system and sent to the sampler with the sampling containers.

- Once the samples are submitted to the licensed laboratory, staff will record details of the samples (i.e. date/time the samples were received, analyst and testing details, final test results, etc.).

What are my MICROBIOLOGICAL sampling and testing requirements?

How often samples need to be taken and submitted for testing

Raw water sampling:

- Ground water and GUDI: minimum once a month from each well
- Surface water: none required
- Transported water: none required, but the storage container that receives the water (e.g. cistern) should be constructed and maintained in a manner that prevents surface water and other foreign materials from coming into contact with the treated drinking water.

Distribution sampling (drinking water taken from distribution or plumbing fixtures such as taps):

- Once every two weeks if treatment is provided in accordance with the regulation
- Once a week if treatment is not provided in accordance with the regulation, or is not required because exemption from treatment has been obtained (see page 9)

Note: If your system is using **point of entry (POE) treatment** (see page 11) in accordance with the regulation, these distribution samples must be taken on a rotating basis so that a sample is taken from a location downstream of the POE treatment unit in each home and facility supplied by the system at least once every 24 months.

What licensed laboratories test for

They test for the following bacteria:

- *E. coli*
- Total coliforms
- Heterotrophic plate count or “HPC” (only for distribution samples and only if the distribution system is required to have secondary disinfection, i.e. chlorine residual – see page 11)

HPC is a microbiological laboratory test that gives a measurement of the general bacterial population present within your distribution system or plumbing. HPC results are a good indicator of overall water quality, but not water safety. Drinking water distribution lines are not sterile and some microorganisms can attach to the inner lining of the pipes and grow. There are no reporting or corrective action requirements specified in O. Reg. 170/03 following HPC test results. It is suggested, however, that you monitor your HPC results in order to develop a good sense of what the normal or ‘baseline’ levels of HPC measurements are in water from your system.

If you see an abrupt spike in HPC counts it may indicate a problem with your water treatment processes, or perhaps the ‘sloughing-off’ (detachment) of the organisms that may have attached and grown on the inner lining of the distribution pipes. You should double-check all your treatment and monitoring equipment, and make sure that all of your system’s maintenance programs have been rigorously followed. A gradual and steady increase in HPC counts can indicate regrowth of organisms in the system and an overall decline in the water quality.

To solve the problem you may want to raise the frequency with which you flush the distribution lines and increase the overall chlorine residual levels throughout your system. By following these simple steps, the HPC results can be used towards maintaining and improving the overall water quality and management of your system and may help to prevent other problems from occurring.

Note: If your drinking water system is using chlorine, then **you must also sample and test for chlorine residual (the chlorine that stays in the lines to prevent microbiological regrowth) using the proper analyzer (see page 13)**

at the same time and location your microbiological distribution samples are taken. You must record the chlorine residual value clearly on your *Chain of Custody* form provided by your licensed laboratory. In the event there is a microbiological adverse test result, the laboratory is required to tell the Ministry of the Environment and the local Medical Officer of Health what chlorine level was recorded on the form.

How soon samples must be taken

- Existing systems should already be sampling their water.
- New systems must begin sampling as soon as they commence operation, and as soon as the *Laboratory Services Notification* form is submitted.

Note: If your drinking water system is not in operation for seven days or more, or if, for seven days or more, the system is only supplying water to private residences occupied by the system owner or their family, or by the system owner’s employees, agents or their families, you are not required to perform microbiological sampling and testing during that period. However, upon restarting your system you must sample and receive the results prior to supplying drinking water to users of the system.

What are my CHEMICAL sampling and testing requirements?

Where to sample:

- A point where water enters the distribution system, except for lead and trihalomethanes
- Lead must be sampled from a location that is most likely to have higher lead levels (e.g. the oldest pipes)
- Trihalomethanes must be sampled from a system that is providing chlorination or chloramination from a location that is likely to have an elevated potential for the formation of trihalomethanes (e.g. the ends of the lines).

How often samples need to be taken and submitted for testing

- Nitrate and nitrite: at least once every 3 months
- Trihalomethanes (only if your system provides chlorination or chloramination): at least once every 3 months
- Lead: at least once every 12 months
- All organic and inorganic parameters listed in Schedules 23 and 24 of O. Reg. 170/03, at least once every 60 months
- Sodium and fluoride: At least once every 60 months.

How soon samples must be taken

- Existing systems should already be sampling their water
- New systems must start sampling within 12 months after commencing operation, although nitrate and nitrite needs to be done by the third month of operations (see above).

Step 4: Determine the minimum treatment requirements for your drinking water system

Can my system obtain exemptions from treatment?

Treatment exemptions for secure ground water systems

If you have an **existing** or **new** system that uses **ground water** as a raw water supply and does not serve a designated facility, you may be able to obtain exemptions from the treatment requirements of the regulation. A notice must be submitted to the Ministry of the Environment through a *Well Technician's Notice*, signed by one of the following: a person who holds a well technician license for Well Drilling, or a professional engineer, a hydrogeologist, or a certified engineering technologist who has experience in ground water supply.

For the notice to satisfy the criteria for treatment exemptions, one of these experts must have assessed your well and confirmed that it has met the key factors listed on the form and subsection 2-12 (1) of Schedule 2 of O.Reg 170/03.

In addition, for the exemptions to apply, the notice must also include a statement confirming that you have complied with microbiological testing requirements according to the regulation for the past 12 months and that **no** raw water samples and no resamples of drinking water from the distribution system or plumbing indicated the presence of *E. coli* or total coliforms during that period.

The *Well Technician's Notice* can be found at www.ene.gov.on.ca/envision/water/sdwa/forms.htm or by calling the Ministry of the Environment's Public Information Centre at 1-800-565-4923. Submit the notice either via email to the O.Reg. 170/03 email box Reg170_formsubmission@gov.on.ca or by fax 1-416-314-8716.

For a new system, the *Well Technician's Notice* can be submitted prior to start-up and then the notice of microbiological test results would not be required until the end of the month following the first anniversary of the day the system commenced operation. Installation of treatment equipment would not be required during that time.

For other options for meeting your treatment requirements, see *Treatment Options for Owners of Non-Municipal Year-Round Residential Drinking Water Systems* available at www.ene.gov.on.ca/envision/gp/5477e.pdf.

Treatment exemptions for GUDI systems

If your system is deemed by the regulation to have a raw water supply that is ground water under direct influence of surface water (GUDI) because the well is located within close proximity to surface water, you are normally required to install treatment for a surface water system (i.e. filtration and disinfection). However, under subsection 2-3 (2) of O. Reg. 170/03, if you have such a system (not serving a designated facility) and you submit a *Well Technician's Notice* that meets the same exemption criteria as those set out for a ground water system, your system would be required to install treatment for a ground water system, (i.e. disinfection only) rather than for a surface water system.

Note: once you have obtained the treatment exemptions, if *E. coli* is detected in any corrective action resamples of drinking water from the distribution system or plumbing, or if total coliforms are detected on any two separate occasions within a 12 month period in any corrective action resamples of drinking water from the distribution system or plumbing, the exemption is no longer valid. You will have 90 days to install the full treatment that is required by the regulation.

Deadline for installing treatment equipment

Unless your system obtains exemptions from treatment requirements, you must ensure that your system installs the required treatment equipment by certain deadlines. If your system does not serve a designated facility and began operating before June 1, 2003, you must have treatment equipment installed by July 1, 2006. If your system serves a designated facility and began operating before June 1, 2003, you were expected to meet the treatment requirements on or before July 1, 2004. If your system began operating on or after June 1, 2003, you were expected to meet the treatment requirements immediately on start-up.

Treatment processes **must** also be in accordance with the ministry's *Procedure for Disinfection of Drinking Water in Ontario*. The procedure is available at: www.ene.gov.on.ca/envision/gp/4448e01.pdf.

Treatment Basics

Below is a very basic summary of treatment processes that will reduce or eliminate the potential for the presence of pathogens (organisms that can cause illness) in your drinking water. Different water sources necessitate different levels of treatment.

You may wish to consult with the professional engineer assisting you with your Engineering Evaluation Report (see Engineering Evaluation Report, page 12) about the different types of treatment technologies that are available to meet your specific treatment requirements.

Different treatment methods

Filtration of raw water removes particles that may hide or protect pathogens such as viruses, bacteria and protozoa, and helps to ensure that effective primary disinfection can be carried out.

- Where filtration is required, the filtration process must occur before the primary disinfection process.
- Filtration technologies include conventional chemically assisted rapid sand filtration, direct chemically assisted rapid sand filtration, slow sand filtration, diatomaceous earth filtration, cartridge/bag filters, and membrane filters. Your professional engineer will advise you on the most appropriate technology for your system.

Primary disinfection inactivates pathogens before the water is delivered to the first consumer. Effective disinfection can be accomplished by chemical means such as chlorine, or by alternatives such as ultraviolet (UV) light.

- Where *chlorine* is used for primary disinfection the process must involve a contact time (e.g., in a holding tank) during which the water is exposed to a specified chlorine dose that must be monitored.

- Where *UV or other non-chlorine based primary disinfection equipment* is used the equipment must have either an automatic shut-off feature or an alarm that notifies the operator if the equipment malfunctions, loses power or is not providing appropriate levels of disinfection. The alarm must sound where the testing equipment is located. If a person is not always present where the equipment is located, then the alarm must sound in a place where someone is present. If an alarm sounds, a certified operator must be dispatched to take appropriate action as soon as possible.

Secondary disinfection introduces and maintains a chlorine residual in your distribution system to protect the drinking water from microbiological recontamination or bacterial regrowth.

- Secondary disinfection is required if all parts of the drinking water system and plumbing downstream of the primary disinfection equipment are not enclosed in a building or other protective structure.
- For the purpose of secondary disinfection, chlorination equipment must be operated so that, at all times and at all locations within the distribution system, the free chlorine residual is never less than 0.05 mg/L.
- Often, secondary disinfection is provided by the treatment equipment which supplies primary disinfection. If chlorine-based equipment is used to provide primary disinfection, that same equipment may also be used to provide secondary disinfection. However, where UV light or other non-chlorine based equipment is used to provide primary disinfection, that equipment is unable to provide secondary disinfection. Therefore, additional chlorine-based equipment would be needed to meet any secondary disinfection requirements.

Point of entry (POE) treatment

If your system serves 100 or fewer private residences, you can choose the option of meeting requirements using point of entry (POE) treatment. Point of entry treatment units are primary disinfection units that are installed on the plumbing at or near where water from the system enters a building or other structure. The regulation provides a detailed explanation of POE system requirements and obligations that would allow you to be exempt from secondary disinfection (chlorine residual in the distribution system) requirements.

Some things to consider if you plan to use a point of entry approach towards treatment:

- POE units must be installed on the plumbing of **every** building or other structure that is part of a private residence, designated facility or public facility served by the system – full participation is obligatory.
- All POE units must be owned or leased by the drinking water system owner – you will remain responsible for testing the drinking water quality and maintaining the treatment units, and cannot pass these responsibilities to the homeowners.
- POE units can not use chlorination or chloramination.
- Automatic shut-offs are required on all units.
- Notice must be given to occupants of a property where POE units are located whenever permission to enter a property is required.
- You must ensure that all the users of water on the system are properly informed about the point of entry units, and that they understand that access to their home or property will be required on a periodic basis to sample the water and to maintain the units. Once the users are informed, submit to the Ministry of the Environment a *Notice of Point of Entry Disclosure for Your Drinking Water Users* (available on line at www.ene.gov.on.ca/envision/gp/5560e.pdf)
- Additional requirements apply - see section 3-1.1 of Schedule 3 of O. Reg. 170/03 for more details.

Treatment requirements depending on the source of your water

Ground water source

Unless you obtain exemptions from treatment requirements, your ground water system must have water treatment equipment that is capable of achieving, at all times, **primary disinfection**, including at least 99 per cent removal or inactivation of viruses in accordance with the *Procedure for Disinfection of Drinking Water in Ontario* available at www.ene.gov.on.ca/envision/gp/4448e01.pdf.

Surface water or GUDI source

Unless you obtain exemptions from treatment requirements, you must use **filtration** and **primary disinfection** such that the total process is capable at all times of removal or inactivation of 99 per cent of *Cryptosporidium* oocysts, 99.9 per cent of *Giardia* cysts, and 99.99 per cent of viruses in accordance with the *Procedure for Disinfection of Drinking Water in Ontario* available at www.ene.gov.on.ca/envision/gp/4448e01.pdf.

Distribution Systems

Where the treated water is distributed to users through a system of pipes where all or some of the pipes are buried in the ground, primary disinfection must be followed by **secondary disinfection** which introduces and maintains a chlorine residual level in the distribution system.

Engineering Evaluation Report

When installing treatment equipment under this regulation, a professional engineer with experience in sanitary engineering or a person under his or her supervision must assess your system in order to determine the proper treatment solution that is needed for compliance with the regulation. The engineer must then prepare an **Engineering Evaluation Report** that states that the professional engineer or a person under his or her supervision has visited your drinking water system, and that in the engineer's opinion, all equipment needed to comply with the treatment requirements and needed to comply with the operational checks is being provided.

The report must also set out the reasons for the

engineer's opinion, must specify the category of the drinking water system, and must include a maintenance schedule for equipment to be inspected, tested and replaced.

If your system does not serve a designated facility and began operating before June 1, 2003, the Engineering Evaluation Report must be completed and submitted by July 31, 2006. **If your system serves a designated facility and began operating before June 1, 2003**, the Engineering Evaluation Report was to have been completed on or before July 31, 2004.

For systems that began operating on or after June 1, 2003 and altered systems: An Engineering Evaluation Report must be completed on and submitted to you within 30 days after a new system begins operation or an alteration is completed on an existing system, unless treatment exemptions apply.

You must submit written notice to the ministry within 7 days of the day that the Engineering Evaluation Report is required using an *Engineering Evaluation Report Notice* available on the ministry's website at www.ene.gov.on.ca/envision/water/sdwa/forms.htm. Do not submit the actual Engineering Evaluation Report to the Ministry of the Environment, just the notice via email through Reg170_formsubmission@ene.gov.on.ca, by fax, or by mail. Keep it on file and make sure it is available upon request. If you require assistance please call 1-866-793-2588 during normal business hours.

Note: If your system serves any designated facilities (facilities that serve people who may be more susceptible to illness from drinking water of poor quality), you may also need to submit the written notice to the interested authority for the facility, if applicable. See Schedule 21, s. 21-7 for more details on this requirement. The interested authority is usually the Ontario Government ministry to which the designated facility is responsible, e.g., the Ministry of Health and Long-Term Care if it is a health care facility.

Names of some resources who may assist you in finding a professional engineer are available at www.ene.gov.on.ca/envision/gp/5677e.htm.

Step 5: Ensure maintenance and operational checks are carried out

Proper day-to-day operation of your drinking water system is the responsibility of the system owner. The following operational tasks must be performed by a “certified operator” in accordance with the regulation:

- conducts tests on-site such as chlorine residual and filter effluent turbidity
- makes all adjustments to the water treatment equipment
- examines the results of continuous monitoring equipment within 72 hours of the water samples being taken
- if disinfection equipment malfunctions, loses power or ceases to provide the appropriate level of disinfection, takes appropriate action at the location where the equipment is installed
- is promptly dispatched if alarms sound due to an equipment malfunction, loss of power or a test result that does not meet the standards established by O. Reg. 170/03
- performs regular maintenance checks on the water treatment equipment to ensure proper functioning.

For non-municipal year-round residential systems a “certified operator” is a person who holds a Class 1-4 “Water Treatment”, “Water Distribution” or “Water Distribution and Supply” certificate or who holds the applicable “Limited Subsystem” certificate issued under O. Reg. 128/04 (Certification of Drinking-Water System Operators and Water Quality Analysts).

For more information on becoming certified, contact the Ontario Environmental Training Consortium at: www.oetc.on.ca or by calling 905-796-2851.

Despite these requirements, a person working under the supervision of a “certified operator” is also allowed to perform on-site chlorine residual and turbidity testing, as long as that person has been trained by the certified operator to conduct the test, and the person immediately advises the certified operator of all test results. A person holding a Water Quality Analyst certificate may also perform these tests. Materials for training the “supervised person” may be downloaded from www.ene.gov.on.ca/envision/water/sdwa/dwsr.htm

Operational Test Basics

Below is a summary of the regulatory requirements related to operational tests to be carried out on the system.

Turbidity testing

- Use a turbidity meter that measures in Nephelometric Turbidity Units (NTUs).

Monitor raw water turbidity (only required for systems that have a ground water supply):

- A turbidity sample must be taken and tested **every month** from each well from a location before the raw water enters the treatment system.

Monitor filter effluent turbidity (only required for systems that require filtration)

- If continuous monitoring equipment is used, ensure that sampling and testing for turbidity is conducted by continuous monitoring equipment on **each** filter effluent line, and that requirements of section 6-5 of O. Reg. 170/03 have been met.
- If continuous monitoring equipment is not required and not used, ensure that a daily water sample is taken on each filter effluent line and tested for turbidity.
- The *Procedure for Disinfection of Drinking Water in Ontario*, found at <http://www.ene.gov.on.ca/envision/gp/4448e01.pdf>, lists the required frequency of turbidity testing depending on the filtration method used. Cartridge/bag filters and slow sand filtration methods allow the operator the option of monitoring turbidity on a daily basis, whereas other filtration methods are required to have continuous monitoring.

Chlorine residual testing

- Use an electronic direct readout colourimetric or amperometric chlorine analyzer, or another device that a professional engineer considers equivalent.
- If continuous monitoring equipment is used, ensure that requirements of section 6-5 of O. Reg. 170/03 have been met.

Monitor primary disinfection

- If chlorination is used for primary disinfection and continuous monitoring is not used, **daily** chlorine residual tests are required at a minimum. Samples must be taken from a location where the intended contact time has just been completed.

Monitor secondary disinfection

- If you are required to provide secondary disinfection, you must conduct **at least two samples per week** for chlorine residual in the distribution system, at least 48 hours apart. Samples must be taken from a location significantly beyond the point at which water enters the distribution system or plumbing and should be taken randomly throughout the distribution system.

Step 6: Notify authorities of adverse test results and other problems

An adverse test result is a test result that exceeds the standards listed in the *Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines* (a guidance document for O. Reg. 169/03 found at www.ene.gov.on.ca/envision/gp/4449e01.pdf). O. Reg. 169/03 can be found at www.e-laws.gov.on.ca. An adverse test result can also be a prescribed adverse result listed in section 16-3 of O. Reg. 170/03. Adverse test results and other problems related to improper disinfection are required to be reported to the authorities.

When a water sample is submitted to a licensed laboratory for testing, your licensed laboratory will notify you if you have an adverse test result.

What to do if you have an adverse test result

You should ensure ahead of time that contact information for the Ministry's Spills Action Centre and your local Medical Officer of Health is easily accessible to anyone who may need it.

As soon as you become aware of an adverse test result, either from your licensed laboratory or from a test result of a sample taken on-site, or if you observe that your drinking water system is directing water to users that has not been disinfected in accordance with the ministry's *Procedure for Disinfection of Drinking Water in Ontario*, found at <http://www.ene.gov.on.ca/envision/gp/4448e01.pdf>, you are required to immediately contact your local Medical Officer of Health AND the Ministry of Environment's Spills Action Centre (SAC).

See below and Schedule 16, s.16-3 of O. Reg. 170/03 for more details.

First: Make an immediate report (by telephone or in person)

Immediately report the adverse test result or other problem to:

- the Ministry of the Environment's Spills Action Centre (telephone 1-800-268-6060); the Spills Action Centre is open 24 hours/day and 365 days/year
- your local Medical Officer of Health at the local Public Health Unit, by speaking with someone in person or on the telephone. Contact information for your local Public Health Units can be found in your blue pages or at: www.health.gov.on.ca/english/public/contact/phu/phuloc_mn.html; and
- the operator of each designated facility served by your system, if any designated facilities are served by your system, by speaking with someone in person or on the telephone, unless the operator of the designated facility is also the owner of the drinking water system.

Second: Deliver written notice

Within 24 hours of giving the verbal notice, you must deliver written notice to:

- the Ministry of the Environment's Spills Action Centre by fax at 1-800-268-6061
- the local Medical Officer of Health by fax or in person
- the operator of any designated facilities served by your system by fax or in person and
- the interested authority for any designated facilities (if applicable) by fax.

Use the *Notice of Adverse Test Results and Other Problems* available on www.ene.gov.on.ca/envision/gp/4444e.pdf.

Third: Deliver follow-up notice of corrective action taken

Once you have resolved the issue that gave rise to the adverse test result or other problem, you must submit a *Notice of Issue Resolution* available at www.ene.gov.on.ca/envision/gp/4444e.pdf within 7 days of resolution.

The follow-up written notice must summarize the action taken and the results achieved.

- Send the notice to the local Medical Officer of Health, and the Ministry of the Environment's Spills Action Centre within seven days of resolving the issue.
- Send the notice to the interested authority for any designated facility (if applicable) within 30 days.

Step 7: Take corrective action if you have an adverse test result or other problem

If you are required to report an adverse test result or other problem, not only must you notify the appropriate authorities as stated above, but you must also follow corrective actions to resolve the problem and protect the people who are using your water.

You must follow the proper set of corrective actions following the specified adverse result or problem (refer to the chart beginning on the next page).

You can also contact your local Ministry of the Environment office for further advice on any adverse test results. Visit: www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist for contact information.

What Corrective Actions Must You Take Following Adverse Test Results or Other Problems?
(See schedule 18 of O. Reg. 170/03 for more information)

For systems not currently using chlorine, following any adverse microbiological test results take the corrective action as outlined in the ministry's *Procedure for Corrective Action for Systems Not Currently Using Chlorine* (www.ene.gov.on.ca/envision/gp/4414e01.pdf).

For systems providing chloramination, please refer to O. Reg. 170/03, sections 18-4 to 18-9 for further details on specific corrective actions to be taken.

IN ALL CASES, YOU MUST CONSULT WITH THE LOCAL MEDICAL OFFICER OF HEALTH AND TAKE ANY ADDITIONAL STEPS THAT ARE DIRECTED

Adverse test result or other problem	First Step	Second Step	Third Step
Water not disinfected properly is directed to users	Immediately restore the disinfection.	Immediately take all reasonable steps to notify users to use an alternate source of drinking water or, if no alternate source is available, to bring water to a rapid boil for at least one minute before use.	
If filtration is required, the turbidity in filter effluent is more than 1.0 NTU	Immediately check the turbidity monitoring equipment and correct any problems identified. If no problems are identified immediately backwash the nearest filter upstream of the sample location or immediately replace the filter cartridges or filter elements of the nearest filtration equipment upstream of that location, and immediately review other upstream operational processes and correct any faulty processes identified.	Immediately after the first step resample and test. If resample confirms exceedance, immediately take all reasonable steps to notify users to use an alternate source of drinking water or, if no alternate source is available, to bring water to a rapid boil for at least one minute before use.	Follow the manufacturer's recommendations for servicing the filtration equipment upstream of the location, and flush the distribution system and plumbing.
If secondary disinfection is required, free chlorine residual is less than 0.05 mg/L	Immediately flush the distribution system and any plumbing, and restore secondary disinfection to ensure a free chlorine residual level of at least 0.05 mg/L is quickly achieved at all points in the affected parts of the distribution system and plumbing	If 0.05 mg/L of free chlorine residual cannot be quickly achieved at all points in the affected parts, immediately take all reasonable steps to notify users to use an alternate source of drinking water or, if no alternate source is available, to bring water to a rapid boil for at least one minute before use.	

Continued on next page

Adverse test result or other problem	First Step	Second Step	Third Step
E. coli are detected in a test result from a drinking water sample.	Immediately take all reasonable steps to notify users to use an alternate source of drinking water or, if no alternate source is available, to bring water to a rapid boil for at least one minute before use.	Immediately resample and test (see note below). Immediately increase the chlorine dose and flush the distribution system and plumbing to ensure that a free chlorine residual of at least 0.2 mg/L is achieved at all points in the affected parts of the distribution system and plumbing.	Maintain the chlorine residual concentration in the affected parts of the system and continue to resample and test until E. coli is no longer detected in 2 consecutive sets of samples taken 24 to 48 hours apart.
Total coliforms are detected in a test result from a drinking water sample	Resample and test as soon as reasonably possible (see note below).	If resample confirms total coliforms, immediately increase the chlorine dose and flush the distribution system and plumbing to ensure that a free chlorine residual of at least 0.2 mg/L is achieved at all points in the affected parts of the distribution system and plumbing.	Maintain the chlorine residual concentration in the affected parts of the system and continue to resample and test until total coliforms are no longer detected in 2 consecutive sets of samples taken 24 to 48 hours apart.
Exceedance of a chemical or radiological parameter listed in Schedule 2 or 3 of the Ontario Drinking Water Quality Standards Regulation (O. Reg. 169/03)	Resample and test as soon as reasonably possible (see note below).	If resample confirms exceedance, consult with local Medical Officer of Health on further actions.	
Sodium concentration that exceeds 20 mg/L and a report has not been made in the previous 60 months	Resample and test as soon as reasonably possible (see note below).	If resample confirms exceedance, consult with local Medical Officer of Health on further actions.	

Note: To “resample and test” for a microbiological parameter, it means that you must immediately collect and transport a set of at least 3 drinking water samples for the parameter which caused the adverse test result to your licensed laboratory for analysis. The first sample must be from the same location as the sample that gave rise to the corrective action. The second sample must be from a location that is a significant distance upstream from the location of the adverse result, where reasonably possible, and the third sample

must be from a location that is a significant distance downstream from the adverse result, where reasonably possible.

Unless it is a test conducted on-site, to “resample and test” for a parameter that is **not** a microbiological parameter, it means that you must collect and transport a water sample for the parameter which caused the adverse water quality from the same location as the sample that gave rise to the corrective action to your licensed laboratory for analysis.

Step 8: Post warning notices of potential problems whenever required

You must post an approved Ministry of the Environment-issued warning notice to advise the public if:

- following adverse test results or other problems you are required to notify users to use an alternate source of drinking water or, if no alternate source is available, to bring water to a rapid boil for at least one minute before use; or
- you are not currently meeting your sampling requirements; or
- you have not yet carried out required corrective actions.

Where to obtain official warning notices

Warning notices must be in a form provided by or approved by the ministry. There are two types of warning notices available from the Ministry of the Environment. Ensure with ministry staff that the proper notice is used.

You can obtain Ministry of the Environment-approved warning notices by calling 1-800-565-4923.

If you have not yet obtained warning notices, you can (as an interim measure) post any sign that states: “Public Notice: Do not drink this water” until you have received the ministry-approved warning notices.

Where to post warning notices

- Warning notices must be posted in prominent locations where they are likely to be seen by those using water from the system.
- If the system serves any designated facilities, warning notices must also be posted at every entrance to every building or structure that is part of a designated facility.
- If you are the owner of the drinking water system but do not own a designated facility served by your system, you do not have to post notices in the designated facility as above, but you must ensure that the operator of the facility is provided with:
 - sufficient copies of the warning notices, and
 - instructions to post the warning notices as above.
- If you fail to post a warning notice at your drinking water system, a provincial officer, public health inspector, or agent of the interested authority (if applicable) may do so instead.

Warning Notices do NOT provide an exemption from testing or corrective action! The warning notices required to be posted are a temporary requirement meant to protect users of the system in the short term. The owner must still comply with testing and corrective action requirements as soon as possible, despite posting the warning notices.

Step 9: Prepare an annual report and retain records

All drinking water systems subject to the Drinking-Water Systems Regulation must prepare an annual report each year. A copy of each report must be kept on-site. If your system serves any designated facilities then a copy must also be given to each designated facility served by the system and, if applicable, to each interested authority.

Your annual report must cover the period from January 1 to December 31 in a given year. It must be prepared by February 28 of the following year. You can either use the *Annual Report* template available on the ministry's web site at: www.ene.gov.on.ca/envision/water/sdwa/dwsr.htm or create your own template. The annual report must include:

- a description of the drinking water system
- a summary of any adverse test notices or observations of inadequately disinfected water being directed to system users
- a summary of all tests and their results
- a summary of any corrective actions undertaken and
- a description of any major expenses for the system.

Keep copies of all the test results from your required samples, every order that applies to the system, and your Engineering Evaluation Report (in addition to your annual report) on-site. You must make them available during normal business hours to the public upon request for a period of two years, free of charge. You must also have a copy of O. Reg. 170/03 available to the public.

Records and reports must be kept for certain time periods for review by Ministry of the Environment inspectors and any professional engineers/hydrogeologists preparing an opinion, report or assessment regarding your system for the purposes identified in O. Reg. 170/03.

- Keep the following for at least two years:
 - Operational test results
 - Microbiological test results and
 - Records of maintenance checks and activities.
- Keep the following for at least six years:
 - Trihalomethane, nitrate and nitrite test results and
 - Any chemical testing required to be sampled and tested every three months
 - Lead test results
 - Annual reports.
- Keep the following for at least 15 years:
 - Sodium and fluoride test results
 - Any other chemical or radiological, pesticide, and health-related parameter test results
 - Engineering evaluation reports
 - Inorganic and organic chemical test results.

E: Who can I contact for more information?

- If you would like other guides and fact sheets related to drinking water, please contact the Ministry of the Environment's Public Information Centre at: 1-800-565-4923 or visit the Ministry of the Environment's website at: www.ene.gov.on.ca
- You can also sign up for drinking water updates by sending an email to: drinking.water@ene.gov.on.ca and requesting that you be added to the mailing list.

