

**EMERGENCY RESPONSE AND
CONTINGENCY PLANNING FOR
SMALL WATER SYSTEMS**

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**HEALTH PROTECTION BRANCH
MINISTRY OF HEALTH**

**A Step-by-Step Guide to Creating an
Emergency Response and Contingency Plan
for Your Small Water System**



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1 INTRODUCTION

Section 10 of the *Drinking Water Protection Act* requires all prescribed water supply systems to have an **emergency response and contingency plan (ERCP)**. It should be available in case an emergency threatens the safety of the system's drinking water and puts consumers at risk of waterborne diseases and other drinking-water-related hazards.

This guide is designed to be used by operators of small water systems. In B.C., these are water supply systems serving up to 500 individuals during any 24-hour period. The guide will help you – as an operator of a small water system – develop your own emergency response and contingency plan within an overall emergency management framework.

The guide can be used as a workbook and includes:

- The rationale for emergency management and an emergency response and contingency plan.
- Activities and guidance for helping you know your risks.
- Guidance for developing your emergency response and contingency plan.
- Fill-in-the-blank templates you can use to get you started on a plan in minimal time.
- Examples of common emergencies and specific responses to them.
- Checklists to help guide your planning activities, including a master checklist (see p. 6).
- Advice to help you during response and recovery.

Any questions about your water supply system should be directed to your health authority.

Check out these boxes throughout the guide for additional information.

TIPS

The blue boxes in this guide contain tips to aid you in planning.

OTHER ACTIONS

The green boxes have information on other actions you can take to prepare for an emergency.

2 WHAT IS AN EMERGENCY?

Are you prepared for a pump failure? Do you know what to do in case of flooding? Will your water system be able to cope if your operator suddenly resigns? As a water supplier, you should ensure that you are always providing the best and safest possible drinking water, but what do you do when something happens that jeopardizes your system?

An emergency is an unexpected event (natural-, technological- or human-caused) that has the potential to disrupt the operation of your water supply system and affect the safety of your community's drinking water. Many types of emergencies could affect the quality and/or quantity of water in your system, for example:

- Technological: power outage/disruption, pump failure, broken water main, chlorine gas leaks, backflow conditions, leaking pipes.
- Hydrological: flooding, drought (loss of source), severe weather (e.g., rain and snow), storm surges.
- Source contamination: Leakage of gas or other hazardous material into a water course or ground water recharge zone, animal activity near intake, failing septic system close to source.
- Fire: wildfire, interface fire, using water supply to fight a fire, fire at the water supply system.
- Landslides: mudslide or avalanche above intake.
- Human related: mistakes, intentional (e.g., vandalism and terrorism), staff extended vacations, resignation, illness or death.
- Geological: earthquake, volcanic activity, tsunami.
- Spills of disinfected water into fish-bearing streams.

These events generally require immediate attention with a set of coordinated activities to reduce risk. You need to have the ability to anticipate these events and respond quickly.¹ Your best defence is a good offence through emergency prevention and preparation.

2.1 EMERGENCY MANAGEMENT

Emergency management is preparing your water supply system, operators and community of water users for an emergency. The goals of emergency management are to anticipate emergencies and:

- Prevent the emergencies you can prevent.
- Plan for how you will handle the ones you cannot prevent.
- Respond (using your plan) to an event quickly, accurately and efficiently.
- Recover as quickly and efficiently as possible.

Prevention should be part of your everyday activities through routine monitoring and maintenance, ensuring your system is operating at top efficiency and effectiveness at all times. Your emergency response and contingency plan

¹ Emergency Management Policy Directorate. Government of Canada. (2011). *An Emergency Management Framework for Canada*. Second Edition: <http://www.publicsafety.gc.ca/cnt/rsracs/pblctns/mrgnc-mngmnt-frmwrk/index-eng.aspx>.

(ERCP) is the key emergency-planning activity. The ERCP is a written document that outlines what to do and whom to call in case of an emergency. This will minimize panic and confusion. Also, it will increase your ability to respond quickly, accurately and efficiently, to reduce the impact the event has on your system and water users' community.

ROUTINE MONITORING AND MAINTENANCE, AND ASSET MANAGEMENT

Regularly monitoring your system's operations and documenting the results will allow you to become familiar with the system's normal operating conditions. This will help you recognize when something is amiss and prompt you to take action to correct it before it becomes a problem. Monitoring involves routinely and regularly:

- Touring your source to look for signs of contamination.
- Inspecting your system components (e.g., intake/well, treatment equipment, storage and distribution system).
- Taking water samples.
- Monitoring turbidity levels.
- Checking chlorine levels.
- Monitoring pressures.

You should also set up a regular schedule for inspecting and maintaining for your system. This can include:

- Checking expiry dates on chemicals.
- Checking calibrations on your digital equipment.
- Replacing UV lamps, pumps, pipes and other equipment as needed.
- Routine flushing and backwashing.

Your maintenance activities contribute to your asset management plan: a defined plan for rehabilitating and replacing system components. As systems age, they become increasingly at risk for breaches in integrity. Following a defined asset management plan is one of the most important things you can do to manage this risk.

2.1.1 WHAT IS YOUR LEGISLATIVE RESPONSIBILITY?

Section 10 of the *Drinking Water Protection Act* requires all prescribed water supply systems to have an ERCP. Section 13 of the *Drinking Water Protection Regulation* provides further details that must be followed (see section 4.2.1 of this guide). This plan should be available in case of an emergency that may threaten the safety of your system's drinking water.

Not only is it your legislative responsibility to have an ERCP, but it is also good practice. Your ERCP will help you reduce or eliminate the risk of the emergency having a negative health impact on your consumers. It may even save you money by preventing further complications.

3 YOUR EMERGENCY RESPONSE: MASTER CHECKLIST

3.1 PLANNING FOR AN EMERGENCY

- STEP 1: Know your risks.** (p. 5)
 - Complete a source-to-tap assessment.
 - Identify local geographic hazards and weather conditions.
 - Review the security of your water supply system.
 - Make a list of potential emergencies (Appendix B).
- STEP 2: Make an emergency response and contingency plan.** (p. 7) (See Appendices A, B and C for templates.)
 - Create an emergency contact list (Table 1, p. 9 / Appendix A).
 - Make a list of the potential emergencies you have identified and planned responses (Appendix B).
 - Identify communication protocols (Table 2, p. 12).
 - Develop instructions for operating equipment (Appendix C).
 - Create maps of your system (Appendix C).
- STEP 3: Communicate the plan.** (p. 16).
- STEP 4: Train staff.** (p. 16).
- STEP 5: Secure your finances.** (p. 17)
 - Make sure you have an emergency fund.
 - Make sure you have insurance.
- STEP 6: Update your plan annually.** (p. 17)
- STEP 7: Response.** (p. 18).
 - Respond to the emergency using your plan.
- STEP 8: Recovery.** (p. 18)
 - Work with your drinking water officer and other experts.
 - Document the incident (include actions taken).
 - Update your plan.

HAZARD VS. RISK

A **hazard** is anything that has the potential to disrupt the water supply (e.g., flooding and pump failure). **Risk** is an assessment of the likelihood of a hazard occurring vs. the potential magnitude of impact.

3.2 OTHER ACTIVITIES

- Schedule for routine monitoring.
- Schedule for routine maintenance.
- Develop an asset management plan.
- Purchase back-up equipment/tools and create an inventory.
- Secure the physical integrity of the system.
- Prepare your community.
- Gather emergency supplies and ensure CPR training is available for staff.

4 PLANNING FOR AN EMERGENCY

4.1 STEP 1: KNOW YOUR RISKS

STEP 1 in emergency planning is identifying all the physical and administrative vulnerabilities of your water supply system. This allows you to tailor your planning activities to the system's particular set of circumstances.

In other words, what emergencies or hazards could affect your system? What is their potential impact? For example, if your system uses pumps, you should consider how a pump failure would affect your system.

If you use surface water, or ground water at risk for containing pathogens (GARP), you should think about the impact of a source contamination (chemical and biological).

The following sections focus on actions you can take to identify potential hazards to your water supply system.

4.1.1 COMPLETE A SOURCE-TO-TAP ASSESSMENT

Completing a source-to-tap assessment is one of the most important things you can do to guide your prevention and preparedness activities.

A source-to-tap assessment will systematically take you through all aspects of your system (e.g., ownership and management structure, operations, source, treatment system and distribution system). It will also help you identify potential hazards, assess related risks and develop an action plan for reducing risk.

The Ministry of Health has produced tools to help you complete a source-to tap assessment. Two are designed to be easy to use by small water systems:

- *Drinking Water Source-to-Tap Screening Tool*
- *Water System Assessment User's Guide*

These tools are posted online at:

<http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/resources-for-water-system-operators>.

Most operators should be able to complete each of these tools in a reasonable amount of time without the additional cost of hiring a consultant.

The *Drinking Water Source-to-Tap Screening Tool* is the easiest to use. It is a simple survey that will help you identify your system's vulnerabilities in order to focus your prevention and preparation activities.

The *Water System Assessment User's Guide* takes more time to complete. However, it will also help you identify and prioritize your prevention and preparation activities. Talk to your local drinking water officer about which tool would best suit your needs.

PREVIOUS EMERGENCIES?

Make sure you check your log book for previous emergencies. After all, if it has happened before, it could happen again.

4.1.2 OTHER ACTIVITIES

IDENTIFY LOCAL GEOGRAPHIC HAZARDS AND WEATHER CONDITIONS

Are there local geographic hazards or weather conditions (e.g., weather patterns, and geological and hydrological activity) that could present a threat to your water system? For example, the Okanagan has a history of extreme wildfires, western Vancouver Island is at risk for a major earthquake and tsunami, and northern B.C. can experience extreme cold in the winter. These hazards and conditions can negatively impact your source – and the integrity of the water supply system itself – by threatening or destroying system components and/or impeding your ability to physically attend to the system.

Knowing local potential hazards can help you focus your ERCP activities on natural events that have a high likelihood of affecting your ability to provide quality drinking water to your customers. Your local municipality and/or regional district may already have an ERCP. They should provide a list of the most likely/common geographic hazards or conditions that could have a negative impact on your system.

REVIEW THE SECURITY OF YOUR WATER SUPPLY SYSTEM

Looking at source protection issues will be part of your source-to-tap assessment, but what about the security of the physical infrastructure of the water supply system itself? Is your water supply system vulnerable to tampering by animals or unauthorized people? Is your infrastructure vulnerable to damage from geographic hazards or weather? Make sure you identify how various emergencies could affect your physical infrastructure.

4.1.3 MAKE A LIST OF POTENTIAL EMERGENCIES

Using the template in Appendix B, list the potential emergencies you have identified. This will be useful when you develop your emergency response and contingency plan (STEP 2, section 4.2, below). Attach another sheet if you need more space. Appendix B also contains common examples of potential emergencies with example responses.

DROUGHT PROTOCOLS

Many areas of B.C. experienced extreme drought in the summer of 2015, and scientists predict drought will become more common. Will your water supply system be at risk? Do you have drought protocols? Do your water users know what to do during a drought?

Get more information at the Drought Information website, which includes *Dealing with Drought: A Handbook for Water Suppliers in British Columbia*:

<http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/drought-flooding-dikes-dams/drought-information>.

4.2 STEP 2: MAKE AN EMERGENCY RESPONSE AND CONTINGENCY PLAN

Now that you know the potential emergencies that could affect your water supply system, you should start making a plan regarding how you are going to deal with them. This is your emergency response and contingency plan (ERCP). It should outline what to do and whom to call in case of any emergency that could disrupt your water supply system (e.g., a power outage or drop in water pressure) or contaminate it.

Conditions requiring specific actions (e.g., boil water notifications, requests for assistance, and instructions for tapping into alternate sources) should be identified in advance because you do not want to waste time wondering what to do when the emergency happens. This plan should be reviewed regularly (e.g., annually) and revised as necessary.

As you go through STEP 2, fill out the templates in Appendices A, B and C, which are designed to help you create your ERCP. You should also work on your ERCP with your drinking water officer and your water users' community.

4.2.1 WHAT SHOULD YOUR ERCP INCLUDE?

Your ERCP should have all the information you will need to get you, your water supply system and your water users through the immediate aftermath of an emergency.

Section 13(2) of the Drinking Water Protection Regulation outlines the items that you must have in your ERCP:

- An emergency contact list that includes:
 - Management personnel for the water supply system.
 - Your health authority contacts (drinking water officer, medical health officer, and public health inspector or environmental health officer).
 - Other agencies and officials specified by the drinking water officer.
- A list of your identified specific potential emergencies with planned responses, including:
 - The steps to follow for each event on the list.
 - The people on the emergency contact list to contact for each event on the list.
- Communication protocols.

Some other items you may wish to include in your ERCP include:

- Maps of your system.
- Standard operating procedures for equipment.

Your ERCP must be accessible to all personnel responsible for the water supply. Put it in easy-to-find places, and ensure all personnel are familiar with the plan and know where to find it.

HIGH-RISK AND HIGH-USE FACILITIES

Identify high-risk facilities (e.g., schools, hospitals, daycares, food establishments and long-term care facilities).

Identify high-use facilities (e.g., industry and fire department for fire suppression alerts during water shortages) serviced by your water supply system.

Ensure they are highlighted for "special alerts" in your communication protocols.

4.2.2 EMERGENCY CONTACT LIST

Your emergency contact list (see Appendix A) should include the names and contact information for all the people and agencies you will need to contact and the order in which you should contact them in an emergency. This will save you time when time is really important.

It can also act as a check list to make sure you contact all the required people. In addition, it will help remind you of local resources that may be available to help you respond to an emergency. Your emergency contact list will likely require more people and agencies than are listed in section 13(2) of the Drinking Water Protection Regulation. This includes repair people, alternate water suppliers, media representatives and government agencies.

Establish relationships with everyone on your emergency contact list before an emergency. Communication will be much easier if you have already developed relationships with everyone involved. Table 1, below, has a list of people you should consider building relationships with and a description of how they can help you. Be sure to update your contact list on a regular basis. Although, this guidebook recommends updating the overall plan once a year, you should update your contact list more frequently (e.g., every few months) because people and contact information can change several times over the course of a year.

BACK-UP EQUIPMENT AND TOOLS

What spare parts should you have on hand? Do you have the equipment and tools to make minor repairs? Having back-up equipment and easily accessible tools is good practice. Go through your system and determine what is most important to have around in case of an emergency.

You should also develop an inventory system that alerts you to when something is running low and needs to be purchased. Your back-up equipment and tools should be stored in a secure location, and everyone who might need to use them should know this location. Your back-up equipment could include:

- Back-up chlorinator
- Spare pumps
- Extra stock of your chlorine product
- Spare UV lamps
- Spare hoses
- Generator and fuel

Make sure everyone who may need to make minor repairs has the ability and training to do so. No one should undertake any repairs without assistance, unless they are properly trained. Emergency contact information for repair personnel (see section 4.2.2, below, and Table 1) should be available for any equipment breakdowns beyond the capacity of whoever is on site during the emergency.

TABLE 1: EMERGENCY CONTACTS WITH DESCRIPTIONS

Contact	Description
Health Authority Contacts	<ul style="list-style-type: none"> • The drinking water officer at your local health authority is charged with administering and enforcing drinking water legislation in your area. He/she issues your operating permit. • You are required by law to work with the drinking water officer if and when there is a problem with your water supply system. • The drinking water officer must be one of your first points of contact in an emergency, as he/she has the ability to advise and help you in issuing a public notice of threat. • You should seek the drinking water officer’s advice on prevention and risk-reduction activities. • Other health authority staff who may provide assistance before or during an emergency include the local medical health officer, public health engineer and the environmental health officer designated with the duties of a drinking water officer.
Local Government	<ul style="list-style-type: none"> • Each local government (i.e., municipality and regional district) has an emergency management organization responsible for coordinating emergency management actions in their jurisdiction. • Many local governments have appointed emergency management coordinators to lead these organizations. • You should contact the coordinator of your local government’s emergency program to make him/her aware of your water supply system and ask about including it in the emergency program’s emergency management plan.
Emergency Management BC	<ul style="list-style-type: none"> • Emergency Management BC is the Province’s lead coordinating agency for emergency management activities at the provincial level. It also provides support to emergency management organizations within local governments. • Emergency Management BC has six regional offices in the province. • It runs the Emergency Coordination Centre, which operates a provincial call centre where emergency incidents can be reported 24 hours a day, all year round. • For more information, visit the Emergency Management BC website at http://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/emergency-management-bc. Or contact your local emergency program coordinator • The Office of the Fire Commissioner is a leader in fire safety awareness and prevention in British Columbia and closely associated with Emergency Management BC. For inquiries, advice and recommendations regarding water supply issues for fire suppression, you can contact the Office of the Fire Commissioner. Visit the Office of the Fire Commissioner website at http://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/fire-safety.

Contact	Description
B.C. Ministries Responsible for Natural Resource Management	<ul style="list-style-type: none"> • The Ministry of Environment and Ministry of Forests, Lands and Natural Resource Operations are responsible for managing source water (e.g., lakes, rivers and aquifers). This includes groundwater protection, water licensing, water users' communities and water utilities. • The Ministry of Environment is responsible for developing policy, legislation and standards. • The Ministry of Forests, Lands and Natural Resource Operations is responsible for enforcement. • For more information about programming visit the B.C. Government's Water website at http://www2.gov.bc.ca/gov/content/environment/air-land-water/water • You can find contact information for regional offices at http://www2.gov.bc.ca/gov/content/environment/air-land-water/land/regional-environment-contacts.
Local Emergency Departments (e.g., police and fire departments, and ambulance/hospital/health centre)	<ul style="list-style-type: none"> • You should contact your local emergency personnel to make sure they are aware of your water supply system. • You should consider providing them with emergency contact information for the system owner and operator(s) – as well as a map of how to find the system, especially if it is in a remote area. • This will help ensure a quick response, if necessary. In some emergencies (e.g., fire), every second counts.
Repair Personnel	<ul style="list-style-type: none"> • You should make a contact list of people who can help do repairs (e.g., plumber, electrician, excavating company, water-well drilling contractor, pump installer, water treatment suppliers, computer support, and utility company such as BC Hydro). • If appropriate, contact them ahead of time and ensure they know how to find your system. • Find out the days and hours they work, and if they have an emergency line or partner companies if they are unavailable. • It may be worth having back-up people as well. • Having this information on hand will save you the time and stress of searching for someone during an emergency.
Other Local Water Supply Systems	<ul style="list-style-type: none"> • Contact other water supply systems in your area. You could be a valuable resource to each other during an emergency, as you could share spare parts or even staff. • Have discussions with them and try to form partnerships and agreements related to emergency response.

4.2.3 MAKE A LIST OF YOUR IDENTIFIED EMERGENCIES WITH PLANNED RESPONSES

Your ERCP will list your specific potential emergencies and planned responses. This should include step-by-step instructions for actions that should be taken immediately, the person(s) responsible for those actions and a list of emergency contacts that should be called.

All systems should have an overall emergency and start-up procedure outlined in your ERCP.

Appendix B provides examples of potential emergencies with corresponding actions, including a list of whom to contact. It provides space for you to create your own responses for additional emergencies that you identified in STEP 1.

Operators must list only the actions they must carry out immediately to deal with the specific emergency. Other actions to remediate the situation will be taken with the help of the drinking water officer and other supporting people/agencies during the recovery phase.

LEGAL RESPONSIBILITY

You are legally responsible for alerting the public, officials and others of an emergency. Sections 12, 13 and 14 of the *Drinking Water Protection Act* and sections 9 and 10 of the *Drinking Water Protection Regulation* outline these responsibilities.

4.2.4 COMMUNICATION PROTOCOLS

The purpose of your ERCP is to protect your community of water users from drinking water hazards.

You must be able to alert all your system's users about problems with the water supply as soon as possible, especially if the drinking water you provide presents a potential health risk. This involves establishing a system of communication before an emergency occurs. It should be practiced to ensure it will be effective and efficient.

Table 2 lists various methods of communication you could include in your emergency protocols. They should be listed in detail in your ERCP, with sample messaging. A list of the names and contact information for each of your water users should be attached to your ERCP as well.

ARE YOU EXEMPT FROM USING FILTRATION ON YOUR SURFACE WATER OR GARP SYSTEM?

If you are at risk of a turbidity event affecting your water supply, include Decision Tree for *Responding to a Turbidity Event in Unfiltered Drinking Water* in your ERCP. It is in *Part B of the Drinking Water Officers' Guide*, at:

<http://www2.gov.bc.ca/assets/gov/environment/air-land-water/dwog-part-b.pdf>

TABLE 2: METHODS FOR COMMUNICATING WITH YOUR COMMUNITY OF WATER USERS

Communication Method	Description
Phone Tree	<ul style="list-style-type: none"> • A phone tree is a pre-arranged plan that allows every household in the community to be contacted with an important message by other members of the community. • People receive a phone call from someone and have the names of other people to phone, who in turn have the names of other people to phone, and so on down the line until everyone on the system has been alerted. • Many small communities already have some kind of phone tree system in place so they can respond quickly to other emergencies, such as alerting local volunteer firefighters. • Talk to your local fire chief, as you may be able to use the same system for an emergency involving your water system. • If you are using a phone tree to send out a message to your customers telling them not to drink the water or to boil it before they drink it, make sure that people who either do not have phones or who are not in when the call is made also get the message. • A simple note left in the mailbox, or attached to the door is all it takes to make sure everyone gets the message.
Door-to-door	<ul style="list-style-type: none"> • For very small water systems with less than 15 connections located near each other, a phone tree is probably not necessary. • In these cases, assuming that you (as the water supplier) are already at the scene, you can pass the word around just by knocking on a few doors, and getting others to pass the word around too so that everyone is made aware of the problem right away. • If someone is not home, a simple note left in the mailbox, or attached to the door is all it takes to make sure everyone gets the message.
Media	<ul style="list-style-type: none"> • Local media – radio, television, websites and newspapers – can issue warnings to the public if the situation is serious enough. • Make sure you contact local media as part of your emergency planning to establish your credibility with them and ensure that if you ever do have to call they will know who you are and how important it is to cooperate with you in alerting their audience.
Mass Email or Text Messaging	<ul style="list-style-type: none"> • If your community of water users is tech-savvy, a mass email or text may be the most efficient means of quickly getting the message out. • You need a distribution list. Also, you should have the email addresses and/or telephone numbers programmed into your system before there is an emergency.
Signs	<ul style="list-style-type: none"> • All public water outlets (e.g., community centres, campgrounds and businesses) should have signs posted. Signs must be posted in a manner that is approved by the drinking water officer (section 14(1) of the <i>Drinking Water Protection Act</i>).

Keep in mind that technology is an important aspect of communication (e.g., telephone, website, social media and texting), but there are some circumstances in which using technology may not be possible (e.g., during a major disaster).

It may be necessary to create a few different protocols for communication that depend on the circumstances of the emergency. In fact, you may want to use a few different protocols for each emergency so you can ensure as many people as possible get the message.

Your communication protocols should be tailored to whatever makes the most sense for your system's particular circumstances. Work with your community to come up with protocols that will work best for everyone involved.

You can also speak to the local drinking water officer for more advice. Reviewing and assessing your communication protocols is an important process to go through for emergency preparedness.

PROVIDE YOUR WATER USERS WITH YOUR EMERGENCY CONTACT INFORMATION

You should know how best to contact your water users and they should know how to contact you. They can inform you when things do not look, taste or smell right. This could be your first indicator of system problems in an emergency.

MESSAGING

Your communications with your water users in an emergency will probably include one of the following water advisories:

- **Water Quality Advisory**
Used when a public health threat from the water supply system is higher than considered normally acceptable, but not serious enough to warrant (or will not be resolved by) a Boil Water Notice. The advisory will usually describe actions that can be taken to reduce risks.
- **Boil Water Notice**
Used when testing reveals *E. coli* or other coliform organisms in the water supply system, and/or the system fails to meet drinking water treatment objectives – and the associated public health threat can be effectively addressed by boiling the water.
- **Do Not Use Water Notice**
Used when there is a significant public health threat in the water supply system that cannot be adequately addressed by a water quality advisory or boil water notice (e.g., oil/pesticide spill).

COMMUNICATION MATERIALS

Have some ready-made communication materials, including Water Quality Advisories, Boil Water Notices and Do Not Use Water Notices. You may not be able to create them in an emergency. For example: flyers, door hangers and electronic (e.g., email) notices.

PREPARE YOUR COMMUNITY

In addition to preparing communication protocols, you should work with your community of water users to ensure everyone is prepared for a water supply emergency. This starts with having regular communication with them about the water supply and emergency preparedness. Such communication includes the following:

- Send out an update letter on a quarterly basis or with water bills.
- Put up flyers on a community board.
- Speak at local meetings.
- Set up a website or social media page.
- Send out regular emails or text messages.

You are required to make your ERCP public, but do whatever makes the most sense for your system and your customer. At the very least, provide information and updates on emergency preparedness with your mandatory annual report.

Your customers should be aware of the water supply system's emergency protocols. They should know what to do in an emergency, and make preparations beforehand, because communication may not always be possible (e.g., during a major disaster). This includes:

- Knowing how to disinfect water through boiling or adding a disinfectant. (See the HealthLinkBC file, *Disinfecting Drinking Water*: <http://www.healthlinkbc.ca/healthfiles/hfile49b.stm>.)
- Knowing what activities to avoid if there is a concern about the water.
- Keeping 72 hours to one week's worth of drinking water at home. That is four litres of bottled water per person per day.

During regular communication (e.g., water bills), remind your customers about their role in an emergency. Provide them with links to helpful resources. For example:

- PreparedBC: <http://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/preparedbc>
- Government of Canada, Get Prepared: <http://www.getprepared.gc.ca/index-eng.aspx>

4.2.5 INSTRUCTIONS FOR OPERATING EQUIPMENT

Standard operating procedures for equipment and electrical schematics should be located beside the relevant equipment and attached to your ERCP. This could include, but is not limited to:

- Instructions for switching to an alternate source (if applicable).
- Instructions for switching to a generator/alternate power supply.
- Instructions for shutting off the water supply.
- Disinfection procedures for wells, the distribution system and reservoir.
- Disinfection operation.

- Electrical schematics for the generator.
- Electrical schematics for the disinfection equipment and room.

4.2.6 MAPS OF YOUR SYSTEM

You should consider developing maps of your system to provide the physical locations of all important aspects and components of the water supply system. This could include, but is not limited to:

- Source intake(s).
- Treatment plant.
- Reservoir(s).
- Mains.
- Critical control points (e.g., intakes, pump house(s), shut-off valves, connections between alternate sources, and pressure zones).
- Access routes, roads or trails to the critical control points.
- Your emergency contact list.
- Tools and maintenance equipment.
- High water-use industries.
- High-risk facilities (e.g., schools, daycare and long-term care facilities, hospitals and food establishments).

GPS COORDINATES

Consider including the GPS coordinates to important locations and infrastructure (e.g., site office, intake, treatment plant and reservoir) with your maps.

SECURE THE PHYSICAL INTEGRITY OF THE SYSTEM

Securing the physical integrity of your water supply system will help prepare for an emergency. This could include the following:

- Restrict access to your source, if possible, by putting up a fence and locked gate.
- Ensure sensitive equipment (including the generator) is stored off the ground in case of flooding.
- Anchor or strap down heavy equipment, shelves, chemical drums and other sensitive or breakable equipment in case of an earthquake.
- Bolt down shelving.
- Ensure all necessary personnel know how to turn on and off the electricity or gas, emergency generator and the water supply system itself.
- Ensure all equipment and chemicals are stored securely, using health and safety practices.
- Ensure the building that houses the equipment is a safe structure and secured with locks.
- Install motion-sensor lights and security alarms if they are available to you.
- Install a smoke detector, and change the batteries annually.
- Regularly back-up data, computer files and log books, and store copies offsite. Learn how to restore those files if they are electronic.

4.3 STEP 3: COMMUNICATE THE PLAN

You must provide a copy of your ERCP to your drinking water officer. In addition, the ERCP must be made public in accordance with the *Drinking Water Protection Act* and Drinking Water Protection Regulation. The public version can be a summary of the ERCP and should include anything relevant to your water users.

The Drinking Water Protection Regulation states that you must not include anything in the public summary that could reasonably pose a risk to the water supply system. For more information on this point and ways to communicate the ERCP to your consumers, contact your drinking water officer.

4.4 STEP 4: TRAIN STAFF

Everyone involved with operating and maintaining your water supply system should be up-to-date in the necessary training and certification. They should know how to operate, maintain and conduct minor repairs on the system.

Everyone should be familiar with the ERCP and the accompanying communication protocols. Review the ERCP with staff once a year. Consider conducting training exercises with staff in which you pick emergency scenarios and practise going through the ERCP to ensure everyone knows how to use it.

EMERGENCY SUPPLIES AND CPR

Some other items that should be stored securely in case of an emergency include:

- An emergency kit for staff members. It should include:
 - at least one day's worth of water (four litres per person) and nonperishable food
 - a first aid kit with appropriate types and quantities of supplies/blankets
 - a small portable AM/FM radio with extra batteries
 - pads of paper and pens
 - whistles
 - candles with waterproof matches
- Flashlights with extra batteries.
- A fire extinguisher.
- A snow shovel and salt.
- Protective gear and clothing (e.g., rain gear, work gloves and dust masks).

Consider training all staff in CPR, especially if the water supply system is in a remote location.

4.5 STEP 5: SECURE YOUR FINANCES

Recovering from an emergency could be expensive. Can your water supply system financially survive an emergency? Having an emergency fund available, as well as insurance, will likely be important contributing factors to your ability to completely recover. More information on emergency funds, insurance and financial planning is at:

- *Financial Best Management Practices (BMPs) for Small Community Water Systems in British Columbia* (Union of BC Municipalities): <http://www.ubcm.ca/assets/Resolutions~and~Policy/Policy/Environment/00%20Financial%20Best%20Management%20Practices%20Guide.pdf>
- WaterBC.ca (programs and resources for community water suppliers): <http://www.waterbc.ca/>
- *Small Water System Guidebook*: Chapter 9, “Financial Management”: <http://www2.gov.bc.ca/assets/gov/environment/air-land-water/small-water-system-guidebook.pdf>

4.6 STEP 6: UPDATE YOUR PLAN ANNUALLY

Your overall emergency response and contingency plan should be reviewed annually and revised as necessary. You may need to update your contact list on a more regular basis. Ensure you provide an updated version of the plan to your:

- Drinking water officer.
- System staff.
- Community of water users.
- Anyone else who might need it.

EMERGENCY MANAGEMENT IN BC

If you want more information about the overarching emergency management system in BC, see the EMBC document *British Columbia Emergency Management System* at

http://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/bcems/bcems_guide_2016_final_fillable.pdf

5 IN CASE OF AN EMERGENCY

5.1 STEP 7: RESPOND BY USING YOUR PLAN

All the activities suggested in this guide are designed to prepare you for one thing: an emergency. A well thought-out and rehearsed plan should allow you to just take a deep breath and dive in. Keep in mind that safety should be your first priority. If a situation looks dangerous (e.g., a forest fire close to your pump house), it may be best to wait for back-up and/or move on to plan B. This is one of the reasons you should come up with several plans and keep copies of your ERCP in several locations.

5.2 STEP 8: RECOVERY

Longer-term solutions or activities to correct the situation can be developed with the assistance and input of your drinking water officer and other experts after these initial activities listed in the ERCP. This depends on the specifics of the emergency. The time it could take to resolve the situation could take as little as a day or two, or as long as several weeks (if not indefinitely). The amount of time will depend on the severity of the emergency, your ability to work with everyone involved in the recovery and the finances available.

5.2.1 DOCUMENTATION

Documentation of the emergency, initial response and recovery in your log book is important to future emergency-preparedness activities. Everything that happens during an emergency (e.g., what went well and what did not go well) will provide valuable information for improving your responses in the future. It is important to learn what you can and use what you learn.

5.2.2 UPDATE YOUR PLAN

Everything that happens during an emergency can also inform your ERCP. If something did not work, you should come up with a different solution. Once again, it is important to learn what you can and use what you learn.

APPENDIX A: EMERGENCY RESPONSE AND CONTINGENCY PLAN TEMPLATE

This template is designed to be a starting point to aid you in preparing your own plan. Please modify to suit the needs of your water supply system (e.g., add or delete emergency contacts as you see fit).

Name of Water Supply System:

Mailing Address:

Phone Number(s):

Date Prepared:

EMERGENCY CONTACT INFORMATION

Name	Phone Number(s)	Email	Fax
Operator (primary):	Primary: Secondary:		
Operator:	Primary: Secondary:		
Owner (responsible):	Primary: Secondary:		
Other owner(s):	Primary: Secondary: Primary: Secondary:		
Health Authority Contacts			
Drinking water officer / Environmental health officer:	Office: Secondary:		
Public health engineer:	Office: Secondary:		
Medical health officer:	Office: Secondary:		
After-hour health authority emergency contact:			

Name	Phone Number(s)	Email	Fax
Government Agencies			
Local Government Emergency Program Coordinator (Municipality):			
Local Government Emergency Program Coordinator (Regional District):			
Emergency Management BC; Emergency Coordination Centre:	1-800-663-3456		
Ministry of Environment:			
Ministry of Forests, Lands, & Natural Resource Operations:			
Ministry of Transportation:			
Media			
Laboratories			
Bacteriological: Address:			
Chemical: Address:			

Name	Phone Number(s)	Email	Fax
Emergency Departments			
Police/RCMP:			
Fire Department:			
Ambulance:			
Hospital:			
Health Centre:			
Repair Services			
Utility:			
Electrician:			
Plumber:			
Bulk water hauler/ alternate water supplier:			
Excavator:			
Water Well Drilling Contractor:			
Pump Installer:			
Computer Support:			

Name	Phone Number(s)	Email	Fax
Equipment Supplier(s)			
Water Treatment Supplier:			
Other Local Water Supply System(s)			

In the case of emergency contacts, provide as many forms of communication to each contact as possible (including: primary, secondary and after-hours phone numbers). The Emergency Contact Information must be reviewed on annually to ensure the contact information is up to date. Forward any changes to your local drinking water officer or delegate.

Date Reviewed	Completed by	Forwarded to Drinking Water Officer

APPENDIX B: POSSIBLE EMERGENCIES WITH PLANNED RESPONSES

This list provides examples of common possible emergencies and sample responses. You may need to modify the list and/or the responses (including example actions) to ensure to suit the needs of your system. For example, the type of response, contact list and order of response will vary, depending on the size of your system, type of source you use and other factors.

Use the list of possible emergencies that you created to fill in the blanks under “other.” Use the blank templates at the end of this appendix to develop your own emergency responses. You should work with your drinking water officer to make sure you are on the right track.

EXAMPLES OF POSSIBLE EMERGENCIES

SOURCE(S) / INTAKE(S)

- Contamination of source (chemical)
- Loss of source
- Flood conditions
- Turbidity (no example response)
- _____
- _____
- _____
- _____

DISTRIBUTION SYSTEM

- Broken water main
- Backflow or back siphonage
- Blocked/faulty valve (no example response)
- Contaminated reservoir (no example response)
- _____
- _____
- _____
- _____

TREATMENT / PUMP HOUSE

- Pump failure
- Chlorine gas leaks (no example response)
- Chlorinator failure
- Power failure
- _____
- _____
- _____
- _____

OTHER

- Spills of disinfected water into fish-bearing streams (no example response)
- Earthquake (no example response)
- Fire (no example response)
- _____
- _____
- _____
- _____

EXAMPLES OF PLANNED RESPONSES

GENERAL EMERGENCY SHUT-DOWN AND START-UP PROCEDURES

SHUT-DOWN PROCEDURE

In case of any emergency in which the water is not safe for consumption or general use:

1. Issue a Boil Water Notice or Do Not Use Notice.
2. Shut off water supply (if necessary).
3. _____ will contact the drinking water officer _____ or other health authority contact(s) (as per specified emergency procedures).
4. _____ will notify affected water users (as per the communication protocols).
5. _____ will notify appropriate government agencies (as per specified emergency procedures).
6. _____ will post warning signs in public spaces and other necessary locations.
7. _____ will coordinate repairs.
8. _____ will arrange for alternate source of safe drinking water.

START-UP PROCEDURE

1. Identify and correct the source of contamination.
2. The entire system should be flushed and disinfected (as per attached procedures).
3. Send water sample(s) to the appropriate approved lab for testing. For bacteriological contamination, three consecutive sampling results must be negative.
4. Contact the drinking water officer or delegate for approval to resume normal operations of the water supply system (e.g., lifting the Boil Water Notice).

CHEMICAL CONTAMINATION OF SOURCE: SPILL, VEHICLE ACCIDENT, ETC.

ACTIONS

- Shut down pump.
- Notify health authority.
- Notify all users.
- Contact government agencies (see below) for advice and assistance.
- Contact local media for public service announcement (where all customers cannot be notified by phone).
- Arrange alternate source if necessary—i.e., bottled water, bulk hauler and storage tank.

CONTACTS

- Drinking water officer
- Local government's emergency program coordinator
- Emergency Management BC
- Police
- Ministry of Forests, Lands and Natural Resource Operations
- Department of Fisheries
- Others as necessary, depending on severity.

LOSS OF SOURCE: INTAKE DAMAGED, CREEK DRIED UP, ETC.

ACTIONS

- Ensure pump is shut off (to protect pump).
- Notify all users.
- Contact government agencies (see below) for advice and assistance.
- Arrange alternate source (e.g., bottled water, bulk hauler and storage tank)

CONTACTS

- Drinking water officer
- Ministry of Forests, Lands and Natural Resource Operations
- Local government's emergency program coordinator

FLOOD CONDITIONS

ACTIONS

- Notify all users about the potential for water contamination, loss of pump, power, etc. Users should be advised to store some drinking water in advance, and boil any suspect water for two minutes or disinfect with chlorine when flood conditions exist.
- Phone government contacts (see below).
- Contact local media for public service announcement (where all customers cannot be notified by phone).
- Arrange alternate source if possible – i.e., bottled water, bulk hauler, storage tank.

CONTACTS

- Drinking water officer
- Local government's emergency program coordinator
- Emergency Management BC
- Ministry of Forests, Lands and Natural Resource Operations.

PUMP FAILURE

ACTIONS

- Notify all users of interruption of service.
- Call for repairs: pump manufacturer.
- Advise drinking water officer (if interruption not short-term).
- Arrange alternate source if necessary (e.g., bottled water, bulk hauler, etc.).

CONTACT

- Drinking water officer

CHLORINATOR FAILURE

ACTIONS

- Advise local health authority.
- Notify all users to boil water for two minutes or take other disinfection procedures in accordance with recommendation of local health officials.
- Arrange chlorinator repairs.

CONTACTS

- Drinking water officer
- Chlorinator manufacturer

POWER FAILURE

ACTIONS

- Call BC Hydro.
- Start back-up generator.
- Notify all users about interruption of service if back-up not capable of maintaining supply.
- Advise drinking water officer.
- Arrange alternate source if necessary (e.g., bottled water, bulk hauler, etc.).

CONTACT

- Drinking water officer

BROKEN WATER MAIN

ACTIONS

- Reduce pressure (but maintain enough pressure to prevent backflow).
- Call for repairs (e.g., plumber, excavator).
- Notify all users of interruption of service.
- Advise local drinking water officer
- Arrange alternate source if necessary (e.g., bottled water, bulk hauler, etc.).

CONTACT

- Drinking water officer

BACKFLOW OR BACK SIPHONAGE

ACTIONS

- Advise medical health officer at local health authority.
- Notify users to boil water for two minutes or take other disinfection procedures in accordance with recommendation of local health officials.
- Purge and disinfect lines as directed, after corrections have been made.

CONTACT

- Drinking water officer

TEMPLATE FOR PLANNED RESPONSES

Fill in the following blank template with your planned responses to possible emergencies you listed under “other.”
Make more copies of this page as necessary.

EMERGENCY:

ACTIONS

-
-
-
-
-
-
-

CONTACTS

-
-
-

EMERGENCY:

ACTIONS

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CONTACTS

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-
-

APPENDIX C: ADDITIONAL INFORMATION CHECKLIST

Check off the following items as you add them to your emergency response and contingency plan.

COMMUNICATION PROTOCOLS

- Communication protocols with contact list of water system users (include phone numbers and addresses).
- Boil Water Notice and Do Not Use Water Notice signs, and instructions for issuance.
- Operating equipment instructions.
- Instructions for switching to alternate source (if applicable).
- Instructions for switching to generator/alternate power supply.
- Instructions for shutting off water supply.
- Disinfection procedures for wells, distribution system and reservoir.
- Disinfection operation.
- Electrical schematics for generator.
- Electrical schematics for disinfection equipment and room.

MAP OF WATER SUPPLY SYSTEM

- Source (include GPS settings and directions as needed).
- Mains.
- Critical control points.
- Intake(s).
- Shut-off valves.
- Access routes to critical control points.
- Pump house.
- Location of emergency contact list, tools and maintenance equipment.
- High-water-use industries.
- High-risk facilities:
 - schools
 - day-care centres
 - hospitals
 - long-term-care facilities