TOWN OF LUMSDEN
BYLAW No. 1-2004

A BYLAW FOR THE ESTABLISHMENT OF A QUALITY ASSURANCE, QUALITY CONTROL POLICY AND EMERGENCY PLAN FOR WATERWORKS

WHEREAS we the owner/operator of the drinking water system servicing Lumsden understand that supplying good quality drinking water is essential to the continued growth, prosperity, and well being of our citizens. We are committed to managing all aspects of our water system effectively to provide safe and aesthetically appealing water that tastes good and is free from objectionable color or odor. It is our policy that the drinking water we provide will be produced in accordance with and meets or exceeds the quality standards required by *The Water Regulations, 2002.*

AND WHEREAS *The Water Regulations, 2002* requires municipalities as permittees of licensed waterworks and sewage works to follow standards and objectives, to achieve water quality objectives for human consumption as well as best practices for the treatment and distribution of water and wastewater.

AND WHEREAS the rationale for requisite monitoring of drinking water quality as subject to Section 32 of *The Water Regulations, 2002* is to ensure that the microbiological quality does not exceed levels specified in the regulations. As well, it is recognized the monitoring of microbiological quality of drinking water is a critical component in protecting the health of those persons consuming drinking water from municipal and other communal systems.

AND WHEREAS owners of systems are required to monitor the quality of the drinking water and subject to Section 37 of *The Water Regulations 2002,* immediately report to Saskatchewan Environment any known or anticipated process upset, bypass conditions, operational anomalies in a waterworks, any instance where disinfection equipment fails or where the level of disinfection is not achieved or anticipated to be achieved as required by Subsection 30(6). Owners are also required to act on direction or advice from EcoRegions and Health Regions to resolve problems or to prevent health hazards (Section 39).

AND WHEREAS 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.

AND WHEREAS a Water Quality Contingency Plan is a complement to the Municipal Emergency Plan and is a vital component of the operational and maintenance component of a QA/QC policy.

AND WHEREAS 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. 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 Emergency Plan, rather than losing valuable time which could ultimately result in greater contamination and cost to resolve.

AND WHEREAS in some cases, the Emergency may be a multi-agency emergency, such as a flood, in which case the Municipal 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.

THEREFORE BE IT RESOLVED The Council of the Town of Lumsden enacts as follows:

1. We hereby establish a ***Water Quality Assurance and Quality Control Policy for Waterworks*** as attached hereto in ***Appendix A*** and forming a part of this bylaw.

2. We hereby establish a ***Water Quality Contingency Plan*** *(Water Quality Emergency Plan)* as attached hereto in ***Appendix B*** and forming a part of this bylaw.

3. We hereby establish a ***Waterworks Emergency Plan*** as attached hereto in ***Appendix C*** and forming a part of this bylaw.

4. We hereby establish a ***Waterworks Technical Action Plan*** as attached hereto in ***Appendix D*** and forming a part of this bylaw.

5. The Public Works Supervisor or his/her designate shall be designated as the ***Water Quality Crisis Coordinator.***

6. The Chairman of the Water and Sewer Committee shall be designated as the ***Council member assigned responsibility for the Waterworks.***

7. Pursuant to the *Water Quality Assurance and Quality Control Policy for Waterworks* we hereby establish a **Waterworks Emergency Planning Task Force** which shall consist of the following members:
   a. Mayor
   b. Chairman of Water & Sewer Committee
   c. Waterworks Manager
   d. Town Administrator
   e. EMO Coordinator
   f. Environmental Project Officer
   g. Medical Health Officer

8. Pursuant to the *Water Quality Assurance and Quality Control Policy for Waterworks* we hereby establish a **Waterworks Quality Crisis Management Cell** which shall consist of the following members:
   a. Water Quality Crisis Coordinator
   b. Mayor
   c. Chairman of Water & Sewer Committee
   d. Town Administrator
   e. EMO Coordinator
   f. Waterworks Assistant foreman
   g. Sask Environment Advisor
   h. Local Health District Advisor

9. The Town's Emergency Measures Plan shall be activated at the discretion of the *Water Quality Crisis Management Cell.*

10. This Bylaw comes into force and becomes effective on the date of third and final reading.

Readings

Read a first time this	*26th*	*Day of*	*January, 2004.*
Read a second time this	*9th*	*Day of*	*February, 2004.*
Read a third time this	*9th*	*Day of*	*February, 2004.*

Mayor

SEAL

Administrator

Certified to be a true copy of **Bylaw No. 1-2004**
passed by resolution of Council.
on the **9th** day of **February, 2004.**

Administrator

SEAL

Appendix A Bylaw 1-2004

Waterworks Quality Assurance/Quality Control Policy for the Community of Lumsden

Approved: By-Law 01-2004 **Date: January 26, 2004**

1. Policy Statement

We, "the name of the owner / operator of the drinking water system servicing Lumsden" understand that supplying good quality drinking water is essential to the continued growth, prosperity, and well being of our citizens. We are committed to managing all aspects of our water system effectively to provide safe and aesthetically appealing water that tastes good and is free from objectionable color or odor. It is our policy that the drinking water we provide will be produced in accordance with and meets or exceeds the quality standards required by *The Water Regulations, 2002.*

To achieve our goals we will:

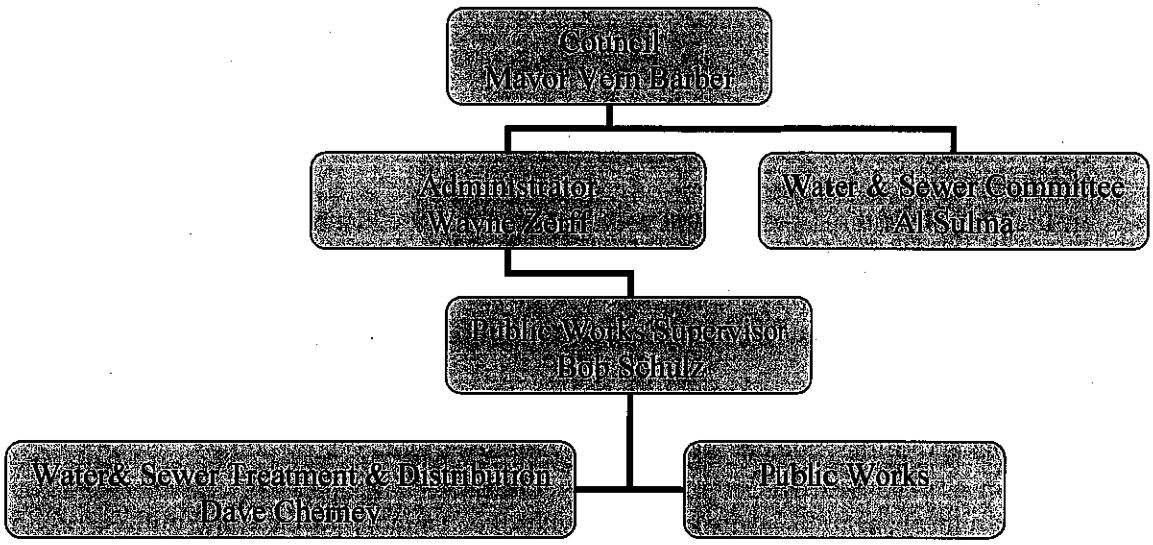
- Cooperate with the provincial government to protect our waterworks and water sources from contamination.
- Ensure the potential risks associated with water quality are identified and assessed.
- Ensure that our water supply, treatment, storage, and distribution infrastructure is properly designed, constantly maintained, and regularly evaluated and improved.
- Include the drinking water quality and quantity priorities, needs, and expectations of our citizens, the provincial authorities, and our water system employees into our planning.
- Develop a mechanism to ensure adequate funds are available for the water utility to maintain and improve the infrastructure, implement best practices, and ensure our water treatment employees are educated about their responsibilities and adequately trained and certified.
- Establish regular verification of the quality of drinking water provided to our citizens and monitoring of the water treatment process that produce the water.
- Provide community awareness about the water supply and its management by establishing and maintaining effective reporting of the water quality and timely information about the water system to our citizens.
- Develop contingency plans and incident response capabilities in cooperation with provincial authorities.
- Where possible participate in activities to ensure continued understanding or drinking water quality issues and performance.
- Regularly assess our performance and continually improve our practices to produce good quality water.

We will develop a Drinking Water Quality Management System including an implementation plan to achieve these goals and adequately manage the risks to our drinking water quality.

All of our officials, managers, and employees involved with the supply of drinking water are responsible for understanding, implementing, maintaining, and continuously improving the Drinking Water Quality Management System.

2. Organizational Structure

In this section, an organizational chart for the waterworks and associated administration should be inserted. The roles and responsibilities of each person identified in the organization structure chart should also be provided. In addition, contact information for members listed below should be included. A member of Council should be appointed as carrying the responsibility for reporting to the elected structure on the operation and condition of the works and on monthly review of records as required by section 43(2) of *The Water Regulations, 2002*.



Waterworks Operations, Management and Administration

Mayor
Verne Barber, Box 754, Lumsden, Sk. S0G 3C0; (306)731-2621

Council member responsible for waterworks (Chairman of Water & Sewer Committee)
Al Sulma, Box 193, Lumsden, Sk. S0G 3C0; (306)731-2563

Municipal Administrator
Wayne Zerff, Box 160, Lumsden, Sk. S0G 3C0; (306)731-2404

Public Works Supervisor (Waterworks Manager)
Bob Schulz, Box 160, Lumsden, Sk. S0G 3C0; (306)731-3142

Water Treatment Operator
Dave Cherney, Box 160, Lumsden, Sk. S0G 3C0; (306)731-3142
Bob Schulz, Box 160, Lumsden, Sk. S0G 3C0; (306731-3142

Water Distribution System Operator
Dave Cherney, Bob Schulz

Wastewater Works Operator
Dave Cherney, Bob Schulz

Wastewater Collection System Operator
Dave Cherney, Bob Schulz

Others: Backup Operators

Jeff Carey,	Box 160, Lumsden, Sk. S0G 3C0 (306)731-3142
Barry McGill,	Box 160, Lumsden, Sk. S0G 3C0 (306)731-3142
Lance Whitteron,	Box 719, Lumsden, Sk. S0G 3C0 (306)731-3835

The following is a summary of the role and responsibility of various persons involved in production and management of drinking water for the community of Lumsden.

The role of the Mayor with respect to waterworks operation includes:

- Overall responsibility for waterworks, quality of water provided to consumers, and regulatory compliance in capacity of person responsible for the municipality or waterworks
- In conjunction with council, allocates financial resources through a budgeting process and establishes water and sewer rates and or surcharges
- Chief official in the event of an emergency situation

The role of the Council Member assigned responsibility for the Waterworks includes:

- Oversees and reports on operational, maintenance or infrastructure issues or needs to Council and the Mayor or Reeve to ensure issues are addressed
- In conjunction with the Waterworks manager reviews operational records and logs on a monthly basis in accordance with the requirements of section 43(2) of *The Water Regulations*

The role of the Municipal Administrator includes:

- Receives and prepares administrative, budget
- Arranges for and provides annual notification to consumers served by the waterworks on the quality of drinking water provided and on sample submission compliance. Submits a report to Council on the state of drinking water on an annual basis,
- Receives and resolves or forwards all correspondence dealing with drinking water operations from on behalf of mayor and council
- Prepares financial reports regarding waterworks operational and maintenance issues
- Prepares strategies for ensuring waterworks sustainability
- Invoicing and receipt of waterworks related expenses as well as consumer charges for water use

The role of the Waterworks Manager includes:

- Overall responsibility for the day to day operation of the waterworks
- Develops operational and maintenance protocols and plans
- Develops safety plans and conducts safety inspections
- Assists with Budget preparation for operation and maintenance of waterworks
- Develops Waterworks Emergency Response Plan
- Provides guidance to operators on operation of works
- Prepares a report on the state of drinking water on an annual basis and submits to Administrator
- Provides waterworks record submissions for review of assigned Council member and submits for informational purposes to Council meetings
- Assists with staffing of waterworks operators and issues of supervision and scheduling

The role of the Water Treatment Operator(s) includes:

- Start up, shut down and periodic operating checks of plant equipment such as pumping systems, chemical feeders, auxiliary equipment (compressors), and measuring and control systems
- Makes arithmetic calculations to determine chemical feed rates, flow quantities, detention and contact times, and hydraulic loadings as required by plant operations
- Monitors the status of plant operating guidelines, such as flow pressures, chemical feeds, levels and water quality indicators, by reference to measuring systems
- Performs routine preventative maintenance, such as lubrication, operating adjustments, cleaning and painting equipment;
- Maintain plant records, including operating logs, daily diaries, chemical inventories and automated data logs

- Collects representative water samples and performs laboratory tests on samples for turbidity, chlorine residual and other tests as required by the operating permit or operational protocol
- Perform minor corrective maintenance on plant mechanical equipment, e.g.: chemical feed pumps
- Conducts tours of the waterworks and communicates with the public on issues associated with water quality
- Orders chemicals, repair parts and tools
- Load, unload and store water treatment chemicals
- Follows safety rules for plant operations

The role of the Water Distribution System Operator includes

- Periodic flushing or swabbing of the distribution system
- Locate and repair water leaks and operates, maintains and repairs valves and hydrants
- Collects and transports routine water samples from the distribution system and ensures proper packaging and shipment to the laboratory
- Performs repair work while ensuring safety procedures for the works site, traffic and the public are maintained
- Disinfects repaired or new sections of pipe and collects the necessary water samples
- Maintains distribution system plans and maps
- Cleans, disinfects and maintains reservoirs or other storage systems
- Operates and maintains any pumping equipment or facilities remote from the main water treatment plant as necessary
- Locates and eliminates cross-connections or potential cross-connections

Further information or information regarding the role of water treatment, water distribution, wastewater treatment and wastewater collection system operators, is available from "Water and Wastewater Operator Certification Program Guide, 2003, February 2003, EPB-144".

3. Operations and Maintenance Protocol

Operation of the community waterworks will be performed in accordance with design specifications and standard operating protocols of the waterworks industry. Further detail regarding standards operating procedures, range of operation and chemical feed, maintenance practices and intervals are outlined below.

Waterworks Operation/Maintenance Protocol Template

System Design Capacity (m^3/day or L/s):	3,974m3/day
Well(s)	
Number of wells:	2
Pump maintenance/change-out:	5 years/ 10 to 15 years
Well/pump service disinfection:	5 years
Wellhead protection inspection:	7 days/week
Supply Pipeline	
Quantity supply agreement	No
Disinfection – Method/Type(s):	
Disinfectant used:	Sodium Hypochlorite
Dosage rate/range:	2.66mg/l to 4.05 mg/l
Feed Type:	LMI – Diafram Pumps
Residual monitoring (location):	Daily – Dist. System

Water Storage – Type/size:

Volume of treated storage:	1,137m3
Fire water capacity:	577m3
Output metering (Yes/No):	at the wells only
Output meter recording:	none
Maintenance:	Grass cutting, electrical/mechanical as required
Inspection & cleaning:	Monthly inspections, clean every 2nd year

Water Distribution System

Piping type(s):	AC, C900
Flushing schedule:	Spring/Fall
Foam Swabbing schedule:	5 year
Pumping capacity:	gravity only, 75L/s @ valley bottom (approx.)
Emergency pumping capacity:	None
Backflow prevention: (Yes/No)	Some
Hydrant maintenance schedule:	Yearly
Valve maintenance schedule:	Yearly
Repair safety procedures (Yes/No)	Yes
Line/Main break disinfection (Yes/No)	Yes
Line/Main break sampling (Yes/No)	Yes
Customer metering (Yes/No)	Yes
Truck Fill Station (Yes/No)	Yes
Truck fill backflow (Yes/No)	Yes
Water hauler protocols:	Yes

Corrosion Control – Method:

Chemical(s) used:	Aqua Mag
Cathodic protection (Yes/No):	No

4. Water Quality Monitoring, Data Collection, Record Keeping, Record Review and Reporting Procedures

The following monitoring and record keeping protocols apply to the operation of the waterworks and distribution system

Water Quality Monitoring - Permit and Regulatory Requirements

The community of **Lumsden** will conduct all monitoring required by permit or ministers order issued by SE. The Environmental Project Officer (EPO) **Dennis Perras** is responsible for regulation of the waterworks will be advised of any positive bacteriological sample result as well as any exceedence of other water quality standards as determined through sampling and analysis for other substances as required by permit or ministers order. As of March 31, 2004 all required drinking water quality monitoring samples, other than samples for chlorine residual, turbidity or pH will be sent to and analyzed by an accredited laboratory. Appendix A which contains a Treated Water Quality Monitoring Plan can be used to record the communities monitoring activities and results.

The community of **Lumsden** will conduct daily free chlorine residual monitoring of drinking water entering the distribution system and turbidity monitoring at each filter as required by regulation, permit or ministers order issued by SE. The EPO, **Dennis Perras** who is responsible for regulation of the waterworks will be advised of any failure to meet a free-chlorine residual of at least 0.1 mg/L for water entering the distribution system as well as any exceedence of turbidity levels as required by operational permit, ministers order or regulatory requirement. Additionally, the community of **Lumsden** will advise the EPO, **Dennis Perras** responsible for regulation of the waterworks of any failure of the disinfection system or any other upset to the water treatment process, operation or distribution system concern in accordance with good practice or the emergency response plan – technical action plans for the waterworks.

Operational Monitoring Plan

Observational and measurement related operational monitoring of water quality and associated reporting requirements are established for the community of Lumsden waterworks. Water works operators will monitor operational process in accordance with Table 1. (Note: Monitoring requirements should be established for all aspects of the water supply system where possible and Table 1 offers guidance for this task – certain monitoring may not apply to specific systems and the table should be modified accordingly. SE's EPOs may be consulted with respect to selection of operational process monitoring appropriate to a specific waterworks).

Operational Parameter	**Treatment step/Process**					
	Raw water	**Coagulation**	**Sedimentation**	**Filtration**	**Disinfection**	**Distribution system**
pH	√				√	√
Turbidity (or particle count)	√			**X**	√	**X**
Temperature	√				√	√
Dissolved Oxygen	√					
River/stream flow						
Total coliforms	√				√	**X**
Background bacteria					√	**X**
Color	√				√	
Conductivity	√					
Alkalinity	√					
Organic carbon	√				√	
Algae and algal toxins						√
Chemical dosage					√	
Flow rate				√	√	
Headloss					√	
CT					√	
Disinfectant residual					**X**	**X**
Disinfection By Products					√	**X**
Pressure						√

Key:

Items with a check mark √ are recommended
Items with an "X" are mandatory

Table 1. Operational parameters – Examples

Record Keeping

Waterworks records and logs will be kept in accordance with the requirements of The Water Regulations, 2002. The following persons are delegated responsibility for operational record and log keeping: **Bob Schulz and Dave Cherney.** Operational records and logs will include:

- total water pumped into the distribution system on a daily basis or the total raw water used;
- the types, dosages and total amounts of chemicals applied to the water for treatment;
- locations from which samples for any tests conducted by the permittee of the waterworks were taken in accordance with the permittee's permit and the name of the person who conducted the sampling or testing and the results of those tests;
- any departures from normal operating procedures that may have occurred and the time and date that hey occurred;
- any instructions that were given during operation of the waterworks to depart from normal operating practices and the name of the person who gave the instructions;
- any upset condition or bypass condition, the time and date of the upset condition or bypass condition and measures taken to notify others and resolve the upset condition or bypass condition;
- any condition of low disinfectant levels, the time, date and location of occurrence and measures taken to restore disinfectant levels to required values;
- the dates and results of calibrating any metering equipment and testing instruments; and
- the dates and types of maintenance performed on equipment and any actions taken to ensure the normal operations of the waterworks.

The operational records or logs mentioned above will be recorded and maintained in the following manner:

- operational records or logs must be made in chronological order, with the dates, times and testing locations clearly indicated;
- entries in an operational record or log will only be made by the permittee or person specifically appointed by the permittee;
- persons making an entry in an operational record or log shall do so in a manner that allows the person to be unambiguously identified as the maker of the entry;
- operational records or logs must be maintained for at least five years;
- any anomalies or instances of missing entries in an operational record or log must be accompanied by explanatory notes;
- operational records or logs must only contain data or information that is actually observed or produced;
- operational records or logs must not contain default values generated manually or by automated means;
- operational records or logs maintained in accordance with the above requirements must be made available promptly on request of the Minister of Environment or a representative of the Minister.

(Note: Sample waterworks log and record sheets are provided by SE in the Drinking Water Information Binder which may be used and modified as necessary to aid in record/log keeping at waterworks (see tab 11 in binder provided by to each waterworks)).

Record Review and Reporting

The assigned council member and the waterworks manager will review all monitoring results, records and operational logs on a monthly basis. If the review of the records or logs indicates that the quality of water from the waterworks has been adversely affected, the findings will be reported to SE as soon as reasonably practical after the report has been completed.

5. Emergency Response Planning

Waterworks Emergency Response Plan forms part of this binder along with SE's Guidelines for Waterworks Emergency Response Planning, EPB-240 and Waterworks Emergency Response Planning Template, EPB-241". These documents provide guidance on Emergency contact listings, establishing a waterworks emergency planning taskforce, crisis management, notification and communication as well as technical action plans for a number of incidents which commonly occur.

TREATED WATER QUALITY MONITORING PLAN

	Parameters (list as specified in the permit)	Sampling location	Sampling method	Results	SE standards/ guidelines	Compliance with standards/ guidelines	Remarks
	Bacteriological						
1.	----------	---------	----------	-------	------	---------	---------
2.	----------	---------	----------	-------	------	---------	---------
	Chemical						
1.	----------	---------	----------	-------	------	---------	---------
2.	----------	---------	----------	-------	------	---------	---------
3.	----------	---------	----------	-------	------	---------	---------
4.	----------	---------	----------	-------	------	---------	---------
5.	----------	---------	----------	-------	------	---------	---------
6.	----------	---------	----------	-------	------	---------	---------
7.	----------	---------	----------	-------	------	---------	---------
8.	----------	---------	----------	-------	------	---------	---------
9.	----------	---------	----------	-------	------	---------	---------
10.	----------	---------	----------	-------	------	---------	---------
11.	----------	---------	----------	-------	------	---------	---------
12.	----------	---------	----------	-------	------	---------	---------
	Chemical -Health category						
1.	----------	---------	----------	-------	------	---------	---------
2.	----------	---------	----------	-------	------	---------	---------
3.	----------	---------	----------	-------	------	---------	---------
4.	----------	---------	----------	-------	------	---------	---------
	Physical						
1.	pH	---------	----------	-------	------	---------	---------
2.	Temperature	---------	----------	-------	------	---------	---------
3.	----------	---------	----------	-------	------	---------	---------
4.	----------	---------	----------	-------	------	---------	---------
5.	----------	---------	----------	-------	------	---------	---------
	Other						
1.	Turbidity	---------	----------	-------	------	----------	---------
2.	Residual Disinfectant Concentration	---------	----------	-------	------	----------	----------

APPENDIX – A

Appendix 'B' To Bylaw No. 1-2004
A Bylaw for the Establishment of a Quality Assurance, Quality Control and Emergency Plan for Waterworks

Water Quality Contingency Plan

Community Of Lumsden

Date Completed: January 26, 2004 Date Approved By Waterworks Owner: January 26, 2004

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 outlines 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) V Door to door
V 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):

V 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.

	Actions	**Contact**
1) Flood conditions **Trigger events: widespread flooding occurs.** (Disaster)	• notify SE – Environmental Project Officer (EPO); • 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; • notify priority customers; • contact local media for public service announcement (where all customers can not be notified by phone); and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary.
2) Outbreak of a waterborne disease **Trigger events: local Health District notifies the water system of a confirmed outbreak.** (Major emergency to disaster)	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; • contact local media for public service announcement (where all customers can not be notified by phone; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary
3) Contamination of source **Trigger event: gross deterioration of source water due to a spill, vehicle accident or natural causes.** (Major emergency)	• shut down pump; • notify SE – Environmental Project Officer; • notify users; • notify priority customers; • contact government agencies (see below) for advice and assistance; and • contact local media for public service announcement (where all customers can not be notified by phone).	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary.
4) Loss of source **Trigger tvent: Access to source water is lost due to intake problems or natural causes** (Major emergency)	• shut down pump; • notify SE – EPO; • notify users; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local Environmental Project Officer) and others as necessary.
5) Treatment process failure **a) Loss of chlorine residual leaving plant** **Trigger events: chlorine level leaving the plant is less than 0.1 mg/l free chlorine.** (Minor emergency)	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO), Chlorinator and chlorine suppliers

b) Loss of chlorine residual in distribution system **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.** (Major emergency)	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local Environmental Project Officer), Chlorinator and chlorine suppliers
c) Increased turbidity in filter effluent **Trigger event: the effluent turbidity of a filter is greater than 0.3 N.T.U.** (Minor emergency) Sudden increases generally indicate a system disturbance or treatment failure	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO)
d) Microbial contamination detected **Trigger event: a positive microbial test result is received for the treated water.** (Routine incident to major emergency)	Follow Saskatchewan's Bacteriological Protocol for Waterworks Regulated by Saskatchewan Environment EPB 205 procedures document	As per Saskatchewan's Bacteriological Follow-up procedures document.
e) Pump system failure **Trigger events: all pumps fail and unable to supply water or distribution system pressure drops** (Minor Emergency)	• notify SE – EPO; • notify users of interruption of service; and • notify priority customers.	Owners of water system, SE (Local EPO), Pump supplier
f) Other treatment process failure **Trigger events: loss of coagulation, or other significant process failures.** (Routine incident to major emergency)	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO)
6) Power failure **Trigger events: power outage.** (Minor emergency)	• notify SE – EPO; • start backup generator, if possible; • notify users of interruption of service if backup pump not capable of maintaining supply; • notify priority customers; and • call SaskPower.	Owners of water system, SE (Local EPO)
7) Distribution system problems **a) Backflow or back siphonage/ significant loss of pressure in the system** **Trigger events: backflow or contamination is widespread throughout the distribution system** (Major emergency)	• notify SE – EPO; • notify users of to boil their water for at least one minute or take other disinfection procedures or as instructed by SE ; • notify priority customers; and • purge and disinfect lines as directed.	Owners of water system, SE (Local EPO)

b) Water breaks - sanitary repair procedures **Trigger event: main line breaks** (Major emergency) 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.	If contamination is not expected: • call excavation contractor; • treat the replacement pipe and fittings with a chlorine solution; and • notify downstream users of interruption of water service, if required. 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): • control water loss by completely or partially shutting down the main. • flushing may be used to minimize flow toward the damaged main, thus reducing the extent of possible contamination; • 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; • 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; • extensive flushing may be used to purge possible contaminants and to bring clear water to the point of damage; • chlorine residuals should be checked hourly to evaluate the effectiveness of pumping and flushing procedures; • mains which have been repaired after a break or leak need to be cleaned, disinfected and monitored before being returned to service; and • 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.	Owners of the water system, excavation contractor and others as necessary Owners of water system, SE (Local EPO), excavation contractor and others as necessary.
Trigger event: storage facility break (Major emergency) Emergency repair of finished water storage facilities is warranted by conditions such as: • penetration due to localized corrosion; • penetration or splits due to extensive metal loss; • high turbidity and/or bacteria from excessive sediment; or • animal contamination due to screen failure. 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.	• temporarily plug hole or other penetration in storage facility wall, if required • notify SE – EPO; • flush the water from the storage facility; • notify users if an interruption in service is expected; • contact government agencies (see below) for advice and assistance; and • contact contractor to permanently repair puncture. (ie. welded patch on a steel reservoir).	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary
8) Customer complaints **Trigger event: consumer complaint** (Routine incident) 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.).	• log the water quality complaint; • investigate the water quality complaint;	None

Appendix C to Bylaw 1-2004

Town of Lumsden

Waterworks Emergency

Response Plan

January, 2004

Saskatchewan
Environment

Waterworks Emergency Plan

Community of **Lumsden**, Sask.

Date Completed: January 21, 2004. Date Approved By Waterworks Owner: January 26, 2004.

Table of Contents

Section 1- Introduction and Policy Statement

The intent of this emergency 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 incident. In particular, this plan deals with events that may affect water quality.
The performance goals and acceptable levels of service are outlined below.

Goal 1: Life safety

The primary goal of the water system is to ensure the safety of its users. At all times, safe, clean water should be provided to the public. Examples of conditions that should never occur are the failure of the distribution system; the distribution of contaminated water; the release of hazardous materials and the collapse of structures.

Goal 2: Fire suppression

Water for fire suppression should be made available as soon as possible after a disaster or emergency

Goal 3: Public health needs

Water is essential to life and health however some needs are more immediate than others. For instance, hospitals, care homes and emergency shelters require a continuous supply of potable water.

Section 2 - Emergency Response Contact List

Community/Waterworks Name	**Town of Lumsden**
Waterworks owner	**Town of Lumsden**
Source water	Ground Water
Water treatment plant location	NE ¼ 28-10-21-W2M

Personnel contact - Telephone / Fax Numbers

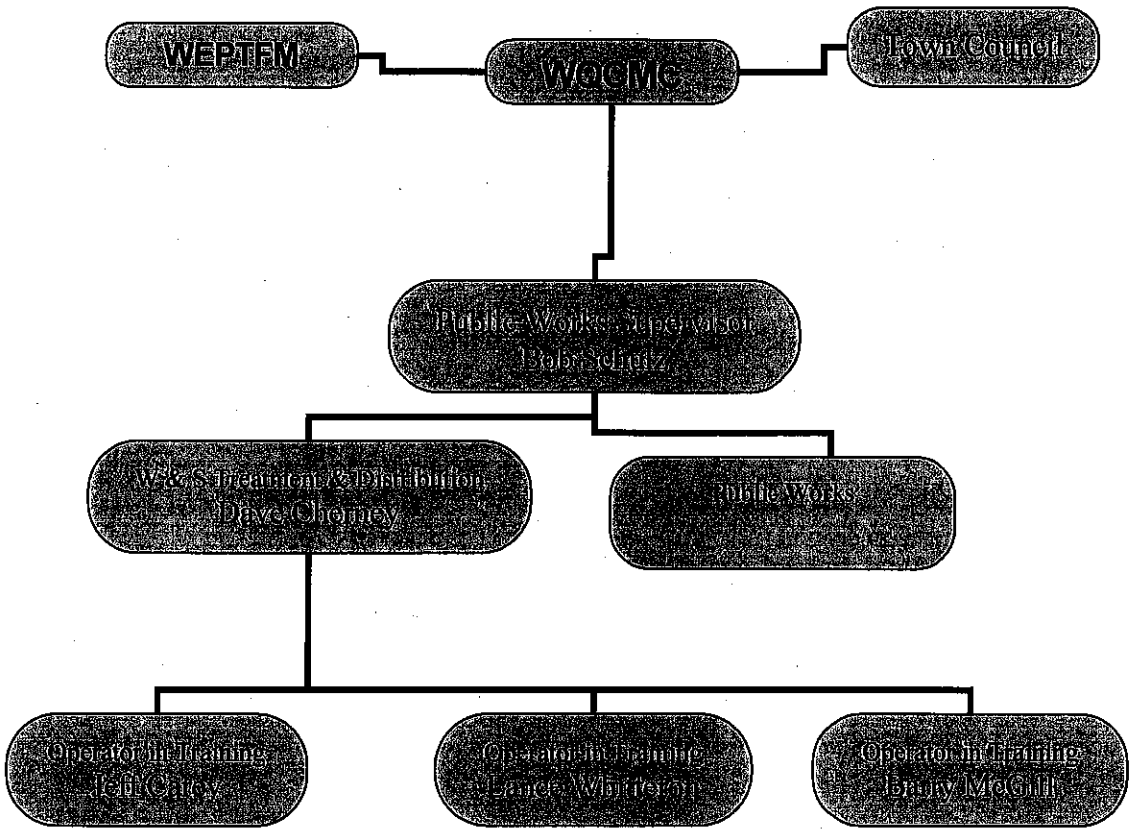
Contact Name		Telephone Home	Telephone Cell	Fax
Operator's name:	Bob Schulz	306-731-2132	306-731-7748	306-731-3572
Alternate operator 1:	Dave Cherney	306-731-2769	306-731-8024	306-731-3572
Alternate operator 2:	Jeff Carey	306-731-2976		306-731-3572
Alternate operator 3:	Lance Whitteron	306-731-3835		306-731-3572

Emergency Contact Numbers

Contact Name		Telephone Home/Work	Telephone Cell	Fax
Public Health Inspector: John Kline (to March 31, 2004)		306-766-7716(w)		306-766-7730
Medical Health Officer: Dr. Tanya Diener		306-766-7774(w)		306-766-7607
Environmental Project Officer: Dennis Perras		306-787-6199(w)	306-539-4188	306-787-8280
Saskatchewan Emergency Planning 24 Hour Line -7 Days a Week	Regina	306-787-9563		
	Saskatoon	306-933-6116		
Saskatchewan Environment (SE) EcoRegion Office				
SE Spill Emergency NumberOutside		1-800-667-7525 Province 306-953-2980		
Police		306-731-4270 or 911		
Ambulance		911		
Fire department		911		
Municipal engineer: Asscociated Engineering Ltd.		306-721-2466		
Pump manufacturer: LMI(Clear Tech) & Prominent(Metcon)		1-800-680-2522, 306-584-0022		
Chlorinator manufacturer		n/a		
Chemical supplier: Clear Tech		1-800-680-2522		
Excavation services: Cary's Trenching, Pettigrew Excvavating		306-731-536-3775, 306-596-0909		
Call Before You Dig #: Sask-Tel, Sask-Power, Sask-Energy		1-866-324-8344, 1-888-757-6937,1-866-828-4888		
Electrician: Rankin's Electric, Stockdales Electric		306-731-7683, 306-352-4505		
Plumbing services: Sinclair's Plumbing, Reinhardt's Plumbing		306-731-731-3636, 306-731-3002		
Bulk water hauler				
Bottled water supplier: Cowen Bigway Foods		306-731-2624		

Section 3 – Organizational Responsibilities

Organizational Chart



Water Quality Crisis Management Cell Members (WQCMC)

Contact Name	Name	Telephone Work	Cell	Fax
Water Quality Crisis Coordinator	Bob Schulz	731-2404	731-7748	731-3572
Public Relations Coordinator (Technical)	Bob Schulz	731-2404	731-7748	731-3572
Public Relations Coordinator (Mayor)	Vern Barber	731-2262		731-2494
Maintenance Foreman	Dave Cherney	731-3142	731-8024	731-3572
Town Administrator	Wayne Zerff	731-2452	737-2465	731-3572
Water Committee Chairman	Al Sulma	731-2563	536-3389	731-3572
Advisor – Saskatchewan Environment	Dennis Perras	787-6199		
Advisor – Health Inspector	John Kline	766-7716		766-7730
Advisor – EMO Coordinator	Thomas McCord	731-3592		731-3521
Advisor – Town Administrator	Wayne Zerff	731-2452		737-2465

Waterworks Emergency Planning Task Force Members (WEPTFM)

	Name	Telephone Home	Cell	Fax
Mayor	Vern Barber	731-2262		731-2494
Public Works Supervisor	Bob Schulz	731-2404	731-7748	731-3572
Town Administrator	Wayne Zerff	731-2452	737-2465	731-3572
Sask. Environment	Dennis Perras	787-6199		
Medical Health Officer	Dr. Tanya Diener	766-7774		766-7607
Water Committee	Al Sulma	731-2563	536-3389	731-3572
Water Committee	Bryan Matheson	731-3603		731-3572
Water Committee	Gordon Bonokoski	731-2416	731-7122	731-3572

General emergency procedures

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);
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.

Section 4 - Notification and Communication

Emergency notification to customer
The system notifies all system users via the following manner in case of an emergency (Check all that apply): ___Telephone calls (phone list location)
Door to door_V__ Media release _V_ 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:
Water Billing _V_

Media communications
In any crisis situation, the media will receive information only from the designated spokesperson(s). The spokesperson(s) will call a media conference, give information over the phone or release a written statement.

The website (www.lumsdensk.info) will be updated as information becomes available. In the case of a major emergency or disaster, the emergency hotline will be manned 24 hours a day until the CMC determines that the crisis has ended. The phone at the office (731-2404) will be utilized for this purpose.

Media contacts

MEDIA LIST

T.V.:

CBC Steve Krueger	347-9666 (newsroom)	347-9540(switchboard)
CTV CKCK Frank Flegel	569-2000 "	569-2000 "
STV	721-2212 "	721-2211 "

Radio:

CBC Pat Hume	347-9691 "	347-9540 "
CKCK Ross Wotten	757-3808 "	522-8591 "
CKIT	" "	" "
CKRM Manfred Joehneck	525-9195 "	525-9295 "
CFMO	" "	" "
CHAB Moose Jaw D. Blackie	693-6397 "	694-0808 "
CJME Bob Richards	757-6397 "	569-1300 "
CIZI " "	" "	" "

Newspapers:

Waterfront Press	editor	731-3143
Regina Leader-Post		565-8211

Official statements

- Emergency Boil Water Order Has Been Issued
  (Insert standard press release here)
- Emergency Boil Water Order Has Been Rescinded
  (Insert standard press release here)
- Precautionary Drinking Water Advisory Has Been Issued
  (Insert standard press release here)
- Precautionary Drinking Water Advisory Has Been Rescinded
  (Insert standard press release here)
- Refute a False Water Contamination Report
  (Insert standard press release here)

Signs

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

Section 5 - Technical Action Plans Appendix D

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 TAPs included in this document are only examples and may not apply to your water system

	Actions	Contact
1) Flood conditions **Trigger events: widespread flooding occurs.** (Disaster)	• notify SE – Environmental Project Officer (EPO); • 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; • notify priority customers; • contact local media for public service announcement (where all customers can not be notified by phone); and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary.
2) Outbreak of a waterborne disease **Trigger events: local Health District notifies the water system of a confirmed outbreak.** (Major emergency to disaster)	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; • contact local media for public service announcement (where all customers can not be notified by phone; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary
3) Contamination of source **Trigger event: gross deterioration of source water due to a spill, vehicle accident or natural causes.** (Major emergency)	• shut down pump; • notify SE – Environmental Project Officer; • notify users; • notify priority customers; • contact government agencies (see below) for advice and assistance; and • contact local media for public service announcement (where all customers can not be notified by phone).	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary.
4) Loss of source **Trigger tvent: Access to source water is lost due to intake problems or natural causes** (Major emergency)	• shut down pump; • notify SE – EPO; • notify users; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local Environmental Project Officer) and others as necessary.

5) Treatment process failure **Loss of chlorine residual leaving plant** **Trigger events: chlorine level leaving the plant is less than 0.1 mg/l free chlorine.** (Minor emergency)	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO), Chlorinator and chlorine suppliers
b) Loss of chlorine residual in distribution system **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.** (Major emergency)	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local Environmental Project Officer), Chlorinator and chlorine suppliers
c) Increased turbidity in filter effluent **Trigger event: the effluent turbidity of a filter is greater than 0.3 N.T.U.** (Minor emergency) Sudden increases generally indicate a system disturbance or treatment failure	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO)
d) Microbial contamination detected **Trigger event: a positive microbial test result is received for the treated water.** (Routine incident to major emergency)	Follow Saskatchewan's Bacteriological Protocol for Waterworks Regulated by Saskatchewan Environment EPB 205 procedures document	As per Saskatchewan's Bacteriological Follow-up procedures document.
e) Pump system failure **Trigger events: all pumps fail and unable to supply water or distribution system pressure drops** (Minor Emergency)	• notify SE – EPO; • notify users of interruption of service; and • notify priority customers.	Owners of water system, SE (Local EPO), Pump supplier
f) Other treatment process failure **Trigger events: loss of coagulation, or other significant process failures.** (Routine incident to major emergency)	• notify SE – EPO; • notify users of the potential for water contamination. Users should be advised to boil any suspect water for at least one minute; • notify priority customers; and • contact government agencies (see below) for advice and assistance.	Owners of water system, SE (Local EPO)
6) Power failure **Trigger events: power outage.** (Minor emergency)	• notify SE – EPO; • start backup generator, if possible; • notify users of interruption of service if backup pump not capable of maintaining supply; • notify priority customers; and • call SaskPower.	Owners of water system, SE (Local EPO)
7) Distribution system problems **a) Backflow or back siphonage/ significant loss of pressure in the system** **Trigger events: backflow or contamination is widespread throughout the distribution system** (Major emergency)	• notify SE – EPO; • notify users of to boil their water for at least one minute or take other disinfection procedures or as instructed by SE ; • notify priority customers; and • purge and disinfect lines as directed.	Owners of water system, SE (Local EPO)

b) Water breaks - sanitary repair procedures **Trigger event: main line breaks** (Major emergency) 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.	contamination is not expected: • call excavation contractor; • treat the replacement pipe and fittings with a chlorine solution; and • notify downstream users of interruption of water service, if required. 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): • control water loss by completely or partially shutting down the main. • flushing may be used to minimize flow toward the damaged main, thus reducing the extent of possible contamination; • 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; • 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; • extensive flushing may be used to purge possible contaminants and to bring clear water to the point of damage; • chlorine residuals should be checked hourly to evaluate the effectiveness of pumping and flushing procedures; • mains which have been repaired after a break or leak need to be cleaned, disinfected and monitored before being returned to service; and • 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.	of the water system, excavation contractor and others as necessary Owners of water system, SE (Local EPO), excavation contractor and others as necessary.
Trigger event: storage facility break (Major emergency) Emergency repair of finished water storage facilities is warranted by conditions such as: • penetration due to localized corrosion; • penetration or splits due to extensive metal loss; • high turbidity and/or bacteria from excessive sediment; or • animal contamination due to screen failure. 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.	• temporarily plug hole or other penetration in storage facility wall, if required • notify SE – EPO; • flush the water from the storage facility; • notify users if an interruption in service is expected; • contact government agencies (see below) for advice and assistance; and • contact contractor to permanently repair puncture. (ie. welded patch on a steel reservoir).	Owners of water system, SE (Local EPO), Saskatchewan Emergency Planning and others as necessary
8) Customer complaints **Trigger event: consumer complaint** (Routine incident) 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.).	• log the water quality complaint; • investigate the water quality complaint;	None