

# Water Quality Contingency Planning Guide

## Example Emergency Response Plan Overview

The example Emergency Response Plan (ERP) and templates are provided to aid waterworks owners and operators in completing an ERP for the waterworks which they are responsible. Some sections are completed, some partially complete and some are left blank. This is only intended as an example to give you a better idea of how to complete an ERP. The information provided is only for demonstration purposes and is not intended to be a complete ERP.

This document is designed to form the basis for a fundamental plan for use by small municipal waterworks such as those found in a hamlet, village, resort village, northern village and some smaller towns. It may also provide a useful example for private waterworks regulated by Saskatchewan Environment and some sections will be of value to pipeline owners and operators.

This example includes the rationale for an ERP and provides some guidance that may apply for common problems and upset conditions that occur in waterworks from time to time. Those using this should not only complete the blank contact lists, but should verify and update these listings on an annual basis to ensure that when an emergency occurs, the required aid is available.

Section 43(1) of *The Water Regulations, 2002* requires all waterworks permittees to have a Quality Assurance and Quality Control (QA/QC) Policy in place by December 31, 2003. An ERP is a vital component of the operational and maintenance component of a QA/QC policy. ERPs are also vital in protecting the health of consumers served by a waterworks and will be valuable as an example of “due diligence” in the event that serious problems do affect a waterworks.

An ERP will help to ensure waterworks owners and operators know what to do in the event a problem occurs and act accordingly, rather than losing valuable time which ultimately could result in greater contamination and cost to resolve. Owners and operators who are not directly involved in the development of the waterworks specific plan should familiarize themselves with the content of the final plan.

A typical ERP will contain several items, many of which are already provided in this example. Items normally found in an ERP for a Waterworks includes:

- a listing of all contacts that may be necessary in the event of a problem;
- a listing of the most common and anticipated problem situations and early response actions;
- information on emergency notification and communication procedures for media contacts
- signs and postings that may be needed to warn consumers of water quality problems and example Precautionary Drinking Water Advisories or Emergency Boil Water Orders;
- operational manuals for equipment and stand-by equipment (if available); and
- drawings or maps of the water distribution system, control points (valves) and flush-out points.

Further material and example information is available from Saskatchewan Environment's Waterworks Emergency Response Planning Guide, EPB-240.

EPB 240B  
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Saskatchewan  
Environment

Environmental  
Protection  
Branch

# Water Quality Contingency Plan

Community Of \_\_\_\_\_

Date Completed: \_\_\_\_\_ Date Approved By Waterworks Owner: \_\_\_\_\_

Section 43(1) of *The Water Regulations, 2002* requires all waterworks permittees to have a Quality Assurance and Quality Control (QA/QC) Policy in place by December 31, 2003. A Water Quality Contingency Plan is a complement to the Corporate/Municipal Emergency Plan and is a vital component of the operational and maintenance component of a QA/QC policy.

The Water Quality Contingency Plan Guide is provided to aid waterworks owners and operators in completing a Water Quality Contingency Plan, which is an addition to their existing Municipal Emergency Plan or Corporate Emergency Plan. Every municipality is required to have a Municipal Emergency Plan by *The Emergency Planning Act, 1989* and many corporations also already have developed Emergency Plans. This template is to help waterworks owners and operators develop a Water Quality Contingency Plan that is a part of the larger plan. However, this is only intended as an example to give your water system owners and operators a better idea of how to complete a Water Quality Contingency Plan as a part of the larger Emergency Plan and is not intended to supercede a municipality's or corporation's Emergency Plan. The information provided with the examples is only for demonstration purposes and is not intended to be a complete Water Quality Contingency Plan.

A Water Quality Contingency Plan will help to ensure that waterworks owners and operators know what to do in the event of a problem and act accordingly and in conjunction with the larger Municipal/Corporate Emergency Plan, rather than losing valuable time which could ultimately result in greater contamination and cost to resolve. In some cases, the Emergency may be a multi-agency emergency, such as a flood, in which case the Municipal Emergency Plan or Corporate Emergency Plan would be enacted. In this case, the Water Quality Crisis Management Cell would become a part of the larger emergency response group and all efforts should be coordinated from the larger perspective. Owners and operators who are not directly involved in the development of the waterworks specific plan should familiarize themselves with the content of the final plan.

A typical Municipal or Corporate Emergency Plan will contain much information. Items normally found in an Municipal or Corporate Emergency Plan include:

- a listing of all contacts that may be necessary in the event of a problem;
- a listing of the most common and anticipated problem situations;
- information on emergency notification and communication procedures media contacts;
- planning committee listing and the name of the Emergency Measures Coordinator;
- authority structure and organizational responsibilities in the event of an emergency; and,
- Emergency Operation Center Details.

If the above list of information is not contained within your Corporate/Municipal Emergency Plan, then EPB 241 Guidelines for Waterworks Emergency Response Planning should be referenced for further guidance or the missing information placed in your Water Quality Contingency Plan.

In addition to the previous list, SE also requires that the following information be included in either your Water Quality Contingency Plan or your Corporate/Municipal Emergency Plan

- a listing of all contacts (such as priority customers) that may be necessary in the event of a water quality incident;
- signs and postings that may be needed to warn consumers of water quality problems and example Precautionary Drinking Water Advisories or Emergency Boil Water Orders;
- operational manuals for equipment and stand-by equipment (if available);
- a listing of the most common and anticipated problem situations particular to the water system and early response actions; and
- drawings or maps of the water distribution system, control points (valves) and flush-out points.

Before being submitted to SE, all Water Quality Contingency Plans should be approved by Council (in the case of a municipality) or Management (in the case of a corporation) in the same manner that the Municipal or Corporate Emergency Plan was.

Further material and example information is available from the following SE publications:

- ❑ Guidelines for Waterworks Emergency Response Planning, EPB-240. Planning assistance to make a stand-alone Waterworks Emergency Plan.
- ❑ Waterworks Emergency Response Planning Template, EPB- 241. An Example stand-alone Waterworks Emergency Plan.
- ❑ Water Quality Emergency Planning, EPB-241B. A fact sheet discussing emergency planning.

### **Water Quality Contingency Plan Content**

A Water Quality Contingency Plan should contain the following information. Some of this information can be found in the Municipal or Corporate Emergency Plan and, if so, should not be reproduced in the Water Quality Contingency Plan except where emphasis or clarification is necessary.

#### **1. Introduction and Policy Statement**

The intent of this contingency plan is to ensure the safety of consumers and the protection of life, property and the environment in the most efficient way possible in the event of an unexpected water quality incident. In particular, this plan deals with events that may affect water quality.

The performance goals and acceptable levels of service are outlined in this section and should coincide with the goals in your Municipal or Corporate Emergency Plan.

#### **2. Water Quality Contingency Plan Contact List**

All contacts particular to a water quality incident should be listed here. This list may be contained within your existing Municipal or Corporate Emergency plan.

Home, work, fax and cell phone numbers should be provided in this section for the following types of people:

- personnel of the waterworks: operators, managers, engineers, and alternates
- government agencies: SE, Saskatchewan Health, Saskatchewan Emergency Planning
- emergency contacts: fire, ambulance, police
- equipment suppliers, repair personnel
- Water Quality Crisis Cell and Waterworks Emergency Planning Task Force members
- priority Contacts: hospitals, dentists, water companies, schools, other utilities supplied
- utility Contacts: Sask Power, Sask Tel, Sask Energy, CPR, CNR

#### **3. Organizational Responsibilities**

In this section, an organizational chart should be inserted. In addition, where applicable contact information for the Waterworks Emergency Planning Task Force (WEPTF) and the Waterworks Crisis Management Centre (CMC) or similar larger format organizational structures as outlined below should be included. In the event of a major emergency, the community's or corporation's Emergency Plan will take precedence. It should be demonstrated in this section how the Water Quality Contingency Plan and specifically the Waterworks Emergency Task Force and the Waterworks Crisis Management Cell are integrated with the larger existing Emergency Measures Organization.

The Waterworks Emergency Planning Task Force is the committee responsible to develop the Water Quality Contingency Plan and should be made up of municipal officials (elected officials, administration staff), emergency personnel, and possibly provincial government officials (such as the local Environmental Protection Officer (EPO), the Medical Health Officer or Health Inspector). It is very important that the waterworks manager and/or operator as well as the Emergency Measures Coordinator are involved in the planning stages to ensure that the Water Quality Contingency Plan complements the existing Municipal or Corporate Emergency Plan.

A different set of people may be defined who deal with crisis as they arise. This group is called the Waterworks Crisis Management Cell Members. This group should take advantage of facilities provided for and planning done for the Municipal/Corporate Emergency Plan. Members of this group should include the Emergency Measures Coordinator, the Waterworks operator/manager, and Sask Environment and Sask Health advisors. The Water Quality Crisis Coordinator coordinates all the incident responses and is typically the waterworks manager or town administrator. Spokespersons should be identified for the Waterworks Crisis Management Cell. These spokespersons should coordinate with the Emergency Measures Organization in the event of a large incident where the Municipal Emergency Plan is activated.

A general incident procedure, such as the one below, should be listed. In general, a waterworks incident should follow these steps:

1. the waterworks owner/operator(s) monitor the distribution system and treatment plant for trigger events. The local Health District monitors the public for a public health trigger;
2. all incidents are reported to the Water Quality Crisis Coordinator;
3. the Water Quality Crisis Coordinator evaluates the event, determines if a trigger has been met and classifies all events even those without a technical action plan (TAP). – see section 5;
4. the Water Quality Crisis Coordinator activates the Water Quality Crisis Management Center (CMC), if called for;
5. the CMC directs the implementation of the TAP and recommends further actions, if required. This may require the notification of the Emergency Measures Organization for the municipality or corporation;
6. the CMC utilizes the Communication Plan to advise the public;
7. when the emergency is over, CMC is deactivated; and
8. the Water Quality Crisis Coordinator prepares a report on the incident and presents it to the Waterworks Emergency Planning Task Force for evaluation.

#### 4. Notification and Communication

Notification and communication actions should be directed in the same manner as detailed in your Municipal or Corporate Emergency Plan.

##### Emergency Notification to Customer

The system notifies all system users via the following manner in case of an emergency (Check all that apply):

Phone calls (phone list location) \_\_\_\_\_  Door to door  
 Media release \_\_\_\_\_  Other \_\_\_\_\_

##### Emergency Numbers Distribution

System users are provided the names and phone numbers of the system personnel to contact in case of emergency via the following manner (Check all that apply):

Billing  Newsletter  Other \_\_\_\_\_

##### Media

Media Communication procedures and contact lists should be outlined in your Municipal/Corporate Emergency Plan.

##### Official Statements

The statements listed below should be included in your Water Quality Contingency Plan and usually will not be found in your Corporate/Municipal Emergency Plan.

- Emergency Boil Water Order Has Been Issued
- Emergency Boil Water Order Has Been Rescinded
- Precautionary Drinking Water Advisory Has Been Issued
- Precautionary Drinking Water Advisory Has Been Rescinded
- Refute a False Water Contamination Report

##### Signs

All example signs (Precautionary Drinking Water Advisory & Emergency Boil Water Order) are available from SE's document entitled "Bacteriological Follow-up Protocol for Waterworks Regulated by Saskatchewan Environment, November 2002, EPB 205".

## 5. Technical Action Plans (TAP)

Many emergency situations can lead to water quality degradation, for example, a main break, a power outage, pumping equipment failure or a natural disaster. Other emergency situations are a direct result of a water quality problem such as a waterborne disease outbreak, bacterial contamination of the distribution system or contamination of the source of supply. Water service can be disrupted by these events and water quality can be threatened if not degraded.

The technical action plans included in this document are only examples and may not apply to your water system. TAPs are not typically included in your Municipal/Corporate Emergency Plan and therefore must be contained in the Water Quality Contingency Plan. The Emergency Measures Coordinator must be advised of every situation where more than the waterworks could be affected or human health is at risk.

	<b>Actions</b>	<b>Contact</b>
<b>1) Flood conditions</b> <b>Trigger events: widespread flooding occurs.</b> (Disaster)	<ul style="list-style-type: none"> <li>notify SE – Environmental Project Officer (EPO);</li> <li>notify users of the potential for water contamination, loss of pump, power, etc. Users should be advised to store some drinking water in advance and to boil any suspect water for at least one minute;</li> <li>notify priority customers;</li> <li>contact local media for public service announcement (where all customers can not be notified by phone); and</li> <li>contact government agencies (see below) for advice and assistance.</li> </ul>	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary.
<b>2) Outbreak of a waterborne disease</b> <b>Trigger events: local Health District notifies the water system of a confirmed outbreak.</b> (Major emergency to disaster)	<ul style="list-style-type: none"> <li>notify SE – EPO;</li> <li>notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute;</li> <li>notify priority customers;</li> <li>contact local media for public service announcement (where all customers can not be notified by phone); and</li> <li>contact government agencies (see below) for advice and assistance.</li> </ul>	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary
<b>3) Contamination of source</b> <b>Trigger event: gross deterioration of source water due to a spill, vehicle accident or natural causes.</b> (Major emergency)	<ul style="list-style-type: none"> <li>shut down pump;</li> <li>notify SE – Environmental Project Officer;</li> <li>notify users;</li> <li>notify priority customers;</li> <li>contact government agencies (see below) for advice and assistance; and</li> <li>contact local media for public service announcement (where all customers can not be notified by phone).</li> </ul>	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary.
<b>4) Loss of source</b> <b>Trigger event: Access to source water is lost due to intake problems or natural causes</b> (Major emergency)	<ul style="list-style-type: none"> <li>shut down pump;</li> <li>notify SE – EPO;</li> <li>notify users;</li> <li>notify priority customers; and</li> <li>contact government agencies (see below) for advice and assistance.</li> </ul>	Owners of water system, SE (Local Environmental Project Officer) and others as necessary.

<p><b>5) Treatment process failure</b></p> <p><b>a) Loss of chlorine residual leaving plant</b>  <b>Trigger events: chlorine level leaving the plant is less than 0.1 mg/l free chlorine.</b> (Minor emergency)</p>	<ul style="list-style-type: none"> <li>• notify SE – EPO;</li> <li>• notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute;</li> <li>• notify priority customers; and</li> <li>• contact government agencies (see below) for advice and assistance.</li> </ul>	<p>Owners of water system, SE (Local EPO), Chlorinator and chlorine suppliers</p>
<p><b>b) Loss of chlorine residual in distribution system</b>  <b>Trigger events: chlorine levels at any place in the distribution system is less than 0.1mg/l free chlorine or 0.5 mg/l total chlorine.</b> (Major emergency)</p>	<ul style="list-style-type: none"> <li>• notify SE – EPO;</li> <li>• notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute;</li> <li>• notify priority customers; and</li> <li>• contact government agencies (see below) for advice and assistance.</li> </ul>	<p>Owners of water system, SE (Local Environmental Project Officer), Chlorinator and chlorine suppliers</p>
<p><b>c) Increased turbidity in filter effluent</b>  <b>Trigger event: the effluent turbidity of a filter is greater than 0.3 N.T.U.</b> (Minor emergency)  Sudden increases generally indicate a system disturbance or treatment failure</p>	<ul style="list-style-type: none"> <li>• notify SE – EPO;</li> <li>• notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute;</li> <li>• notify priority customers; and</li> <li>• contact government agencies (see below) for advice and assistance.</li> </ul>	<p>Owners of water system, SE (Local EPO)</p>
<p><b>d) Microbial contamination detected</b>  <b>Trigger event: a positive microbial test result is received for the treated water.</b> (Routine incident to major emergency)</p>	<p>Follow Saskatchewan’s Bacteriological Protocol for Waterworks Regulated by Saskatchewan Environment EPB 205 procedures document</p>	<p>As per Saskatchewan’s Bacteriological Follow-up procedures document.</p>
<p><b>e) Pump system failure</b>  <b>Trigger events: all pumps fail and unable to supply water or distribution system pressure drops</b> (Minor Emergency)</p>	<ul style="list-style-type: none"> <li>• notify SE – EPO;</li> <li>• notify users of interruption of service; and</li> <li>• notify priority customers.</li> </ul>	<p>Owners of water system, SE (Local EPO), Pump supplier</p>
<p><b>f) Other treatment process failure</b>  <b>Trigger events: loss of coagulation, or other significant process failures.</b> (Routine incident to major emergency)</p>	<ul style="list-style-type: none"> <li>• notify SE – EPO;</li> <li>• notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute;</li> <li>• notify priority customers; and</li> <li>• contact government agencies (see below) for advice and assistance.</li> </ul>	<p>Owners of water system, SE (Local EPO)</p>
<p><b>6) Power failure</b>  <b>Trigger events: power outage.</b>  (Minor emergency)</p>	<ul style="list-style-type: none"> <li>• notify SE – EPO;</li> <li>• start backup generator, if possible;</li> <li>• notify users of interruption of service if backup pump not capable of maintaining supply;</li> <li>• notify priority customers; and</li> <li>• call SaskPower.</li> </ul>	<p>Owners of water system, SE (Local EPO)</p>
<p><b>7) Distribution system problems</b></p> <p><b>a) Backflow or back siphonage/ significant loss of pressure in the system</b>  <b>Trigger events: backflow or contamination is widespread throughout the distribution system</b>  (Major emergency)</p>	<ul style="list-style-type: none"> <li>• notify SE – EPO;</li> <li>• notify users of to boil their water for at least one minute or take other disinfection procedures or as instructed by SE ;</li> <li>• notify priority customers; and</li> <li>• purge and disinfect lines as directed.</li> </ul>	<p>Owners of water system, SE (Local EPO)</p>

<p><b>b) Water breaks - sanitary repair procedures</b>  <b>Trigger event: main line breaks</b> (Major emergency)</p> <p>Repairing a main break is the most common type of emergency maintenance in a distribution system. Depending on site-specific conditions, a main break may be a source of contamination. For example, if the damaged pipe is below the water table or in contact with a sewage or storm water main, contamination may occur. As noted, maintenance procedures differ for main breaks between those breaks likely and unlikely to cause contamination. Contact your local EPO if you are unsure about whether contamination is expected for a particular break.</p> <p><b>Trigger event: storage facility break</b>  (Major emergency)  Emergency repair of finished water storage facilities is warranted by conditions such as:</p> <ul style="list-style-type: none"> <li>• penetration due to localized corrosion;</li> <li>• penetration or splits due to extensive metal loss;</li> <li>• high turbidity and/or bacteria from excessive sediment; or</li> <li>• animal contamination due to screen failure.</li> </ul> <p>Generally, emergency maintenance on steel or concrete storage facilities involves temporarily plugging a hole or other penetration in the facility wall. Ultimately, however, the temporary repair should be replaced with a welded patch.</p>	<p>If contamination is not expected:</p> <ul style="list-style-type: none"> <li>• call excavation contractor;</li> <li>• treat the replacement pipe and fittings with a chlorine solution; and</li> <li>• notify downstream users of interruption of water service, if required.</li> </ul> <p>If the existing main is partially or wholly dewatered, some of the following steps may be necessary to repair the main: Actions (AWWA C651-99):</p> <ul style="list-style-type: none"> <li>• control water loss by completely or partially shutting down the main.</li> <li>• flushing may be used to minimize flow toward the damaged main, thus reducing the extent of possible contamination;</li> <li>• water should be reduced to a level below the break as quickly as possible. Groundwater may be treated with hypochlorite while repairs are underway. If the water appears to be clear, a 25 to 50 ppm dose may be sufficient. If sewage is present, a dose greater than 100 ppm is suggested;</li> <li>• customers at higher elevations than the break should be notified to shut off the inlet valve at their meter to prevent siphoning of hot-water tanks or water softeners;</li> <li>• extensive flushing may be used to purge possible contaminants and to bring clear water to the point of damage;</li> <li>• chlorine residuals should be checked hourly to evaluate the effectiveness of pumping and flushing procedures;</li> <li>• mains which have been repaired after a break or leak need to be cleaned, disinfected and monitored before being returned to service; and</li> <li>• monitoring that follows a main disinfection or the addition of a new facility usually entails a check for microbial activity, pH, turbidity, color, disinfectant residual, odor and an analysis for volatile organic compounds that may be associated with the application of coatings.</li> </ul> <ul style="list-style-type: none"> <li>• temporarily plug hole or other penetration in storage facility wall, if required</li> <li>• notify SE – EPO;</li> <li>• flush the water from the storage facility;</li> <li>• notify users if an interruption in service is expected;</li> <li>• contact government agencies (see below) for advice and assistance; and</li> <li>• contact contractor to permanently repair puncture. (ie. welded patch on a steel reservoir).</li> </ul>	<p>Owners of the water system, excavation contractor and others as necessary</p> <p>Owners of water system, SE (Local EPO), excavation contractor and others as necessary.</p> <p>Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary</p>
<p><b>8) Customer complaints</b>  <b>Trigger event: consumer complaint</b> (Routine incident)</p>	<ul style="list-style-type: none"> <li>• log the water quality complaint;</li> <li>• investigate the water quality complaint;</li> </ul>	<p>None</p>

<p>Water quality complaints should be logged in a retrievable format for tracking and reporting purposes. Tracking the complaints can help identify problem areas of the system. Temporary fixes (such as flushing) should not be used to address chronic water quality problems (such as excessive chlorine demand, turbidity, sediment, corrosive water, etc.).</p>		
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