

Small Drinking Water Systems: Response to Adverse Events

Working Together to Safeguard our Health

What is an adverse event and how do I respond?

Did you know that effective December 1, 2008, the Ministry of Health and Long-Term Care (MOHLTC) has oversight of small drinking water systems (SDWS) in Ontario? The MOHLTC has prepared a brochure – *An Introduction to Operating a Small Drinking Water System* to help you to become familiar with the changes to Ontario’s drinking water legislation. Reading this brochure is a good beginning.

Under the Health Protection and Promotion Act, Ontario Regulation 318/08 (*Transitional – Small Drinking Water Systems*) and Ontario Regulation 319/08 (*Small Drinking Water Systems*) as an owner or operator of a small drinking water system (SDWS), you are required to provide users with safe drinking water at all times.

When something goes wrong with your SDWS, the event may be referred to as either an adverse observation or an adverse test result, and specific notification requirements and corrective actions will be required. The public health inspector will assist you in determining the appropriate response, which may include actions such as:

- notifying the users of the SDWS;
- taking necessary steps to correct the problems; and
- notifying the local medical officer of health (MOH) in the health unit that you operate your SDWS.

To find out more about the regulatory requirements for your SDWS, contact the local public health unit to consult with a PHI, obtain fact sheets or other SDWS information.

What is an adverse observation?

An “adverse observation” means that you or an employee of the SDWS for which you are responsible observed an event (other than an adverse test result) that suggests that your SDWS may not be providing water that is safe for the users to drink. Some of these events may include, but are not limited to:

- Inadequate filtration of the water entering the system
Turbidity (cloudiness) is an indication of how heavily contaminated the water is. Therefore, if turbidity is seen, the existing treatment system may not be providing adequate disinfection and may require adjustment of the chemical levels or other action.
- Low disinfection levels in the distribution system
Proper disinfection levels throughout your distribution system will prevent build-up of biofilm. If biofilm builds up, it can reduce the effectiveness of the disinfectant used to protect the water from the growth or re-growth of microorganisms.
- Contamination of the SDWS due to the possibility of back siphonage
If there is a cross connection in the

pipings of your SDWS, during low pressure situations, the drinking water may become contaminated with waste water or other untreated water.

For example: During low pressure situations, a hose left in a sink of dirty water could siphon into the drinking water system. You should become familiar with these types of situations and prevent them from occurring. Installation of a backflow prevention device is a good safeguard. Check with your local building department to determine if these devices are required under local bylaws.

◦ Following a site-specific risk assessment, the public health inspector will issue a directive for each SDWS, which may include a requirement to install a backflow prevention device where warranted.

What is an adverse test result?

An “adverse test result” means a drinking water test result that shows any of the following outcomes that differ from the Ontario Drinking Water Quality Standards (under Ontario Regulation 169/03 under the *Safe Drinking Water Act, 2002*) or from a directive issued under the new SDWS regulations:

a) Laboratory testing:

Microbiological parameters:

- Your water test results should be free of *Escherichia coli* (*E. coli*) and total coliforms bacteria.
- Under the SDWS regulations, SDWS owners and operators are required to ensure that at least one sample is taken every three months for *E. coli* and total coliforms and submitted for testing to a laboratory licensed or approved by the Ministry of the Environment (MOE).

- The presence of these organisms is an indication of recent fecal contamination or entry of surface water and a warning that there is a risk to the health of users of your SDWS.
- If you are using a surface water source (lakes or river) or a non-secure groundwater source (dug or bored well), the PHI may require you to test more frequently for these micro-organisms or for additional micro-organisms such as bacteria, viruses or protozoa.

Chemical or radionuclide parameters:

- Sometimes there may be high concentrations of chemicals (nitrate or lead) or radionuclide (uranium or radon) parameters in your source water. These may occur naturally or as a result of an accident such as a spill.
- The PHI may include requirements in the directive for specific chemical or radionuclide testing based on the site-specific risk assessment.
- Examples of the maximum allowable concentrations in drinking water are 10.0 milligrams per litre (for nitrate) and 0.01 milligrams per litre (for lead).

b) Disinfection residuals:

Where the SDWS is required to provide secondary disinfection, the test results should be in accordance with the type of disinfection that is used. The use of chemical disinfection will inactivate bacteria present in the water and prevent any re-growth of bacteria or biofilm during storage.

Free chlorine residual (FAC):

If the system is chlorinated, the FAC concentration must be at or above 0.05

milligrams per litre collected from plumbing or the distribution system.

Combined chlorine residual:

If the system is disinfected by chloramination, you must maintain the combined chlorine residual concentration of at least 0.25 milligrams per litre and the concentration of free chlorine residual of at least 0.05 milligrams per litre in the plumbing and distribution system.

Who should I notify of any adverse test results or observations?

- SDWS operators are required to immediately report every adverse observation and every adverse test result to the local medical officer of health (MOH) and to the owner of the system. The immediate notice to the MOH must be done by speaking in person or by phone with the MOH, the office of the MOH, or the after-hours on-call person. A follow-up written notice within 24 hours must also be sent to the MOH.
- Both the immediate report and the 24-hour written notice must specify the adverse result or observation, the actions being taken in response, and whether any required corrective action (specified in the regulations) is being taken.

General corrective actions

In addition to the above general notification requirements, the SDWS regulations also include corrective actions and notification requirements according to the specific adverse result or observation in question. Some examples are as follows.

1. Presence of E. coli:

- a) Immediately notify all users of the drinking water system to use an alternate source of drinking water or, if none is available, to bring their water to a rapid, rolling boil for at least one minute before use.
 - b) Immediately resample and test.
- If your SDWS uses chlorine, immediately increase the chlorine dose and flush the system to ensure there is adequate chlorine residual.

- Maintain the residual until two consecutive water samples taken 24 - 48 hours are free of E. coli.

- If your SDWS does not use chlorine, immediately follow the steps for temporary disinfection of the system as required by the MOH (consistent with the Procedure for Corrective Action for Small Drinking Water Systems that are Not Currently Using Chlorine).

2. Presence of total coliforms:

- a) Resample and test as soon as possible

- If your SDWS uses chlorine and total coliforms are still detected upon resampling, immediately increase the chlorine dose and flush the system to ensure there is adequate chlorine residual.

- Maintain the residual until two consecutive water samples taken 24 - 48 hours apart are free of total coliforms.

- If your SDWS does not use chlorine.

- immediately follow the steps for temporary disinfection of the system as required by the MOH (*consistent with the Procedure*



for Corrective Action for Small Drinking Water Systems that are Not Currently Using Chlorine).

3. Improper disinfection

- Immediately restore the disinfection
- Immediately notify all users of the drinking water system to use an alternate source of drinking water or, if none is available, to bring their water to a rapid, rolling boil for at least one minute before use
- Immediately notify the MOH.

4. Other Adverse Events

- When an adverse event is not a result of bacterial contamination, you may need to apply different corrective measures than those listed above. Some adverse events may be caused by any of the following:
 - Chemical spill that enters the source water that supplies your SDWS (e.g., diesel or other petroleum-based products).
 - Agricultural products that enter your SDWS source either from run-off or by leaching into the aquifer that supplies your SDWS.
 - Broken pipes or water mains that become contaminated.
 - Naturally-occurring chemical or radiological agents such as nitrate, lead or uranium.
- At such times, you must notify your local public health unit and follow any steps required by the MOH or PHI to resolve the problem.

Instructions from the medical officer of health

In addition to the specific regulatory requirements for responding to adverse observations and adverse test results, the MOH or PHI in the health unit where you operate your SDWS may issue additional requirements to correct the problem. You must take such steps as are directed by the MOH or PHI.

Resolution

Once you have taken the necessary steps to remedy the problem that caused the adverse test result or observation, you must provide a written notice to the MOH summarizing:

- actions that were taken to correct the issue; and
- the results that were achieved.
- Remember, if you are uncertain of what actions to take, immediately contact the local health unit and speak with a PHI.

Note:

With respect to corrective action that arises from a water sample test for a microbiological parameter, “**resample and test**” means:

- to take a set of water samples, at approximately the same time, with,
 - at least one sample from the same location as the sample that gave rise to the corrective action,

° at least one sample from a location that is a significant distance upstream from the location described in a), if that is reasonably possible, and

° at least one sample from a location that is a significant distance downstream from the location described in a), if that is reasonably possible, and

- conduct, on the samples taken, the same test that gave rise to the corrective action.

Where can I find additional information?

Please remember...

This fact sheet is only a summary of your responsibilities as the owner or operator of a SDWS and is not a substitute for legal advice. For a more complete understanding of your legal responsibilities as an owner or operator, refer to Ontario Regulation 318/08 and Ontario Regulation 319/08 or any directives issued on your system.

In addition, you should become familiar with the procedure documents produced to help you efficiently operate a SDWS:

- Procedure for Disinfection of Drinking Water in Ontario.
- Procedure for Corrective Action for Small Drinking Water Systems that are Not Currently Using Chlorine.

For general information about well water safety, ask your health unit staff for a copy of:

- Keeping Your Well Water Safe to Drink: An information kit to help you care for your well.

You may also find additional information on the following Ontario ministry websites:

Acts and Regulations:

www.e-laws.gov.on.ca/index.html

Ministry of Health and Long-Term Care (MOHLTC):

www.health.gov.on.ca

- Current list of local public health units:

www.health.gov.on.ca/english/public/contact/phu/phuloc_mn.html

Ministry of the Environment (MOE):

www.ene.gov.on.ca/en/index.php

- Current list of licensed private laboratories:

www.ene.gov.on.ca/en/water/sdwa/licensedlabs.php

Ministry of Agriculture, Food and Rural Affairs (OMAFRA):

www.omafra.gov.on.ca/english/

