

**GUIDE TO EMERGENCY RESPONSE
AND CONTINGENCY PLANS
FOR WATER SUPPLY SYSTEMS**

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**HEALTH PROTECTION BRANCH
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**Guidance for the Preparation of Emergency Response and Contingency Plans
for Drinking Water Supply Systems in British Columbia**



**Ministry of
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Preface

Developing an emergency response and contingency plan is required for water systems and helps water suppliers respond to and recover from emergency events. This document, *Guide to Emergency Response and Contingency Plans for Water Supply Systems* supports water suppliers across the province to develop and deploy an emergency response and contingency plan. This document complements the *Emergency Response and Contingency Planning for Small Water Systems* developed by the B.C. Ministry of Health in 2016.

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1. WHY DO WATER SUPPLY SYSTEMS REQUIRE ERCPS?

Emergency response and contingency plans (ERCPS) provide a step-by-step approach to response and recovery from a drinking water system emergency and are essential to promptly and effectively managing an emergency. Section 10 of the *Drinking Water Protection Act* (DWPA) and Section 13 of the *Drinking Water Protection Regulation* (DWPR) require all water suppliers to develop and maintain an ERCP.

While the DWPA and DWPR outline the minimum requirements for an ERCP, this guide helps water suppliers in developing and maintaining a detailed, up-to-date, and site-specific ERCP.

This guidance is based on the recommended practices from Emergency Management British Columbia (EMBC) and reflects the requirements set out in the DWPA and DWPR.

The *Guide to Emergency Response and Contingency Plans for Water Supply Systems* has been prepared for drinking water suppliers and drinking water officers¹ as described in Table 1.

Small water systems should refer to *Emergency Response and Contingency Planning for Small Water Systems*.

Table 1 Objectives of the Guide to Emergency Response and Contingency Plans for Water Supply Systems

Audience	Objectives
Drinking Water Suppliers	<ol style="list-style-type: none"> 1. Provide a step-by-step procedure that can be used to develop, maintain, and update the water supply system’s ERCP. 2. Promote a consistent approach to ERCPS by water suppliers across British Columbia.
Drinking Water Officers	<ol style="list-style-type: none"> 1. Guide the drinking water officer on the content that should be included in the ERCP. 2. Assist the drinking water officer to confirm that the water supplier has met their legislative requirement in preparing an ERCP. 3. Inform the drinking water officer as to the best practices regarding emergency planning.

¹ For further information on the drinking water officer’s responsibilities, refer to the Drinking Water Officer’s Guide.

1.1 CONTENTS OF THE GUIDE

This guide provides step-by-step guidance to water suppliers for developing an ERCP for their water system. This document contains the following tools to aid in the development of the ERCP:

- Guidance on using an emergency management process to develop a ERCP for your system.
- A template for developing an ERCP found in Appendix A.
- Callout boxes for tips and legislative responsibilities that should be included in the ERCP.

Tips: Blue boxes contain editorial suggestions for developing an ERCP and key items that should be included in the ERCP

Legislative Responsibility: Yellow boxes contain key references to the Act and Regulation.

1.2 LEGISLATIVE RESPONSIBILITY

Water suppliers are required to have an Emergency Response and Contingency Plan (ERCP) for their water supply system. Table 2 outlines the water supplier’s legislative responsibility as per the DWPA and DWPR and outlines how this guidance can help water suppliers-meet legislative requirements.

Table 2 Legislative Responsibility with Respect to the DWPA and DWPR for ERCPs

Legislation		Guidance on Meeting Legislative Requirements
Drinking Water Protection Act 10 (1)	In the case of a prescribed water supply system, the water supplier must have a written emergency response and contingency plan per the regulations, to be implemented in the event of an emergency or abnormal operational circumstances affecting its water supply system or drinking water source.	Complete an Emergency Response and Contingency Plan and following it in the event of an emergency.
Drinking Water Protection Act 10 (2)	The drinking water officer may order a water supplier to review and update their emergency response and contingency plan.	Complete an Emergency Response and Contingency Plan.
Drinking Water Protection Act 13 (1)	A water supplier must immediately notify the drinking water officer if the supplier considers a threat that is likely to result in the drinking water, provided by its water supply system, not meeting the requirements of providing potable water and any requirements established in the operating permit.	Follow established communication protocols in the Emergency Response and Contingency Plan.

Legislation		Guidance on Meeting Legislative Requirements
<p>Drinking Water Protection Act Section 14</p> <p>Public notice of threats to drinking water</p>	<p>(1) The drinking water officer may request or order a water supplier to <u>give public notice</u> in a manner approved by the drinking water officer, or in accordance with the directions of the drinking water officer, if</p> <p>(a) the drinking water officer has received a report under section 12 [<i>notice if immediate reporting standard not met</i>],</p> <p>(b) the drinking water officer has received a report under section 13 [<i>water supplier must report threats</i>], or</p> <p>(c) the drinking water officer considers that there is, was or may be a threat to the drinking water provided by a water supply system.</p> <p>14 (2) In addition to any requirement under subsection (1), if a water supplier</p> <p>(a) has received a report under section 12 or considers that there may otherwise be a drinking water health hazard in relation to its water supply system, and</p> <p>(b) is not able to immediately notify the drinking water officer,</p> <p>the water supplier must <u>immediately give notice of the possible hazard to the users</u> of drinking water from that water supply system.</p>	<p>Follow established communication protocols in the Emergency Response and Contingency Plan and communicate with your drinking water officer.</p> <p>Refer to the Emergency Response and Contingency Plan.</p>
<p>Drinking Water Protection Act 15 (a)</p>	<p>A water supplier must ensure that the following information is made public in accordance with the regulations and any requirements of the drinking water officer:</p> <p>(a) the water supplier's emergency response and contingency plan</p>	<p>Make a summary of the Emergency Response and Contingency Plan public once complete.</p>
<p>Drinking Water Protection Regulation 13 (2)</p>	<p>A water supplier must include the following in an emergency response and contingency plan:</p> <p>(a) the names and telephone numbers of:</p>	<p>Maintain an up-to-date contact list in your Emergency Response and Contingency Plan.</p>

Legislation		Guidance on Meeting Legislative Requirements
	<p>(i) the management personnel for the water supply system,</p> <p>(ii) the drinking water officer, medical health officer and environmental health officer, and</p> <p>(iii) other agencies and officials specified by the drinking water officer.</p> <p>(b) the persons referred to in paragraph (a) to be contacted in each type of emergency or abnormal operational circumstance.</p> <p>(c) the steps to follow in the event of an emergency or abnormal operational circumstance;</p> <p>(d) protocols to follow respecting public notice, if an immediate reporting standard is not met.</p>	
Drinking Water Protection Regulation 13 (3)	<p>A water supplier must</p> <p>(a) make the emergency response and contingency plan accessible to the staff of the water supplier, and</p> <p>(b) provide a copy of the emergency response and contingency plan to the drinking water officer.</p>	Provide a copy of Emergency Response and Contingency Plan to staff and the drinking water officer once complete.
Drinking Water Protection Regulation 13 (4) & (5)	<p>A water supplier must make a summary of the emergency response and contingency plan accessible to the users served by its water supply system.</p> <p>A water supplier must not include in the summary referred to in subsection (4) any information that may reasonably pose a risk to the water supply system.</p>	Make a summary of the appropriate sections of the Emergency Response and Contingency Plan public once complete.

1.3 GOVERNMENT AGENCIES' ROLE IN RESPONDING TO EMERGENCIES

Emergency response requires the coordination of many levels of government and agencies. This section describes the breakdown of responsibility relative to a drinking water emergency.

Local Government Authority

Under the *Emergency Program Act* of British Columbia and the associated Local Authority Emergency Management Regulation, all Local Authorities are required to prepare emergency plans.

The water supply system ERCP would serve as a department-specific extension to the Local Authority's emergency response plan.

In an emergency situation, the first line of support for water suppliers should come from the Local Government Authority that has jurisdiction for the area.

Regional Health Authorities

The Regional Health Authorities through the drinking water officer, offer assistance and advice related but not limited to:

- distribution system protection
- water quality testing
- health advisory notifications
- threats to loss of water supply

Emergency Management BC (EMBC)

The Provincial Emergency Program provides support to local government authorities and provincial government agencies before, during and after major emergencies. EMBC can be contacted 24/7 through their emergency contact line at 1-800-663-3456.

1.4 OVERVIEW OF THE EMERGENCY MANAGEMENT PROCESS

The Emergency Management Cycle includes four stages, of which preparation and maintenance of an ERCP is one. ERCPs are developed as part of the preparedness stage of the cycle. Each stage in the cycle is described below.

Mitigation and Prevention

The first step is to mitigate and prevent emergencies. Mitigation and prevention is managed through the monitoring and maintenance steps water suppliers routinely take to eliminate or reduce hazards and their impacts.

An asset management program is an important component of mitigation and prevention activities. As systems age, they become increasingly at risk for breaches in integrity so following a defined asset management plan is one of the most important things that can be done to mitigate and prevent emergencies from occurring.

Protecting the watershed is a critical first step to preventing emergencies, and Source water protection plans and water quality monitoring programs also play a significant role in mitigating and preventing emergencies.

Preparedness

Preparedness refers to steps taken by the water supplier to ensure that they are ready to react. This would include preparing an ERCP, conducting training, stockpiling personal protective equipment and spare parts, financial planning for emergencies and preparing communication plans. Mutual aid agreements should also be developed as needed to mobilize emergency resources for additional emergency assistance.



Figure 1 Emergency Management Cycle (Emergency Management BC)

Response

Response refers to how the water supplier reacts during an emergency. This phase includes measures to maintain the supply of potable water or restore the supply of potable water as quickly as possible, and/or coordinate short term alternate sources of water. This guide supports water suppliers in developing emergency response procedures.

Recovery

Recovery refers to the steps taken after an emergency to restore conditions to pre-emergency conditions. This includes restoring physical, economic, and social conditions as quickly as possible. Documentation of the response to the emergency and results of the emergency should be completed to assess the successes and lessons learned.

2. EMERGENCY RESPONSE AND CONTINGENCY PLAN DEVELOPMENT AND MAINTENANCE

The development of an ERCP should be done methodically so that no valuable information is forgotten.

This guide has segmented ERCP development into the following seven steps, described throughout this document.

An ERCP must contain the elements described in DWPR, however a water supplier may find it valuable to broaden the scope and add more detail. Each of the seven steps provides guidance and opportunity different levels of detail.

Step 1: Initiate the Emergency Response Planning Process

Step 2: Develop Emergency Response Procedures

Step 3: Establish Communication Procedures

Step 4: Develop Recovery Procedures

Step 5: Preparedness Steps

Step 6: Maintain the ERCP

Step 7: Complete the ERCP

Legislative Responsibility: Section 10 (2) of the Act states that the drinking water officer may order a water supplier to review and update their ERCP. Section 13 (3 b) of the Regulation requires water suppliers to provide a copy of the ERCP to the drinking water officer.

STEP 1: INITIATE THE EMERGENCY RESPONSE PLANNING PROCESS

It is important to clearly set the direction of the emergency response planning process before beginning to develop the plan. This can be achieved through the following initiation activities:

- A. Establishing an Emergency Response Planning Committee
- B. Reviewing background information
- C. Establishing the ERCP Framework
- D. Completing a water system overview

A. ESTABLISH AN EMERGENCY RESPONSE PLANNING COMMITTEE

The water supplier should establish an emergency response planning committee to be responsible for developing the ERCP, coordinating and conducting regular ERCP updates and reviews. The ERCP should be developed in a team environment so that there are multiple champions of the ERCP, and multiple perspectives and areas of knowledge represented in the planning process.

The committee should be people who will be involved in the emergency response efforts so that they are invested in the success of the emergency response planning process. Consequently, the committee should be knowledgeable of all aspects of the ERCP and can execute the ERCP more efficiently during an emergency. A Terms of Reference can be developed so that all committee members are clear on the task at hand and the process to develop the ERCP.

The committee should represent the people who plan, manage and operate the water system. The committee should include those who can contribute to the development of emergency response measures and need to be involved in decision making.

Committee members may include:

- Water treatment plant operator
- Wastewater treatment plant operator
- Distribution Network Operator
- SCADA or Control System Operator
- Local authority emergency program staff
- Managerial staff
- Financial staff
- Administrative staff
- Relevant emergency response organizations such as police and fire
- Representative from any connected or impacted water systems

Committee members should include those who have direct knowledge of the water system and need to be involved in emergency response decision making.

One committee member should be nominated as the ERCP Committee Lead. This person will oversee the development of the ERCP and the continued updates and training programs

B. REVIEW BACKGROUND INFORMATION

The water supplier should review relevant background information to become familiar with the functions of the water system and the current emergency response procedures in place.

The following background documents – where available - may be reviewed prior to developing the ERCP:

- Hazard, Risk, and Vulnerability Assessment
- Water system overview, highlighting critical infrastructure
- Water system operating procedures
- Maps and drawings of the water system
- Source-to-Tap Assessment or Water System Assessment
- Water quality results to determine the historic trends in water quality
- Current or previous Emergency Response and Contingency Plans, for both the water supplier and municipality
- Dam Emergency Plan
- Firefighting protocols and agreements
- Mutual aid agreements
- Memorandums of Understanding
- Post-emergency reports or reviews
- Lessons learned documents
- Service agreements
- Reports and correspondences with the-DWO
- Water System Annual Report
- Operating permit conditions
- Drought protocols
- Established communication procedures

Once these documents have been collected, reviewed, and summarized, knowledge gaps should be identified and documented.

C. ESTABLISH THE ERCP FRAMEWORK

Establishing a framework for the ERCP will clearly define what will be included in the document (and what will not).

Key components of this framework include:

- Purpose
- Objectives,
- a defined scope
- a list of operational assumptions, and
- an overview of the water system.

Purpose

The water supplier should identify the purpose of the ERCP at the outset of the planning process. The purpose should identify the following:

- What is the ERCP being developed to do?
- Who is the ERCP being developed for?
- What is the goal of following the implementation of the ERCP?

A template has been provided in Appendix A to complete these sections.

Example: The purpose of the City of Watertown's Water Supply Emergency Response and Contingency Plan is to provide the action plan for the response and recovery measures taken during an emergency to maintain the provision of clean, safe, and reliable drinking water to the users.

Objectives

The water supplier should determine the objectives of the ERCP. The following are examples of objectives for a water system ERCP:

- Identify the hazards and risks present in the drinking water system
- Identify and prioritize reasonably foreseeable hazards
- Establish periodic review and update procedures for the ERCP
- Provide procedures to restore normal water system operations
- Provide procedures to protect the water users from adverse water quality
- Establish communication procedures that can be employed during an emergency
- Provide procedures to continue to provide water for firefighting during an emergency

Scope

The water supplier should identify the scope of the ERCP. Identifying the scope at the outset of the ERCP planning process, will focus the working group and the eventual users of the ERCP. The water supplier should define both the in-scope and out-of-scope aspects. The scope would likely be the extent of the drinking water system, and any infrastructure outside of the drinking water system would be out of the ERCP scope.

Example: The scope of this ERCP is Watertown's drinking water system, from the source water, Lake Clearwater, to the water user's service connection. Any emergencies that do not pertain to the drinking water system are not covered within the scope of this ERCP.

Operational Assumptions

The water supplier should outline the assumptions at the outset of the ERCP planning process. Each water system will have different assumptions, based on location, resources, and typical operations. Note: many of the assumptions below will require action to ensure they are functional/possible in the event of an emergency. The following are examples of assumptions that a water system may make in developing their ERCP:

- Two operators will be available in the event of an emergency
- Personnel are able to travel to different key areas of the water distribution system in the event of an emergency
- The backup equipment has been maintained and is operable
- Spare equipment, supplies, and tools are on hand and in good working order/not expired
- Financial and human resources are available to address the emergency
- There is an alternative source of water
- The alternative source water is not affected by the emergency
- All emergency response training has been completed
- The ERCP has been updated on schedule and contact information is correct
- The power outage will last a maximum of 24 hours
- Key people can be reliably contacted

Once the assumptions have been developed, they should be reviewed to confirm that they are realistic. For example, if it is unlikely that two operators would be available during an emergency, the ERCP should reflect the correct number of operators who can be expected to be available.

D. WATER SYSTEM OVERVIEW

The water supplier should include a water system overview from the source to the tap in the ERCP document. This should highlight the critical pieces of infrastructure within the system. The water system overview should include an overall map of the system, showing the system's extent and the location of the critical pieces of infrastructure, valve locations, backup equipment and any available mobile treatment systems. The watershed or wellhead capture zones should be identified in this section.

This part of the ERCP should also identify any service agreements or memorandums of understanding that the water supplier has. The water supplier can also include a reference to their supervisory control and data (SCADA) system to allow for easy reference.

STEP 2: DEVELOP EMERGENCY RESPONSE PROCEDURES

The water supplier should develop emergency response procedures for priority risks identified by following a risk management approach which includes:

- A. Identifying potential hazards
- B. Completing a risk assessment
- C. Developing emergency response procedures



Emergency response planning and protocols for addressing hazards may be completed at the local authority-level and the water system ERCP should take this into consideration.

A. IDENTIFY POTENTIAL HAZARDS

The water supplier should assess the water system from source to the tap and put forward a list of potential hazards that could impact the system. The process for developing a comprehensive list of hazards would include reviewing documentation of past emergencies and considering the potential effects on your water system of large scale disaster events (ex. wildfire, earthquake, pandemic) and the changing climate.

The climate is changing in B.C. This is leading to trends such as longer and dryer summers, lower annual snowpack, and changes to the timing of precipitation and snow melt. Climate modelling is used to identify these trends across regions in B.C. All these trends may lead to hazards that can impact a water system.

Groups such as the Pacific Climate Impacts Consortium – <https://pacificclimate.org/> – provide resources and tools that may support water suppliers in identifying climate hazards specific to their regions.

The following are examples of potential hazards that may affect the infrastructure and operation of the water system:

DRINKING WATER SOURCE	DISTRIBUTION SYSTEM	TREATMENT
<input type="checkbox"/> Contamination of source (chemical)	<input type="checkbox"/> Immediate reporting standard exceeded	<input type="checkbox"/> Major pump failure
<input type="checkbox"/> Algae Bloom	<input type="checkbox"/> Broken watermain	<input type="checkbox"/> Chemical leak
<input type="checkbox"/> Loss of primary source	<input type="checkbox"/> Backflow or back-siphonage	<input type="checkbox"/> Chemical overfeeding or back feeding
<input type="checkbox"/> Loss of all source water	<input type="checkbox"/> Blocked/faulty valve	<input type="checkbox"/> Disinfection failure
<input type="checkbox"/> Flood conditions	<input type="checkbox"/> Contaminated reservoir	<input type="checkbox"/> Extended power failure
<input type="checkbox"/> High Turbidity	<input type="checkbox"/> Vandalism/Sabotage	<input type="checkbox"/> Treatment failure, including filtration, UV etc.
<input type="checkbox"/> Chemical contamination	<input type="checkbox"/> Spill of disinfected water into fish-bearing streams	<input type="checkbox"/> Cyber-terrorism attack on the control system
<input type="checkbox"/> Biological contamination	<input type="checkbox"/> Failure of pressure control/air valves	<input type="checkbox"/> Facility fire
<input type="checkbox"/> Forest Fires	<input type="checkbox"/> Lack of residual chlorine	<input type="checkbox"/> Loss of transportation of critical supplies
<input type="checkbox"/> Loss of intake	<input type="checkbox"/> Loss of pressure	<input type="checkbox"/> Loss of key staff
<input type="checkbox"/> Landslide	<input type="checkbox"/> Contamination of the distribution system	
<input type="checkbox"/> Breach of dam	<input type="checkbox"/> Loss of key staff	

B. COMPLETE A RISK ASSESSMENT

The water supplier can use a risk assessment process to prioritize the potential hazards identified. Risk can be defined as the likelihood of an event occurring and the consequence of impacts if that event occurs. The risk assessment process can be numerically defined, or assigned qualitative rankings based on a specific scale.

Risks identified should be prioritized according to:

- Low risks will likely not need an emergency response procedure and should be incorporated in Standard Operating Procedures
- Moderate risks may or may not need an emergency response procedure at the discretion of the committee
- High and Very High risks will need an emergency response procedure

Table 3 is a sample risk rating table that can be used to determine the risk level of each potential hazard. The committee can work through developing the response procedures based on the risk rating applied to each potential hazard starting with the hazards assessed to have the highest risk.

The *Water System Assessment* process or a *Source to Tap Assessment* can be used to help complete a risk assessment.

Risk = Likelihood x Consequence

Table 3 Sample Risk Rating Table

Likelihood	Consequence				
	1 (Insignificant)	2 (Minor)	3 (Moderate)	4 (Major)	5 (Catastrophic)
1 (Rare)	1 (Low)	1 (Low)	2 (Moderate)	3 (High)	3 (High)
2 (Unlikely)	1 (Low)	1 (Low)	2 (Moderate)	3 (High)	4 (Very High)
3 (Possible)	1 (Low)	2 (Moderate)	3 (High)	4 (Very High)	4 (Very High)
4 (Likely)	2 (Moderate)	3 (High)	3 (High)	4 (Very High)	4 (Very High)
5 (Almost certain)	2 (Moderate)	3 (High)	4 (Very High)	4 (Very High)	4 (Very High)

C. DEVELOP EMERGENCY RESPONSE PROCEDURES

The water supplier should develop emergency response procedures for all priority risks. Each emergency response procedure should contain, at a minimum, the course of action that needs to be taken, and the list of parties that need to be contacted during each emergency.

It is recommended that the response procedures for each potential hazard be printed on a stand-alone sheet for easy access in an emergency. A consistent format should be followed for all response procedures.

Responding to each type of emergency will likely require the following high-level steps:

1. *Identify the emergency.*
2. *Notify the drinking water officer and water supplier management.*
3. *Issue a public notice.* This may require direction from the drinking water officer and reference to the water supplier’s standard operating procedures or ERCP.
4. *Resolve the emergency.* This will depend on the type of emergency and require unique step-by-step procedures developed for each emergency.
5. *Confirm the water is potable.* If the quality of the water is compromised during the emergency, the drinking water officer will provide direction on the resampling requirements.
6. *Notify the public that the emergency has been resolved.*

The emergency response procedure should be concise and written in plain language for ease of use during an emergency.

The water supplier should identify water supply system emergencies that may affect infrastructure outside the scope of the immediate water system such as a flood or earthquake. At a minimum, the emergency response procedures should identify:

- Procedures the water supplier is responsible for.
- Communication protocols with other emergency response agencies.
- Reference external emergency response plans that may integrate or supersede the water supplier’s ERCP.

The **Dam Safety Regulation** should be referred to for any water supplier who owns a dam. A **Dam Emergency Plan** should be developed as directed by the Dam Safety Technical Resources.

STEP 3: ESTABLISH COMMUNICATION PROCEDURES

The water supplier is required to have an emergency contact list in place. Clear lines of communication will help expedite the emergency response procedures. The following emergency communications should be established by the committee:

- A. Developing an emergency contact list
- B. Developing a communication flow chart
- C. Developing communication protocols

A. EMERGENCY CONTACT LIST

The water supplier is required to develop an emergency contact list. The list must:

- Contain a primary and secondary contact for each person on the list
- Include phone numbers and email addresses of all people involved in responding to the emergency
- Be updated during every planned review period

Legislative Responsibility: Section 13 (2) of the Regulation requires that the following names and phone numbers be included in the contact list:

- .1 the management personnel for the water supply system,
- .2 the drinking water officer, medical health officer and environmental health officer, and
- .3 other agencies and officials specified by the drinking water officer.

B. COMMUNICATION FLOW CHART

The water supplier should develop a communication flow chart showing the order of precedence and communication flow up the chain of command. This will prioritize the flow of communication during an emergency. There may also be unique communication requirements described within each specific emergency response procedures.

The drinking water officer should be contacted during all emergencies where there is a threat that may result in the drinking water supplied by the water system not being potable. They will advise on issuing a public notification.

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. For further description of these roles refer to the B.C. Ministry of Health *Drinking Water Officer's Guide*.

C. COMMUNICATION PROTOCOLS

The water supplier should identify the communication protocols that will be followed in the event of an emergency. These protocols outline the flow of information:

- among the water supplier’s staff
- between the water supplier and the drinking water officer
- between the water supplier and other agencies
- between the water supplier and water users, as necessary
- between the water supplier and other partners or resources, as necessary

Include contact information in the contact list only to avoid updating communication protocols if contact information changes.

The method for communicating with each party should be described in the communication protocol.

The communication protocol should also identify high-risk and high-use facilities that may require special consideration in the event of an emergency. High-risk facilities could include schools, hospitals, daycares and long-term care facilities. High-use facilities could include industrial water users and the fire department. These facilities along with their contact information and the special notice that is required for them should be included in the communication protocols in the ERCP.

Water suppliers should use multiple communication methods to issue notifications to a variety of water users, including the general public, and high-use and high-risk water users. The selection of communication methods will depend on the situation, with options including:

- Traditional media (e.g., radio, television, newspapers)
- Internet (e.g., email, websites, social media)
- Phone calls
- Text messaging
- Door-to-door communication, including pamphlets and mail-outs

Legislative Responsibility: Section 13 (2) of the Regulation requires that the following be included in the ERCP:

the persons to be contacted including names and phone numbers in each type of emergency or abnormal operational circumstance.

the steps to follow in the event of an emergency or abnormal operational circumstance.

protocols to follow respecting public notice if an immediate reporting standard is not met.

PUBLIC NOTIFICATIONS IN CASE OF A DRINKING WATER HAZARD OR EMERGENCY

Water suppliers are required to communicate with water users in the event that their drinking water quality may be compromised. Providing public notification allows water users to better protect their health during a drinking water advisory or emergency.

When there is a threat to the water supply system, the drinking water officer can request or order the water supplier to issue a notification to water users. The DWO will provide direction to the water supplier on which type of public notification is appropriate for the emergency.

The water supplier is required to notify the public in the following situations:

1. The immediate reporting standard, as defined in the DWPR Schedule A, is not met,
2. There are threats to the drinking water, or
3. The drinking water officer considers that there may be a threat to the drinking water.

If any of the above occurs, the water supplier must contact the drinking water officer and work collaboratively to determine which type of public notification is appropriate for the water advisory or emergency. If the drinking water officer cannot be reached, the water supplier must immediately give notice to water users of the possible threat.

Types of Notification

There are three different notifications that may be issued to the water users depending on the threat or emergency:

- Water Quality Advisory
- Boil Water Notice
- Do Not Use Water Notice

Appendix B includes templates that can be customized by the water supplier and posted at a public water source and/or distributed through other methods of communication (e.g., traditional media, internet, text messaging).

An overview of these three notifications can be found below.

These same notification requirements are outlined in the *Guide for Communicating with Water Users*.

WATER QUALITY ADVISORY

A Water Quality Advisory must be used when a drinking water officer determines some level of risk associated with water use but the circumstances do not warrant a Boil Water Notice or Do Not Use Notice.

A Water Quality Advisory should specify the nature of the risk, steps that the water supplier is taking or is required to take to address them, and steps that water users may take in the meanwhile to minimize the risk associated with that water.



BOIL WATER NOTICE

A Boil Water Notice must be used when a drinking water officer determines that there is a risk associated with water consumption that can be adequately addressed by boiling the water before human consumption. The notice should specify the nature of the risk, contain specific instructions regarding boiling requirements and the steps that the water supplier is taking or is required to take to address the risks that exist, apart from using the Boil Water Notice. Table 4 provides examples of appropriate water uses during a Boil Water Notice.

Table 4 Example of Water Uses During a Boil Water Notice (CDC, 2016)

Use Tap Water	Use Boiled Water	Use Caution
<ul style="list-style-type: none"> — Washing clothes — Washing hands — Taking showers (for adults and older children) — Flushing toilets 	<ul style="list-style-type: none"> — Drinking — Brushing teeth — Preparing food — Washing fruits and vegetables — Mixing baby formula — Making ice — Giving water to pets 	<ul style="list-style-type: none"> — Most kitchen and other household water filters do not remove bacteria or viruses — Coffee makers, vending machines, and soda dispensers with a direct connection to the water supply should not be used — Bathing babies and young children (give sponge bath; use boiled water that has cooled) — Use clean, sanitized containers for storing boiled water

If the Boil Water Notice is issued due to a turbidity event, the risks of the turbidity event should be communicated to water users. The Boil Water Notice should indicate if sampling has confirmed the presence of potential indicator organism (e.g., E. coli) or if the Boil Water Notice is based on other evidence or a lack of information.

The *Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water* from the Drinking Water Officer's Guide, has specific guidance for responding to a turbidity event.



DO NOT USE WATER NOTICE

A Do Not Use Water Notice must be used when there is a risk associated with water consumption that cannot be adequately addressed by boiling the water or issuing a Water Quality Advisory. Examples include a chemical spill near a water intake, a situation where the water system may have been subject to vandalism, or natural events such as a mudslide or earthquake. In some cases, it may be appropriate for the notice to specify types of water use that are not acceptable (Table 5). For example, it may be acceptable to use water for showering but not for human consumption.

In addition to the formal notice to water users, information should be available to address frequently asked questions, including where the water users can find an alternative source.

If the Do Not Use Water Notice is being issued due to the presence of cyanobacteria, the *Decision Protocols for Cyanobacterial Toxins in BC Drinking Water and Recreational Water* in the Drinking Water Officer's Guide should be referenced.



Table 5 Example of Water Uses During a Do Not Use Water Notice (CDC, 2016)

Use Tap Water	Use an Alternative Source	Use Caution
Approved actions will depend on the chemical or toxin present. A preliminary assessment of the contaminant must be completed before recommendations can be developed. In some instances, actions such as washing hands, flushing toilets, and showering with the contaminated tap water will be considered safe; in other instances, none or only a few of these actions will be permissible.	<ul style="list-style-type: none"> — Drinking — Brushing teeth — Preparing food — Washing fruits and vegetables — Mixing baby formula — Making ice — Giving water to pets — Bathing babies and young children 	<ul style="list-style-type: none"> — With appliances that use water. Do not use coffee makers, refrigerator water dispensers, vending machines, and soda dispensers that are connected to the water supply.

STEP 4: DEVELOP RECOVERY PROCEDURES

The water supplier should develop procedures for returning to normal operations once the emergency is over. The cause and the response to the emergency should be reflected upon, deficiencies in the ERCP should be identified, and any required changes should be made.



NOTIFYING THE PUBLIC THAT THE EMERGENCY HAS BEEN SUCCESSFULLY RESOLVED

Once the emergency is over and operations can return to normal, the water supplier should notify the public that the public notice is rescinded. The water supplier should inform the public that the emergency has been resolved and the drinking water is once again safe to use. When rescinding the notification use the same communication methods as were used when issuing the notification.

POST-EMERGENCY REPORT

The water supplier should develop a Post-Emergency Report to document the emergency, response efforts, the success of the response efforts, and lessons learned from the emergency response. The Post-Emergency Report can also identify emergency prevention and preparedness steps that can be improved. Updates to the ERCP should also be considered based on conclusions of the Post-Emergency Report.

The ERCP template in Appendix A can be used to complete this section.

STEP 5: PREPAREDNESS STEPS

The water supplier should engage in regular ERCP exercises to confirm that the ERCP is workable and to identify gaps in the ERCP prior to an emergency. Staff who may be called upon to execute the emergency response should complete regular training and regularly exercise the ERCP.

When completing ERCP exercises, the water supplier should identify various steps that can be taken to assist in being prepared for emergencies. Preparedness steps could include the following:

- Checking personal protective equipment supplies
- Reviewing spare parts inventory
- Putting mutual aid agreements in place with neighbouring municipalities
- Confirming personnel training is up to date



INVENTORY EMERGENCY RESPONSE EQUIPMENT

The water supplier should develop an inventory of emergency response equipment including:

- **Personal protective equipment (PPE)** requirements for the emergencies should be identified to ensure that all required PPE is available and in good working order. The PPE should be checked as per manufacturer requirements.
- **Tools** required to make repairs should be reviewed to ensure they are available and in working order.
- **First Aid** supplies should be reviewed and replenished to ensure that nothing has expired.
- **Spare equipment** that should be stocked for an emergency. For example, spare chemical dosing pumps, filter cartridges, etc. The water supplier should also identify any critical equipment that breaks regularly for which spares should be readily available.
- **Backup power** should be in place for critical infrastructure and tested regularly.
- **Consumables such as reagents, gloves, sample bottles, etc.** Emergencies may disrupt transportation networks. Determine the frequency on which consumables are consumed, the longest period for which they can be stored, and the longest time that could be reasonably expected between shipments during an emergency.

SECURE ALTERNATIVE WATER SUPPLY

The water supplier should consider the need for alternate water supply. Emergencies may lead to a need for an alternative raw water supply and/or an alternative potable water supply. Consider what you would need if your raw water source was impacted, or if your treatment and/or distribution system was damaged by an emergency.

Some examples of preparedness steps for an alternate water supply include:

- Establishing a Mutual Aid Agreement to work with neighbouring water suppliers.
- Obtaining necessary approvals such as a water withdrawal license, and Health Authority permitting for use of an alternative raw water source.
- Developing a plan to distribute bottled or trucked water to the community.

- Considering the practicality of having a mobile treatment unit to supply drinking water in the event of a catastrophic failure. Note: mobile treatment units may require appropriately certified water Operators and Health Authority approval.

TRAINING REQUIREMENTS

The water supplier should identify training needs and undertake training for staff responsible for responding to emergencies. This can also include ensuring that training has not expired. To organize the training program, a training matrix can be developed. The matrix will identify each person who needs to be involved in each training session. The expiry date of the training should be documented in this table as well to alert managers of when training must be updated.

The ERCP template has a training matrix that can be used to track required personnel training.

The water supplier should also schedule ERCP training events for the entire team. Exercising the plan builds a sense of comradery and increases the likelihood that people will step up during an emergency. Following each exercise, the success of the response procedures should be documented. If there were unsuccessful areas or areas that could be improved upon, this should be documented for updating the ERCP.

Types of training exercises can include:

- **Presentations** can be given to inform participants of the contents of the ERCP
- **Tabletop exercises** can be organized to host in depth conversations about the emergency response procedure
- **Drills** can be organized to practice and validate the steps in the response procedure

ESTABLISH MUTUAL AID AGREEMENTS

The water supplier should establish mutual aid agreements with other water suppliers to support sharing of supplies and human resources during an emergency. For example, water suppliers who use the same type of chlorine could have a mutual aid agreement in place. This could also include identifying neighbouring staffing resources in the event of loss of staff or if staff are unable to attend to the emergency due to road blockages etc.

STEP 6: MAINTAIN THE ERCP

The water supplier should establish a review and maintenance schedule for the ERCP which includes:

- Annual reviews and/or after an emergency
- Revisions as part of post-emergency procedures and following an ERCP training event
- Regular updates to the contact list and updated with changes in staffing

The review and maintenance of the ERCP should include the following checks:

- Review staff training requirements and identify any new training required or any training that will be expiring shortly
- Check the PPE and supplies to ensure that it has been serviced as per manufacturer requirements and is not expired. Replenish any PPE that has run low

The drinking water officer should be informed when the ERCP is updated and provided with a revised copy.

STEP 7: COMPLETE THE ERCP

Provide a copy of the final ERCP to the drinking water officer and make a summary of it available to the staff and the public. The ERCP may contain information that could affect the security of the water supply. For this reason, only a summary of the ERCP should be made available to the public.

The legislation requires that the water supplier inform the public of the water supplier's ERCP. Reference can be made to the *Guide for Communicating with Water Users*, which recommends that a summary of the ERCP be included in an annual update report.

Legislative Responsibility: Section 13 (3) and (4) of the Regulation requires that the Water Supplier:

- Ensure the emergency response and contingency plan is accessible to the staff of the water supplier.
- Provide a copy of the emergency response and contingency plan to the drinking water officer.
- Make a summary of the emergency response and contingency plan accessible to the users served by its water supply system, and
- Must not include in the summary referred to in subsection (4) any information that may reasonably pose a risk to the water supply system.

ADDITIONAL RESOURCES

- **Planning for an Emergency Drinking Water Supply:** The US EPA has developed guidance to providing drinking water in the event of a catastrophic emergency
 - **Website:** https://www.epa.gov/sites/production/files/2015-03/documents/planning_for_an_emergency_drinking_water_supply.pdf
- **Drinking Water Advisory Communication Toolbox:** The US Center for Disease Control (CDC) templates, and tools that can be used to communicate drinking water advisories
 - **Website:** <https://www.cdc.gov/healthywater/emergency/dwa-comm-toolbox/index.html>
- The **Decision Protocols for Cyanobacterial Toxins in B.C. Drinking Water** provides direction on the suggested response plan for a cyanobacteria bloom.
 - **Website:** <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/drinking-water-officers-guide>
- **Pacific Climate Impacts Consortium** – PCIC offers a variety of services to deliver regional climate information
 - **Website:** <https://pacificclimate.org/>
- **British Columbia Drought Response Plan** and **Dealing with Drought – A Handbook for Water Suppliers in B.C.** provide guidance on response to droughts
 - **Drought Response Plan:** https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/drought-info/drought_response_plan_final.pdf
 - **Dealing with Drought Handbook:** https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/drought-info/dealing_with_drought_handbook.pdf

ACRONYMS AND DEFINITIONS

- Drinking water health hazard** (a) a condition or thing in relation to drinking water that does or is likely to:
- (i) endanger public health, or
 - (ii) prevent or hinder the prevention or suppression of disease,
- (b) a prescribed condition or thing, or
- (c) a prescribed condition or thing that fails to meet a prescribed standard.

DWO	Drinking Water Officer
DWOG	Drinking Water Officer’s Guide
DWPA	Drinking Water Protection Act
DWPR	Drinking Water Protection Regulation
EMBC	Emergency Management British Columbia
EOC	Emergency Operations Centre
ERCP	Emergency Response and Contingency Plan
Water supplier	Owner of a water supply system
Water user	User of a water supply system, the public

APPENDICES

Appendix A and B are provided as fillable Word templates and can be found through the following links:

Appendix A: Emergency Response and Contingency Plan

Appendix B: Public Notification Templates

Links to both this guide and the appendices are available on the Resources for Water System Operators page: <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/resources-for-water-system-operators#guide-emergency>