

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

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An on-line version of this guide can be found at www.ontario.ca/drinkingwater

Summary of requirements

This chart summarizes 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 (the ministry). 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 (<i>E. coli</i> 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 two weeks if the system is providing treatment in accordance with the regulation, or weekly if no such treatment is installed. Testing for <i>E. coli</i> 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 except for lead	Collect and submit samples from the point or cold water tap where water enters the distribution system or plumbing (unless otherwise specified, for example, plumbing and distribution samples for lead testing) and submit to a licensed laboratory for testing. Testing frequencies range from once every three months to once every 60 months depending on the chemical, but most chemicals are required to be tested only once every 60 months.
Community lead sampling/testing and associated other sampling and testing	<p>Collect, and submit to a licensed laboratory for lead testing, samples from the plumbing in private residences and non-residential buildings and from the distribution system. Samples must be collected and tested twice every year ("winter" and "summer"). The number of sampling locations depends on the size of the population served by the system. The testing frequency drops to twice a year every three years and the number of sampling locations drops by roughly 50 per cent after two sets of very good results or four sets of acceptable results. Under certain conditions, systems serving populations of less than 50,000 may qualify for an exemption from lead sampling in plumbing.</p> <p>Unlike for other required sampling, the sample collection for lead testing must be done by a qualified person who, at the time of the sample collection, must also conduct a pH test and, for the distribution sampling locations, also collect a sample for alkalinity testing. The sample for alkalinity testing may be sent to the laboratory along with the samples for lead testing or tested separately by a qualified person. Depending on the specific qualification of the person collecting the samples and conducting the pH tests, this person may or may not be qualified to conduct the alkalinity tests.</p>
Water treatment	Ensure 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 licensed engineering practitioner 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	These 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 or
- 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.

Finding a licensed laboratory

- To hire a licensed laboratory for testing, view the list of licensed laboratories on the ministry's website at www.ontario.ca/drinkingwater under Testing and Labs 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.
- Some of the larger laboratories may be licensed for all of the required tests under the regulation. Other licensed laboratories only test microbiological parameters (*E. coli*, total coliforms and HPC) or only chemical parameters (e.g., arsenic or benzene, etc.).

Step 3: Take drinking water samples for testing

Note: The instructions below do not apply to community sampling and testing for lead. See page 10 for those instructions.

- Licensed laboratories must provide you with sample containers and instructions on 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 two 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. If samples are being transported in a vehicle, make sure 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, time and location where it 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, analysis 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 any well that serves as a raw water supply
- 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 (see page 16).

Note: If your system is using **point of entry (POE) treatment units** (see page 15) 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. This ensures that a sample is taken from a location downstream of all the other POE treatment units before returning to a location that has already been sampled.

What do 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 14)

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 18) at the same time and location your microbiological distribution samples are taken.** You must record the chlorine residual value clearly on the *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 and the local medical officer of health what chlorine level was recorded on the form.

How soon must samples 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, submit samples to your licensed laboratory and receive the results prior to supplying drinking water to users of the system.

What are my CHEMICAL sampling and testing requirements?

Sampling and testing for organic and inorganic chemicals **other than lead**

Where to sample for all chemicals except lead:

- sample a point where water enters the distribution system, except for trihalomethanes
- trihalomethanes are to 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 three 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
- trihalomethanes (only if your system provides chlorination or chloramination): at least once every three months.

Please see next section for details about sampling for lead.

How soon must samples be taken?

New systems must start sampling in their first year of operation, according to the frequencies described in this guide.

Community sampling and testing for lead

Under the regulation there are two kinds of lead sampling: **standard sampling and reduced sampling**. Reduced sampling can replace standard sampling if the results of your testing meet certain criteria. Systems serving populations less than 50,000 may qualify for an exemption from lead sampling in plumbing. Both are described on page 13.

1. Standard sampling

How often must lead samples be taken?

For standard sampling, samples must be taken twice a year during the following periods:

- once between December 15 and April 15 (“winter testing”) and
- once between June 15 and October 15 (“summer testing”).

If a new system starts operation during a sampling period, they should start sampling during that period. If you start operation in between the sampling periods specified above, you should start sampling during the next sampling period after start-up. After each sampling period, owners must record and submit to the ministry the number of points sampled and the number of points where samples exceeded the standard. Record the results on the *O. Reg. 170/03 Community Lead Testing - End of Period Report* available at Drinking Water Ontario www.ontario.ca/drinkingwater under Forms. Once complete, submit the report within 30 days to the ministry. If you have any questions, call the Public Information Centre at 1-866-663-8477.

Lead samples that are taken outside the sampling period are reportable as long as they are taken according to the regulation.

Where to sample

Owners and operators must take plumbing samples from a mix of private residences (including single family homes and individual units within multi-unit residential buildings) and non-residential buildings (including commercial and industrial properties, designated facilities and public facilities).

You must also take lead samples from the distribution system. If there is no distribution system, samples can be taken from plumbing where necessary to do so. The minimum number of sampling locations depends on the population served by your drinking-water system as outlined in the table below.

If owners cannot secure the required number of sampling points according to the table, they must apply to the director with supporting information and documentation to be considered for partial relief. If a system is granted partial relief, they must continue sampling according to the relief requirements until the relief expires. For more information on relief, go to the Lead and Drinking Water web page on Drinking Water Ontario entitled Information for Municipal and Non-Municipal Owners and Operating Authorities of Drinking Water Systems (www.ontario.ca/drinkingwater) or contact the ministry’s Approvals and Licensing Section at 416-314-4625.

Minimum number of sampling locations for standard sampling			
Population served by drinking water system	Number of sampling points in plumbing serving private residences	Number of sampling points in plumbing not serving private residences	Number of sampling points in distribution system
1-99	5	1	1
100-499	10	1	2
500-3,299	20	2	4

For larger populations please consult the regulation.

How to take samples from plumbing

Step one: Turn on the cold water tap for at least five minutes to flush. The intent of this flushing is to replace the stagnant water within the plumbing serving the sampling tap with water from the water main. It may require longer than five minutes of flushing where the sampling tap is located at some distance from the street. Once flushing is complete and the tap is turned off, the plumbing must not be used for 30-35 minutes. After this time period has passed, the samples can be taken.

Step two: Take two one-litre samples to send to a licensed laboratory for **lead testing** and then, one sample for **pH testing** to be tested on-site. You may use multiple smaller size bottles if provided by the laboratories. Take the samples in the following sequence:

- Put a sampling container for the first one-litre sample under the tap and turn the tap on so that water flows into the container at a rate that is similar to normal use of the tap. Make sure water doesn't splash out of the sampling container. The first one-litre sample must include the first water that comes out when the tap is turned on after the plumbing was not used for 30 to 35 minutes.

This sample must be clearly marked as the first sample.

- Take the second one-litre sample immediately after the first sample (clearly mark it as the second sample) and the third sample immediately after the second sample without turning the tap off or changing its flow rate, and with as little as possible spillage between the samples.

Step three: Conduct the pH test on the third sample immediately after taking the second sample. The pH test results must be given with at least two significant digits (e.g., pH 7.4 or pH 7.0 but not pH 7).

Step four: Record the sampling details for the first and second litre samples on the *Chain of Custody* form that the laboratory provides.

Step five: Record the pH results for your system's records. These results are not sent to the laboratory but must be kept and made available as required by regulation.

Step six: Following the sample handling and transport directions given to you by your licensed laboratory, send the first and second one-litre samples to a licensed laboratory for testing.

Sampling procedures for plumbing systems

You must follow these procedures when taking lead plumbing samples:

- The occupant of the premises must give consent to sampling.
- Samples must be taken from:
 - plumbing that is connected or suspected of being connected to lead service pipes or
 - lead plumbing or plumbing that is suspected of being lead plumbing.
- If this is not reasonably possible, samples may be taken from:
 - plumbing connected to service pipes that are not lead but have lead solder or
 - plumbing that is not lead plumbing but has or is suspected of having lead solder.
- If no such plumbing exists, then samples may be taken from any other plumbing connected to the system.
- Samples must not be taken from more than one point in the same building, unless the

number of buildings served by your system is less than the number of samples required for standard sampling.

- If your system serves fewer than 100 people and the number of buildings served by the system is less than five, take one lead sample per building, even if this number is lower than the number of locations on the sampling table. For example, if your system serves only three buildings with private residences, take one sample per building for a total of three samples.
- If your system serves 100 or more people and the number of buildings served is less than the number of samples required under the standard sampling table, more than one lead sample can be taken per building in order to meet the requirement. For example, if your system serves 200 people, the table requires you to sample from 10 locations.

If your system only serves three buildings with private residences, you can sample from more

than one location per building to meet your requirement of 10 samples.

- If possible, plumbing samples must be geographically dispersed.
- All samples to be collected within a building must be collected from a cold water tap.
- Samples are to be collected from a kitchen tap if the building has a kitchen tap, or a tap commonly used to provide water for human consumption if the building has no kitchen tap.
 - If an aerator is installed on the tap, it is not to be removed from the tap.
 - If a treatment device, for example a filter, is installed on or at the tap, bypass the device without removing it if possible.
 - If bypassing is not possible, another kitchen tap or one used to provide water for human consumption may be used.
- If every kitchen tap and tap used for human consumption has a treatment device and none can be bypassed, the sample must come from a tap as described previously, but the device must be removed before sampling and before flushing the tap.

Sampling procedures for distribution systems

Distribution system sample(s) for lead testing must be taken on the same day(s) when plumbing sample(s) are taken, and must be taken from locations as close as reasonably possible to the locations where plumbing samples are taken.

Distribution samples cannot be taken from points in the distribution system where lead levels are likely to be elevated due to materials such as hydrants that are located at or near the sampling point. This is to ensure that samples reflect the quality of water provided to buildings served by the system.

If hydrants contain lead-based materials, select another location or flush the hydrant thoroughly (five to ten minutes) to ensure that lead levels in the sample water are not elevated from the hydrant materials. Other locations can include distribution sampling taps or, if none of these are available, plumbing taps that best represent the water quality in the distribution system. These samples should also be taken immediately

after flushing the tap, to ensure the quality of water sampled at the tap is representative of the water in the distribution system.

If there is no distribution system, you are not legally required to collect a distribution sample. However, it is strongly recommended that you take a sample from the plumbing in place of the distribution sample, in order to ensure that there are no high concentrations of lead in the drinking water.

How to take samples from distribution systems

Step one: Flush the point from where samples are to be taken until the quality of the water at that point is representative of the quality of the water in that part of the distribution system.

Step two: Take three samples of the water from the sampling point. These samples may be of any volume specified by the licensed laboratory. The first is for **lead testing**, the second for **total alkalinity** testing and the third for **pH testing**.

Step three: Following the collection of the samples, conduct the pH test immediately on the third sample.

Step four: Record the sampling details for the first two samples on the *Chain of Custody* form that the laboratory provides. The first sample (for lead testing) must be submitted to a licensed laboratory. The second sample (for total alkalinity testing) may be sent along with the sample for lead testing to the same laboratory. However, there is no legal requirement for alkalinity to be tested by a licensed laboratory. This test may be conducted by a licensed laboratory or by a certified operator, water quality analyst or a person who, in the preceding 36 months, has successfully completed a course approved by the ministry that relates to the operation and maintenance of drinking water systems, including the conduct of an alkalinity test.

Step five: Record the pH results for your system's records. These results are not sent to the laboratory but must be kept and made available as required by regulation.

Who can take the lead samples and conduct pH tests?

The sample collection and pH testing for the community lead testing program must be done by a person with any one of the following qualifications:

- a certified operator
- a water quality analyst
- a trained person (who has completed in the preceding 36 months “Operation Of Small Drinking Water Systems” course offered by the Walkerton Clean Water Centre, www.wcwc.ca or 1-866-515-0550, or other course approved by the ministry)
- a person who works under the general supervision of a certified operator (and is trained by a certified operator to take samples and conduct pH tests; the results of pH tests must be reported to a certified operator)
- a medical officer of health or a public health inspector (as defined in the Health Protection and Promotion Act).

2. Reduced lead sampling

The standard for lead is 0.010 milligrams per litre which is equivalent to 10 micrograms per litre. A system serving a population of less than 50,000 people may be able to reduce the number of sampling locations and the frequency of sampling and testing if:

- in TWO consecutive “winter” and “summer” periods of testing that are done over one year, not more than 10 per cent of all plumbing sample results exceeded 5 micrograms per litre and no individual plumbing sample results exceeded 10 micrograms per litre, or

- in FOUR consecutive rounds of testing (two “winter” and two “summer” periods) not more than 10 per cent of all plumbing sample results exceeded 10 micrograms per litre.

Only the higher of the two sample results, that are required to be obtained from each sampling point in the plumbing, is considered for the purpose of qualifying for reduced sampling.

If the system meets the criteria above, the testing frequency drops to two consecutive periods of semi-annual testing **once every three years** AND the number of locations is reduced as shown in the table below.

When would reduced sampling no longer apply?

The system must revert back to standard sampling if more than 10 per cent of all the plumbing samples taken during any one round of testing (i.e. December to April **or** June to October) exceeded the standard. Of the two samples taken on the same day from the same plumbing location, the sample with the lower concentration of lead is not considered in the calculations.

3. Exemption from lead sampling in plumbing

Your drinking water system is eligible for an exemption from lead sampling in plumbing (only available to systems serving less than 50,000 people) if:

- You are already doing reduced sampling or have been doing plumbing sampling according to an approved relief granted by the ministry and
- Not more than 10 per cent of plumbing results exceeded the lead standard from two

Reduced Sampling - minimum number of sampling locations			
Population served by drinking water system	Number of sampling points in plumbing serving private residences	Number of sampling points in plumbing not serving private residences	Number of sampling points in distribution system
1-99	3	0	1
100-499	5	1	1
500-3,299	10	1	2

For larger populations please consult the regulation.

consecutive periods of reduced sampling (both “winter” and “summer”) rounds.

Ministry approval is not required for this exemption. It is automatic once the test results have been submitted to the ministry. Once exempt, if future changes impact water chemistry, lead testing in plumbing could be reinstated by the ministry.

Distribution sampling is still required as follows:

- Sample for pH and alkalinity every “winter” and “summer” period
- Sample for lead once every three years, both “winter” and “summer” periods.

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

Treatment basics

Below is a 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 a licensed engineering practitioner about the different types of treatment technologies that are available to meet your specific treatment requirements. See the Engineering Evaluation Report section on page 16.

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 licensed engineering practitioner will advise you on the most appropriate technology for your system.

Primary disinfection inactivates/removes pathogens before the water is delivered to the first consumer. This usually is accomplished by filtration and chlorine or by filtration and ultraviolet (UV) light or chlorine only, depending on the quality of the raw water source.

- 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 units. 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 required.
- 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 POE 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 a *Notice of Point of Entry Disclosure for Your Drinking Water Users* available at www.ontario.ca/drinkingwater under Forms.
- 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**. This includes removing or inactivating at least 99 per cent of viruses in accordance with the *Procedure for Disinfection of Drinking Water in Ontario* available at www.ontario.ca/drinkingwater under Guidance.

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 removing or inactivating 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.ontario.ca/drinkingwater under Guidance.

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.

Can my system obtain exemptions from treatment?

Treatment exemptions for wells

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 through a *Well Technician's Notice*, signed by one of the following: a person who holds a well technician license for well drilling, a licensed engineering practitioner, 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 meets 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.ontario.ca/drinkingwater under Forms or by calling the ministry's Public Information Centre at 1-800-565-4923. Submit the notice either via email to Reg170_formsubmission.moe@ontario.ca or by fax to 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. For example, if the well began operations on June 14, 2010, the notice of microbiological test results would be required on June 30, 2011. 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.ontario.ca/drinkingwater under Guidance.

Reduced treatment for GUDI systems

If your drinking water system is served by a well that is GUDI, it is normally considered as surface water and you are required to provide chemically assisted filtration and disinfection or equivalent treatment. However, your well may be considered a secure well and you would therefore be eligible for reduced treatment if you do not serve a designated facility and you have submitted a Well Technician's Notice to the ministry. The notice must 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.

Note: Your exemption is no longer valid if either of the following are detected in any corrective action resamples of drinking water from the distribution system or plumbing:

- *E. coli* or
- **Total coliforms on any two separate occasions within a 12 month period.**

You will have 90 days to install the full treatment that is required by the regulation.

Engineering Evaluation Report

When installing treatment equipment under this regulation, a licensed engineering practitioner with experience in sanitary engineering or a person under his or her supervision must be retained. A licensed engineering practitioner is a person who holds a license, limited license or temporary license under the Professional Engineers Act. This includes:

- people who are fully licensed to practice engineering in Ontario or
- those who are allowed to practice engineering within a limited scope, including writing *Engineering Evaluation Reports* (EER) or
- temporary license holders who have been licensed from another jurisdiction and are here to practice engineering for a specific period of time.

Practitioners can tell you which type of license they hold.

They assess your system in order to determine the proper treatment solution that is needed for compliance with the regulation. The licensed engineering practitioner must then prepare an EER. The report must state:

- that they, or a person under their supervision, has visited your drinking water system and
- that in the licenced engineering practitioner's opinion, all equipment needed to comply with the treatment requirements and with the operational checks is being provided.

The report must also set out the reasons for their opinion, must specify the category of the drinking water system, and must include a maintenance schedule for equipment to be inspected, tested and replaced. Names of some resources that may assist you finding a licensed engineering practitioner are available at www.ene.gov.on.ca/publications/5677e.php or contact the Consulting Engineers of Ontario at 1-800-339-3716.

Systems receiving transported water are not required to have an EER since the water has already been treated.

Existing systems

The EER must have already been submitted to you within 30 days of the deadline for installation of treatment quipment.

For new and altered systems

An EER must be completed and submitted to you within 30 days after a new system begins operation or an alteration is completed on an existing system.

You must submit written notice to the ministry within seven days of the day that the EER is required using an *Engineering Evaluation Report* Notice available on the ministry's Drinking Water Ontario website at www.ontario.ca/drinkingwater under Forms. Do not submit the actual EER to the ministry, just the notice via email through Reg170_formsubmission.moe@ontario.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.

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 Water Wastewater Certification Office at www.owwco.ca or by calling 416-231-2100 or 1-877-231-2122.

Despite these requirements, a person working under the supervision of a certified operator (referred to as a supervised person) 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.ontario.ca/drinkingwater under Guidance.

Operational test basics

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

See the ministry fact sheet, *Tips for Maintenance of Small Drinking Water Systems*, for more detailed information. Visit www.ontario.ca/drinkingwater under Guidance.

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 www.ontario.ca/drinkingwater 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 licensed engineering practitioner 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: Make required notification of adverse test results and other problems

Adverse test results and other problems related to the drinking water system (not lead-testing samples taken from plumbing)

An adverse test result is one that is prescribed under section 16-3 of Schedule 16 of O. Reg. 170/03. This includes a result that exceeds any of the standards prescribed by Schedule 1, 2 or 3 to the Ontario Drinking Water Quality Standards if the result is from a sample of drinking water. O. Reg. 169/03 (the Ontario

Drinking Water Quality Standards) can be found at www.e-laws.gov.on.ca. Possible adverse test results or other problems and related corrective actions are summarized in the table on pages 21-22. Adverse test results and other problems related to improper disinfection are required to be reported to the authorities.

Your laboratory will notify you if you have an adverse test result.

What to do if you have an adverse test result other than lead

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, you are required to immediately contact your local medical officer of health AND the ministry's Spills Action Centre (SAC) at **1-800-268-6060**.

You may be informed about an adverse test result from:

- your licensed laboratory or
- 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 according to the ministry's *Procedure for Disinfection of Drinking Water in Ontario*. This document can be found at www.ontario.ca/drinkingwater.

Note: As of December 14, 2009, systems receiving transported water that are required to take chlorine residual tests must report low test results to the local medical officer of health, the Spills Action Centre and the operator of the designated facility, if they serve such a facility.

See next page and Schedule 16, section 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 all of the following:

- 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 unit can be found in your blue pages or at www.health.gov.on.ca/english/public/contact/phu/phu_mn.html
- the ministry's Spills Action Centre (telephone 1-800-268-6060); the Spills Action Centre is open 24 hours/day and 365 days/year
- 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 all of the following:

- the local medical officer of health by fax or in person
- the ministry's Spills Action Centre by fax at 1-800-268-6061
- 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 at www.ontario.ca/drinkingwater under Forms.

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, within seven days of resolution you must complete and submit Section 2(B) Notice of Issue Resolution, on the same *Adverse Test Results and Other Problems* notice form.

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'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.

Exceedances of lead in plumbing samples

When a laboratory finds an exceedance of lead or other chemical standards in a sample of water taken from **plumbing** for lead testing in accordance with the requirements of Schedule 15.1, the notification requirements are as follows:

- The **laboratory** doing the analysis is required to provide a written report (delivered in person, by fax or email) within 24 hours to the:
 - local medical officer of health
 - ministry's Spills Action Centre
 - drinking water system **owner** or operating authority and
 - interested authority in the case of a designated facility.
- The drinking water system **owner** must give to the local medical officer of health a copy of the report received from the laboratory within 24 hours of receiving the report.
- You must report all adverse results during and outside of the "winter" and "summer" sampling periods, as long as they are part of your community sampling and were taken in accordance with the regulation.
- The drinking water system **owner or operating authority** is also required to give to the occupant of the premises where plumbing samples were taken a copy of all test results received from the

laboratory within seven days of receiving the results from the laboratory. This should include an indication of whether the results exceed any standard in Schedule 2 of the Ontario Drinking-Water Quality Standards (O. Reg. 169/03). It should also include advice given by the public health inspector to the owner/operator about what steps the occupant should take to address any exceedances and a telephone number for enquires about the report. Within seven days, the system owner or operating authority must also report exceedances to owners of multi-residential buildings where the sample was taken from a unit in the building.

Note: if you have adverse test results for lead from distribution system samples, see the previous section about adverse result notification.

Step 7: Take corrective action if required

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 take the proper set of corrective actions following the specified adverse result or problem (refer to the chart beginning on the next page). There is also a ministry fact sheet, *Corrective Actions to Take if Your Drinking Water Becomes Contaminated* at www.ontario.ca/drinkingwater under Guidance.

You can also contact your local Ministry of the Environment office for further advice on any adverse test results. Visit www.ontario.ca/drinkingwater under Contact Us.

If any of the results for samples of water taken from plumbing exceed lead or any drinking water standard, the local medical officer of health will direct steps to be taken by owners and operators in order to address lead exceedances in plumbing. These steps must be followed if directed by the local medical officer of health, and may include providing additional information to occupants of the affected premises so that they know the appropriate actions to take to reduce any potential health risks.

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* available on Drinking Water Ontario at www.ontario.ca/drinkingwater under Guidance

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
<i>E. coli</i> 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, bring water to a rapid boil for at least one minute before use.	Immediately resample and test (see Note on page 23). 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 free chlorine residual or combined chlorine concentration in the affected parts of the system and continue to resample and test until <i>E. coli</i> is no longer detected in two consecutive sets of samples taken 24 to 48 hours apart, or as otherwise directed by the local medical officer of health.
Total coliforms are detected in a test result from a drinking water sample.	Resample and test as soon as reasonably possible (see Note on page 23).	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 free chlorine residual concentration in the affected parts of the system and continue to resample and test until total coliforms are no longer detected in two consecutive sets of samples taken 24 to 48 hours apart.
Sodium concentration that exceeds 20 mg/L and a report of an adverse test result has not been made in the previous 57 months.	Resample and test as soon as reasonably possible (see Note on page 23).	If resample confirms exceedance, consult with the local medical officer of health on further actions.	
Water not disinfected properly is directed to users.	Immediately restore the disinfection, if possible, before notifying users.	Immediately take all reasonable steps to notify all users to use an alternate source of drinking water or, if no alternate source is available, bring water to a rapid boil for at least one minute before use.	Take any other steps directed by the local medical officer of health.

Adverse test result or other problem	First step	Second step	Third step
<p>If filtration is required, the turbidity in filter effluent is more than 1.0 NTU.</p>	<p>Immediately check the turbidity monitoring equipment and correct any problems identified. If no problems are identified:</p> <ul style="list-style-type: none"> • 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. 	<p>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, bring water to a rapid boil for at least one minute before use.</p>	<p>Follow the manufacturer's recommendations for servicing the filtration equipment upstream of the location, and flush the distribution system and plumbing.</p> <p>Take any other steps directed by the local medical officer of health.</p>
<p>If secondary disinfection is required, free chlorine residual is less than 0.05 mg/L.</p>	<p>Immediately flush the distribution system and any plumbing, and restore secondary disinfection to ensure 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.</p>	<p>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.</p>	<p>Take any other steps directed by the local medical officer of health.</p>
<p>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).</p> <p>Presence of a pesticide as reported by the licensed laboratory.</p>	<p>Resample and test as soon as reasonably possible (see Note on page 23).</p>	<p>Consult with the local medical officer of health and take any steps directed by them, if the resample confirms:</p> <ul style="list-style-type: none"> • an exceedance of a chemical or radiological parameter based on the standard in Schedule 2 or 3 of the Ontario Drinking Water Quality Standards, or • that a pesticide has been detected. 	

Note: To “resample and test” for a microbiological parameter means that you must immediately collect and transport a set of at least three 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. 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 the Public Information Centre at 1-800-565-4923 or from your local ministry district office.

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.

