City of Kenora

Drinking Water Quality Management System

Operational Plan

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List of Appendicies

1) Introduction

Quality Management can be defined as the policy and associated organizational structures, procedures, responsibilities, and evaluation measures that ensure the capability of delivering a product to specified standards. The use of Quality Management systems by modern industry has steadily increased over the last 30 years, since the development of the first ISO standard in 1986. Whether implemented voluntarily or as a requirement of suppliers to larger manufacturers, Quality Management has repeatedly proven beneficial in terms of accountability, quality control, efficiency, and productivity. The idea of mandated province-wide implementation of a Quality Management Standard by drinking water system owners originated as a recommendation in the Part Two Report of the Walkerton Inquiry. In brief, Recommendations 51 through 57 from the report state the following:

- .Drinking water systems should be operated by authorities that are accredited based on successful third party audits conducted by a certified accrediting body.

. The Ministry of the Environment, in partnership with other relevant stakeholders, should develop a Drinking Water Quality Management Standard against which the third party audits will be conducted.

. - All municipalities should prepare Operational Plans describing how the requirements of the Quality Management Standard are achieved.

The Provincial Government has committed to implementing all recommendations tabled by the report author, The Honorable Dennis R. O'Connor.

In accordance with those recommendations, the Operational Plan serves as a Quality Management System Guidance Manual that describes the methods by which the City of Kenora implements Quality Management. The Plan is written to meet or exceed the requirements of the Ministry of the Environment prescribed standard and is applicable to the management and operation of those works described in Section 6 of this Plan.

2) Quality Management System Policy

The Mayor, Council, and employees of the City of Kenora are dedicated to the operation and maintenance of its potable drinking water system, in order to provide the residents of Kenora with clean, safe drinking water. The systems shall be operated in such a manner that the system meets all requirements of the governing regulations under the Safe Drinking Water Act.

The City shall implement a Quality Management System, which will assist the City of Kenora in the management, operation and maintenance of the system, and will identify any potential hazards, risks or gaps in the system through the internal auditing process.

Internal audits shall be conducted to:

- Confirm the QMS has been effectively communicated throughout the organization
- Identify any sources of variation
- Promote awareness of the requirements for quality
- Ensures the “controls” for quality are in the hands of the process owners
- Identify any shortfalls in the management, operation and maintenance of the system
- Provide the foundation for continual improvement to the Quality Management System and the Drinking Water System

The QMS shall meet all requirements of the Ministry of the Environment’s Drinking Water Management Standard and shall be available at the Kenora Water Treatment Plant, Operations Centre, Municipal Office and on the City of Kenora’s Website.

3) Commitment & Endorsement

The Mayor and Council of the City of Kenora, being the Owner and Operating Authority for the Kenora Water System are committed to the implementation, maintenance and continual improvement of the Drinking Water Quality Management System. In conjunction with senior management both parties realize the need for sufficient resources, funding and staffing to maintain and make continual improvements to the Drinking Water Quality Management System.

The Quality Management Representative and Alternates have read and understand the roles and responsibilities required by the Quality Management system, and are committed to the appointment.

_____
Date

_____ Leonard Compton, Mayor – City of Kenora
Signed

_____ David McCann, Chair – Operations Committee
Signed

_____ Bill Preisentanz, Chief Administrative Officer
Signed

_____ Richard Perchuk, Manager of Operations
Signed

_____ Bruce Graham, Designated QMS Representative
Signed

_____ Warren Ortlieb, Water and Sewer Supervisor
Signed

_____ Jim Campbell, QMS Representative – Water Treatment
Signed

_____ Rick Cyncora, QMS Representative – Water Distribution
Signed

4) Quality Management System Representation

Designated QMS Representative (Roles & Responsibilities)

- ensure all processes and procedure required for the QMS are established, implemented and maintained

- report to the Manager of operations on the status of the QMS and recommend any changes for improvement of the system.

- ensures documents of the QMS are current and implemented.

- provides affected staff with technical and administrative consultation in regards to QMS document preparation and implementation

- reviews proposed changes to QMS documentation to ensure compliance with the current DWQMS

- performs internal audits

- liasons with external auditors

- ensures staff are aware of all applicable legislative and regulatory requirements

- promotes awareness of the QMS to all relevant personnel of the City of Kenora

Designated QMS Representative (Alternate)

- performs all roles and responsibilities of the QMS Representative

Manager of Operations

- appoints QMS Representatives and Alternates

- reports status of QMS to Senior Management, Mayor and Council

- endorses QMS as Senior Management

Chief Operator, Operators and S&W Repairmen

- assist QMS representatives in the development and implementation of documents as a resource
- provides proposed document changes to the QMS, to provide for continual improvement
- remains aware of the operation plan as well as legislative and regulatory requirements
- participates in the gap analysis and risk assessment to provide for continual improvement to the QMS

5) Quality Management System Document & Records Control

Document Control Procedure

- All Documents of the QMS shall be kept current, legible, readily identifiable and available at all times

(Complete Document control procedure attached as Appendix A)

Records Control Procedure

- All records shall be kept legible, readily identifiable, available at all times retained and disposed of according to the governing regulations. (Complete Records Control procedure attached as Appendix B)

6 Drinking Water System Process Description

General

The City of Kenora Water Supply System provides a potable water supply to the residents and businesses of the City of Kenora. The facilities, consisting of a Class III conventional design water treatment plant having an approved capacity of 25,229 m^3/d, and a Class II water distribution system, are owned by the City of Kenora and operated by the City of Kenora.
The source water for the treatment process is drawn from a surface water source (Lake of The Woods) located adjacent to the City through a 36" HDPE intake approximately 900 feet southwest of the plant. Potentially pathogenic organisms are removed from the raw water source by the following processes:

1. Pre-chlorination
2. Coagulation / flocculation / sedimentation
3. Filtration
4. Post-chlorination (primary disinfection)
5. Trim Chlorination / Ammonium Sulphate Addition for Chlor-ammination (secondary disinfection)

This multiple barrier approach helps to ensure consistently compliant drinking water quality, and ultimately improves the level of public health protection.

Raw Water Supply

Water is drafted from Lake of the Woods and flows into the plant lowlift pumping well eventually being pumped through the plant to the clarifiers. Chlorine is added to provide initial disinfection in the lowlift pumping well. The addition of chlorine to the raw water supply is referred to as prechlorination and serves primarily as a measure to prevent microbiological growth within the raw water pipeline and clarifiers. The pre-chlorine residual is measured periodically in the raw water entering the treatment facility.

Coagulation / Flocculation / Sedimentation

Water flows from the lowlift pumping well through the raw water pipeline to a baffled mixing chamber located on the uppermost floor of the water treatment plant. Alum (aluminum sulphate) is added to the incoming raw water upstream from the clarifiers in the raw water pipeline to promote settling and enhance filtration. Rapid mixing of the alum with the raw water occurs as the raw water passes through an in-line static mixer. Polymer is added to the alum-water solution in the baffled mixing chamber on the uppermost floor. The alum-water-polymer solution enters the clarifiers where gentle mixing promotes the formation of floc masses which attract and gather debris present in the source raw water. The process water and floc remain in the clarifiers. The floc is suspended by incoming water. Excess floc is disposed of by an automatic extraction system. Supernatant (the clear liquid above the suspended floc) flows from the clarifiers via open channels to the top of the dual media filters. Most of the particulate matter that was present in the raw water is captured by the floc particles and removed by gravity/extraction in the clarifiers, however, during normal operations, some floc passes from the clarifiers to the top of the filters.

Filtration

The water treatment plant has four dual media filters. The top layer of the filter is

anthracite while the filter media below the anthracite layer is sand. The anthracite/sand combination is effective in removing residual particulate matter (floc) carried over from the clarifiers.
As debris accumulates in the filters and limits flow, the filters must be cleaned by reversing the flow (referred to as backwashing) and directing the backwash to a wastewater tank.
Turbidity, a measure of the cloudiness of water, is measured continuously in the effluent from each filter to monitor the effectiveness of the filtration process. If the turbidity rises above a set point value, an alarm warns staff that corrective actions are needed.
Filtered water passes through the filter under-drain into the clearwell. The clearwell is a baffled tank with three sections located beneath the filters that are used to store filtered water and to provide disinfectant contact time.

Disinfection (Chlorination)

Primary disinfection (post-chlorination) occurs immediately following filtration, after the filter effluent enters the clearwell. Primary chlorination disinfects the filtered water, ensuring that any potentially pathogenic organisms that may remain after clarification and filtration are rendered harmless. Consistent disinfection is ensured by continuous monitoring of the chlorine residual in the treated water leaving the clearwell. If the residual drops to a predetermined level, an alarm is initiated and an operator is notified prior to levels becoming unacceptable to be allowed to enter the distribution system.
Secondary disinfection is accomplished by adding sufficient trim chlorine and ammonium sulphate at the water treatment plant creating chloramines (combined chlorine), to maintain a residual throughout the entire distribution system. Secondary disinfection prevents regrowth of micro-organisms within the distribution system.

Process Waste Residuals Management

Filter backwash water and extracted alum floc from the clarifiers is directed to the wastewater storage tank where it is allowed to settle out. The heavier settled sludge is pumped to the municipal sanitary sewer. The remaining clarified water may be discharged back to Lake of the Woods.

Distribution System and Elevated Storage Tank

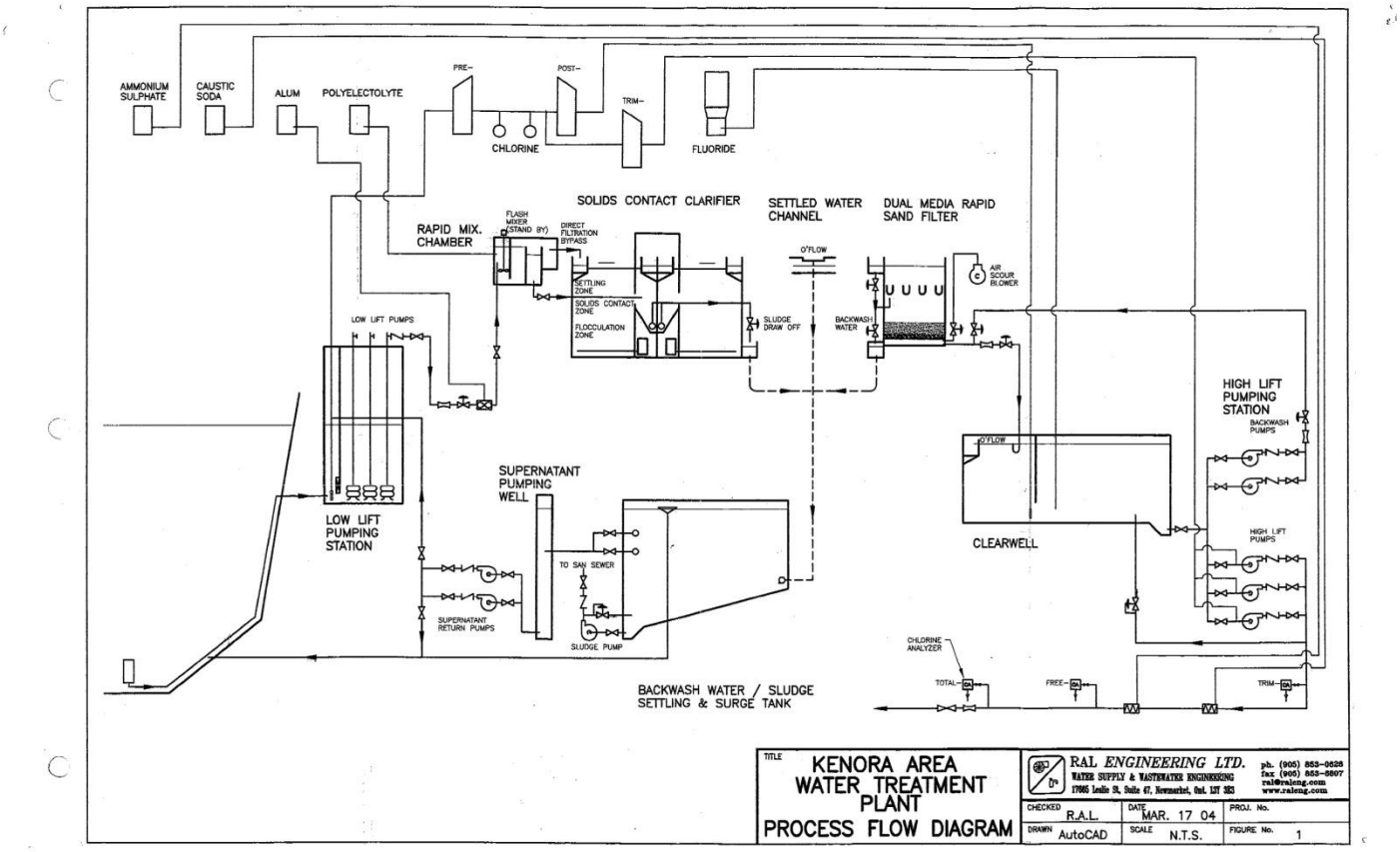
Treated water is pumped from the clearwell into the distribution system. Distribution piping typically ranges in size from 150 mm to 250 mm, and may consist of cast iron, ductile iron, concrete, or PVC, depending on the location and date of installation. Three pressure booster stations, (one at the south end of the city on Pine Portage and the other two on the Airport Road, are used to ensure adequate system pressure in areas of higher elevation orlocations significantly removed from the plant and elevated storage tank. Typical system pressure ranges from 45 P.S.I. to 80 P.S.I. There are standpipes as an integral component of the distribution system in three different locations Fourth Street North, Valley Drive, and Keewatin. The purpose of the standpipe is to provide relatively constant system pressure and a reserve volume of water for community fire protection.

Sample Analysis

Provincial regulations dictate the sampling and monitoring requirements for the system. Water quality is tested throughout the treatment process and from various locations throughout the distribution system. Where required by regulation, samples are submitted to an accredited laboratory for analyses.

6.1) Drinking Water System Process Diagrams

Water Treatment Plant



Water Distribution System

6.2 Source Water Overview

General

The raw water source for the treatment plant is Lake of the Woods. The water from Lake of the Woods is typically low in turbidity (1.6 - 4.0 NTU), low in color 28-49 apparent, slightly basic, and very soft (~54 mg/L as $CaCO_3$). Temperature fluctuates significantly throughout the seasons ranging from approximately 2 Celsius in the winter to as high as 25 Celsius during the summer. Chemical and bacteriological analysis of the raw water indicates a source of relatively good quality.

Events

Seasonal changes in raw water temperatures cause vertical turnover of the lake water during spring and fall. Turnover typically takes place over a relatively short duration (~2 – 7 days). During that period, settled solids from the lakebed are re-suspended, resulting in increased raw water turbidity. Operators must be prepared to make appropriate plant adjustments to respond to changing turbidity levels experienced throughout the year.

Changes in water temperature will also impact treatment process performance (settling and disinfection). Optimal treatment requires adjustments to treatment chemical dosages (disinfectants and coagulants) in response to temperature fluctuations.

Threats

Potential sources of raw water contamination include spills from nearby settling ponds lake traffic mishaps and waste from recreational watercraft.

Operational Challenges

Lake of the Woods provides high quality source water, which is, for the most part consistently low in bacteriological contamination and turbidity. Operator response is needed for changes in turbidity and temperature levels.

7) Risk Assessment

The procedure entitled Hazard Analysis, attached as **Appendix _** , describes the method of hazard identification, risk assessment, and critical control point determination for the City of Kenora Water System. The procedure consists of four main exercises: hazard identification, risk assessment, critical control point determination, and critical limit identification.

8 Risk Assessment Outcomes

The following table documents the initial hazard identification exercise conducted for the City of Kenora Water Treatment Plant. All hazards were identified and categorized according to the Hazard Analysis procedure.

Summary and Classification of Identified Hazards

Hazard	Emergency (Contingency) (Yes/No)	Operational (Instructions) (Yes/No)	Measurable (Yes/No)	Comments/ Control Measures
Spill of biological or chemical material into Lake of the Woods May cause reduction in post or clearwell effluent chlorine level. (Primary disinfection)	Yes	No	-	Plant shut down or increase of chemical dosages may be necessary
Break in raw water intake line.	No	No	No	Periodic intake inspection
Low Lift Pump Failure	No	Yes	Yes	Redundancy
Lowlift Check Valve fails to close	No	Yes	No	Isolation Valves / Redundancy
Milltronics level indicator failure in clarifier channel	Yes	Yes	Yes	Electrician
Vacuum pump failure; sludge blanket collapses due to lack of suspension	Yes	Yes	No	Isolation Valves / Redundancy
Extractors Quitting (closed position); Causes Sludge Blanket to enlarge due to gradual buildup of extra sludge	Yes	No	Yes	Detected visually on daily rounds.
Extractors Quitting (open position)	Yes	No	No	Isolation valves in place to control leakage
Power failure while conducting backwash	Yes	Yes	Yes	Air blower selector switch to off position filters

				closed
Filter console malfunction	Yes	Yes	No	Manual valve/pump operation an option
Underdrain Failure	Yes	-	Yes	Isolation Valves / Redundancy
Filter Effluent valve failure (fails to open or sticks in postion within normal range of operation)	Yes	Yes	Yes	Isolation Valves / Redundancy
Filter Effluent valve failure (Opens to full flow. Runaway condition) May Cause filter breakthough	Yes	Yes	Yes	Isolation Valves / Redundancy
Filter turbidity high or breakthrough; Biological contamination due to ineffective chemically assisted treatment and pathogen removal	Yes	Yes	Yes	Loss of coagulant feed alarm in place to help prevent this.
Failure of all chlorinators due to lack of sufficient feed water volume	Yes	Yes	Yes	Picked up by analyzers and alarm system
Break in pre-chlorine pipe. May cause reduction in post or clearwell effluent chlorine level. (Primary disinfection)	Yes	-	Yes	Detected visually on daily rounds.

Summary and Classification of Identified Hazards

Hazard	Emergency (Contingency) (Yes/No)	Operational (Instructions) (Yes/No)	Measurable (Yes/No)	Comments/ Control Measures
Caustic bulk tank failure.	Yes	-	No	Daily rounds will visually detect this.
Caustic Day tank failure.	Yes	-	Yes	Low pH alarm and Daily rounds will visually detect this.
Alum Bulk Tank Failure; Possible Loss of Coagulant depending on whether day or storage tank fails	Yes	-	Yes / No	Loss of coagulant feed alarm in place and daily rounds will visually detect this.
Ammonium Sulphate bulk tank failure.	Yes	-	No	Daily rounds will visually detect this.
Ammonium Sulphate Day tank failure; Loss of nitrogen for chloramine formation/ Secondary disinfection	Yes	-	Yes	Picked up by analyzers and alarm system
Pre-chlorine failure.	Yes	Yes	No	Filter turbidity may increase. Possible decline in post chlorine analyzer reading. Also noticeable in periodic free chlorine tests.
Post Chlorinator Failure; Primary disinfection affected	Yes	Yes	Yes	Detected by post and clearwell effluent chlorine analyzers. Scada alarms on low alarm setpoint.
Trim Chlorinator Failure; Secondary disinfection affected	Yes	Yes	Yes	Detected by trim and total effluent chlorine analyzers. Scada alarms on low alarm setpoint.
High Pre Chlorine Level	Yes	No	Yes	High THM's , Detected by post chlorine analyzer

				reading increase or periodic free chlorine tests on influent.
Alum Pump Failure; Loss of Coagulant	Yes	Yes	Yes	Detected by flow sensor. Tied in to alarm system. Influent flow, filters, and highlifts shut down automatically.

Hazard	Emergency (Contingency)	Operational (Instructions)	Measurable (Yes/No)	Comments/ Control Measures
Polymer Pump Failure; Loss of Coagulant Aid	Yes	Yes	No	Detectable through daily totals and visual observations.
Sodium Hydroxide Pump Failure; Lowers effuent pH may effect chloramine formation	Yes	Yes	Yes	Detectable through scada alarms.
Ammonium Sulphate Pump Failure; Loss of nitrogen for chloramine formation/Secondary disinfection	Yes	Yes	Yes	Detectable through scada alarms.
Chemical Line Break / Plug	Yes	-	Yes / No	Detectable through scada alarms and/or daily rounds.
Milltronics level indicator failure (Ammonium Sulphate tank)	Yes	Yes	Yes	Detectable through signal loss scada alarm.
Milltronics level indicator failure (Sodium Hydroxide tank)	Yes	Yes	Yes	Detectable through signal loss scada alarm.
High Effluent Free Chlorine	Yes	-	Yes	Detectable through scada alarm.
Highlift Sump Pump Failure	Yes	Yes	Yes	Detectable through scada alarms or visual observation.
Backwash Pump Failure	Yes	Yes	Yes	Detectable through phase failure alarm.
Highlift Pump Failure	Yes	Yes	Yes	Detectable through phase failure alarms
Sludge Pump Failure	Yes	Yes	Yes	Detectable through high wastewater storage alarm.
Supernatant Pump Failure	Yes	Yes	No	Detectable through visual observation.
Highlift Check Valve Failure	Yes	Yes	Yes	Detectable through high or low Zone 1 standpipe alarm.
Generator Quits / Fails to Start	Yes	Yes	Yes	Detectable through various alarms.
Filter Flow Transmitter Failure	Yes	Yes	Yes	Detectable through

				scada alarm.
Adder Subtractor Failure	Yes	Yes	Yes	Detectable through scada alarm.
Influent Flow Transmitter Failure	Yes	Yes	Yes	Detectable through scada alarm.
Effluent Flow Transmitter Failure	Yes	Yes	Yes	Detectable through scada alarms.
Power Failure Standpipe in Service	Yes	Yes	Yes	Detectable through various alarms.
Power Failure Standpipe Out of Service	Yes	Yes	Yes	Detectable through various scada alarms, pressure switches.
Standpipe Low Level	Yes	-	Yes	Detectable through low level alarms.
Marine Line Leak	Yes	-	Yes / No	Detectable through monitoring flows, and Zone 1 low level alarm if leak is bad enough.
Low Chlorine Residual	Yes	-	Yes	Detectable through routine testing.

Controlled Conditions for Critical Control Points

Controlled conditions for each critical control point identified in the summary table are described in detail in the following sets of instructions:

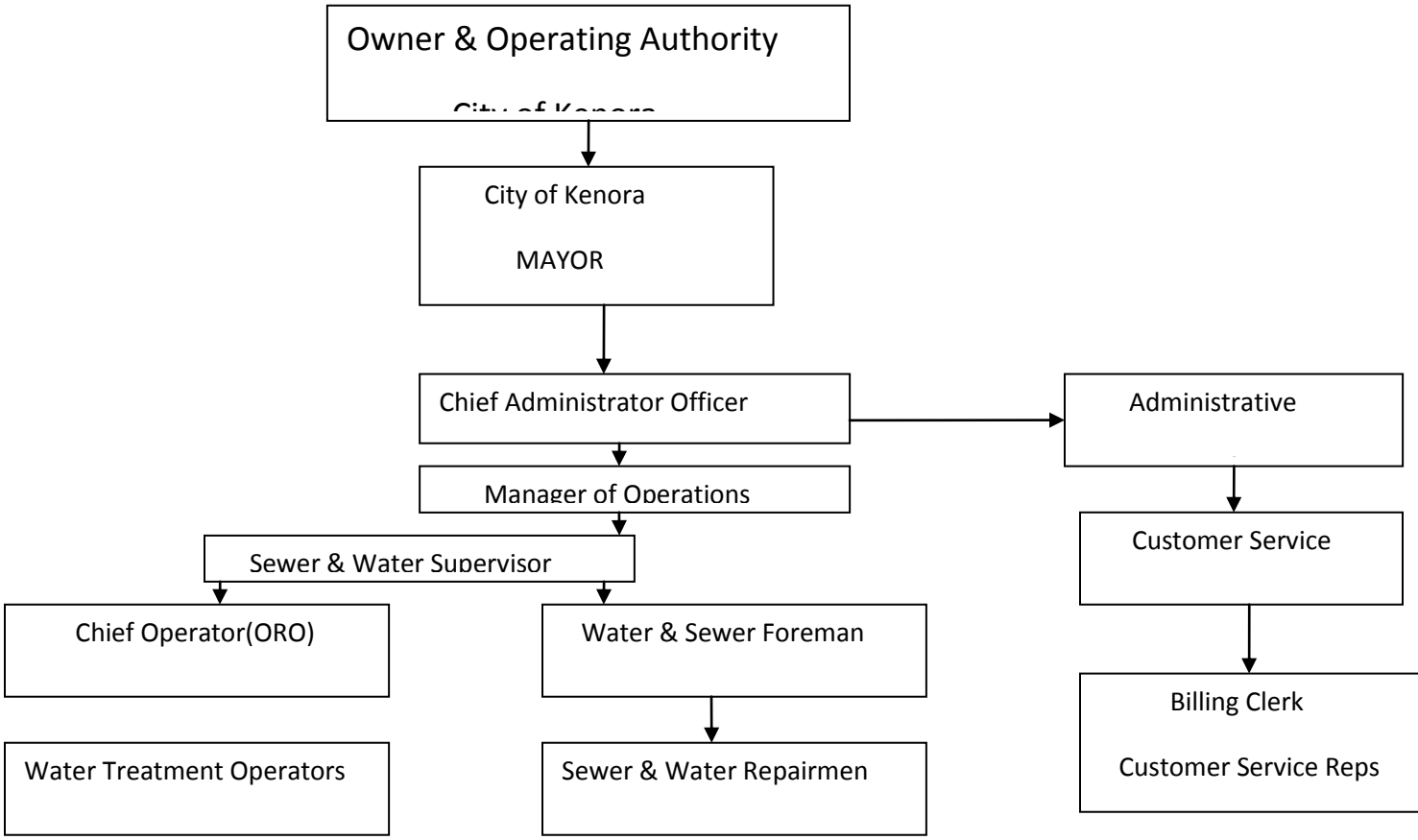
Filter Effluent Turbidity Critical Limit Response, attached as Appendix D

Primary Disinfection Critical Limit Response, attached as Appendix E

Distribution System Pressure Critical Limit Response, attached as Appendix F

Secondary Disinfection Critical Limit Response, attached as Appendix G In addition to a detailed response procedure, each instructional document includes the considerations and rationale for establishing the critical limits, as well as a listing of the operational safeguards currently in place to prevent a breach of the critical limit.

9) Organizational Structure, Roles, Responsibilities & Authorities



Need additional roles and responsibilities information here

10) Competencies

The following table lists the minimum levels of competencies required of trained City of Kenora staff whose performance may have a direct impact on drinking water quality.

Notes: - Roman numerals denote required operator certification - "0" indicates competency not required - "1" indicates basic level of competence - "2" indicates intermediate level of competence - "3" indicates advanced level of competence	Owner / Operating Authority	CAO	Manager of Operations	Water & Sewer Supervisor	Chief Operator (WTP)	Operator (WTP)	Sewer & Water Foreman	Water & Sewer Repairman	Customer Service Coordinator	Customer Services Rep.
Supervisory Skills	0	1	3	3	2	2	3	0	2	0
Presentations / Training	0	0	1	1	0	0	1	0	1	0
Verbal Communications	1	3	3	3	3	1	3	2	3	3
Written Communications	1	3	3	2	2	2	2	1	3	2
Technical Writing	0	3	3	2	1	1	2	1	2	1
Research Skills	1	1	3	2	2	1	2	1	1	1
Budget Preparation /	2	2	2	2	1	0	0	0	0	0

Analysis										
Long-term Planning	1	1	3	2	1	1	0	0	0	0
Scheduling / Work Planning	0	1	2	2	2	2	1	1	1	1
Contract Management	1	1	3	2	1	1	0	0	0	0
Record Keeping	0	1	2	3	3	3	3	2	2	2
Regulatory Requirements	1	1	3	3	3	3	3	3	0	0
Emergency Procedures	1	2	3	3	3	2	2	2	0	0
OETC WT Certification	0	0	III	0	III	III	0	0	0	0
OETC WD Certification	0	0	II	II	I	I	II	I I	0	0
Water Treatment Unit Processes	1	2	3	2	2	2	2	1	2	2
Process troubleshooting	0	0	2	2	3	3	2	0	0	0
Technical mathematics	0	0	3	1	3	3	1	1	0	0
Chemistry	0	0	2	1	2	2	1	1	0	0
Biology	0	0	1	1	2	2	1	1	0	0
Fluid Mechanics	0	0	1	1	2	2	1	1	0	0
Laboratory techniques	0	0	0	0	2	2	0	0	0	0
Sampling / preservation	0	0	0	0	2	2	0	0	0	0
Pumps / valves / piping	0	0	2	2	2	2	2	1	0	0

maintenance										
Electrical instrumentation / controls	0	0	1	1	2	2	1	1	0	0
Motor controls	0	0	1	1	2	2	1	1	0	0
Interpreting plans / blue-prints	0	1	3	2	2	2	2	2	0	0
Computer - spreadsheets and word processing	0	1	2	1	1	1	1	1	1	1
Computer aided design	0	0	1	1	1	1	1	0	0	0
SCADA	0	0	2	1	2	2	1	0	0	0

IMPORTANT NOTE – different competencies are not considered equivalent, therefore cumulative totals are not appropriate for overall skill level comparison

Levels of Competency

The competency identification table on the previous page indicates the skill level required for each position whose actions may have a direct impact on water quality.

At competency Level 1, a basic, theoretical level of understanding is required. Level 1 understanding is normally acquired through a combination of theoretical instruction, on-the-job training, review of journal articles, and specialty seminar attendance.

Level 2 indicates an intermediate, theoretical and working knowledge of a skill, typically acquired through post-secondary theoretical

and practical instruction, on-the-job experience, and participation in specialty workshops and courses.

Level 3 indicates advanced theoretical and working understanding of a particular subject area, particularly as it pertains to the person's responsibilities in the water treatment process. Level 3 is achieved through a combination of successful completion of a post-secondary degree or diploma in engineering, science, or technology, at least 10 years of directly related experience and training, as well as regular participation at specialty seminars and courses.

Satisfying Competencies

Identified competency requirements for City of Kenora staff are satisfied by the following:

. Candidates considered for hire must submit proof of relevant post-secondary education and must demonstrate technical competency and communications skills to an interview panel of City of Kenora staff.

. New employees undergo comprehensive on-the-job training at all facilities, conducted and documented by experienced staff. Training documentation is signed by the employee and trainer, acknowledging successful information transfer. Training files are maintained for all City of Kenora staff.

. All employees receive a minimum of 40 hours training for WTP, and 35 hours for distribution in various topics including safety, treatment process operations, contingency plans, regulatory requirements, equipment operation, and new technologies. The training is provided by experienced City of Kenora staff, technical experts, or contracted professional trainers. Training provision and certification levels meet or exceed those required by legislation.

. The City of Kenora staff are briefed on operating conditions and provided regulatory updates with management staff.

Employees are informed of training opportunities, such as relevant conferences and seminars.

. The City of Kenora provides funding to staff for required training provided the training is related to Water system duties.

11) Personnel Coverage

The City of Kenora employs licensed operators, all of whom are required to hold operator certification for water treatment and water distribution. At the present time there are 4 Water Treatment Operators, with licenses ranging from Class 1 to Class 3, and ten Sewer and Water Repairmen with licenses ranging from OIT to Class 2 Water Distribution. The Operations Manager holds a Class3 WT and Class 2 Water Distribution, while both the Sewer & Water Supervisor and Foreman hold a class 2 license in Water Distribution. Unionized positions include: Chief Operator, WTP Operator, and Sewer & Water Repairman. In the event of a union walkout, plant coverage will be provided by the licensed managers.

Summary Table of WTP Personnel Coverage

	Weekdays (0730hr – 1600hr)*	**After Hours – all days (1500hr – 0830hr)***	**Weekends / Holidays (0730hr – 1600hr)***
Chief Operator (permanent -1)	**X**	X	X
WTP Operator (at least 1)	**X**	X	X
On-call Duty Operator (1)		**X**	
Weekend Duty Operator (1)			**X**

One Chief Operator is permanently designated as the Overall-Responsible-Operator (ORO) for the City of Kenora water treatment plant, the Overall Responsible Operator(ORO) for the Water Distribution System shall be either the Water & Sewer Supervisor or Water & Sewer Foreman. In the event of the absence of the Overall Responsible Operator (ORO,) alternate OROs are designated and properly documented in the log book.

The Chief Operator, under normal operating conditions, is assisted by 3 operators who are assigned duty rotations, and work under the direction of the Chief Operator at the WTP. The WTP is staffed in this manner on weekdays, typically between the hours of 0800 hr and 1630 hr.

Weekend and holiday shifts are covered by one of the licensed union operators on a rotating schedule. The weekend day shift operator is responsible for monitoring the boosters, standpipes and the WTP. Off hours emergencies at the booster stations, standpipes and WTP are addressed by a rotational call out system which is activated by alarm set points on the SCADA system, which sends a signal to a telemetry system when alarm conditions are encountered. The telemetry system then notifies the Operator by telephone. One unionized operator is assigned to on-call duty according to a rotating schedule for the distribution system and is prepared and revised as needed by the Sewer & Water Foreman.

Rationale

One licensed operator is capable of completing all minimal weekend monitoring tasks at the water treatment facilities during routine operations. Similarly, most alarm conditions can be addressed by a single operator when following standard operational documentation. If circumstances arise where additional staff is required, the operator can request the assistance of any of the other off-duty licensed operators. Contact information for all operators is documented , and readily accessible to the on-call operator.

The required emergency response time of 30 minutes is considered reasonable based on the extent of alarm coverage, conservative alarm set points, and the multiple monitoring and treatment barriers in place that prevent risk to public health.

12) QMS Communications

Target Audience	Method of QMS Communication
City of Kenora Mayor & Council	Internal and external audit results, Management Review results, and Operational Plan revisions / updates are provided in writing from the Designated QMS Representative to the Operations Manager and CAO. Hard copies of all correspondence are retained in the City of Kenora's file registry in accordance with the records control procedure.
Operations Manager	Hard copies of any audit reports, Management Review results and Operational Plan revisions / updates are included within the written agenda for Public Council meetings. The Operations Manager is present at Council meetings to supplement the hard copies with brief verbal presentations and to answer questions. Meeting minutes are archived in the City of Kenora file registry.
City of Kenora **Water Treatment & Water Distribution Staff**	A formal presentation of the Operational Plan is provided each year to all staff. New permanent or temporary employees are provided an overview of the Operational Plan during orientation. Similarly, as substantial revisions / additions are required, or if audits have been conducted, a general staff meeting will be called to inform all staff of the changes or audit results. Minor modifications / revisions are communicated to staff by memorandum, copies of which are filed in the City of Kenora file registry.
Critical Suppliers	An annual mailing is sent to all critical suppliers and service providers. The mailing includes a backgrounder describing the City of Kenora QMS and also provides details of the Operational Plan, which relate directly to the relationship between the supplier and the City of Kenora.
Public	. Details of the Operational Plan are also accessible on the website.

The above table is also included in the City of Kenora general Communications Procedure GEN-P9.

13) Essential Supplies and Services

Supply or Service	Primary Supplier	Contingency Supplier
Accredited Laboratory Services	ALS Laboratory 1081 Barton St Thunder Bay, On (807) 623-6463	Maxim Laboratory
Coagulant (Aluminum Sulphate)	Border Chemical	
Chlorine	Brentagg	
Ammonium Sulfate	Brentagg	
Disinfectant (Sodium Hypochlorite)		
Underwater Services (Water Intake, Storage Tank Repair)	Dominion Divers	
Instrumentation Parts (Metering pumps, online analyzers etc.)	Metcon Sales & Engineering 15 Connie Cr., Unit 3 Concord, ON 905-738-2355 905-433-9627 (cell.)	
Instrumentation Calibration	Summa Engineering	

Quality of Supplier Products and Services

All process chemicals meet NSF certification as verified by documentation provided by suppliers.

14 Review and Provision of Infrastructure and Resources

The Operations Manager, conveys all pertinent information to the CAO, mayor and council through scheduled council meetings. Documentation of the condition of the treatment and distribution system infrastructure components based on performance and maintenance records. And the asset management program The condition assessment includes comments on available capacity and recommendations for future upgrading or replacement.

The Infrastructure Review Procedure GEN-P8 is attached as Appendix H.

15) Infrastructure Maintenance, Rehabilitation and Renewal

Infrastructure maintenance, rehabilitation, and renewal are addressed by the following:

Planned Maintenance:

Planned maintenance on the water distribution system is scheduled by the Sewer & Water Foreman. Maintenance is documented in the distribution log book. The Chief Operator is responsible for scheduled maintenance at the WTP.. Scheduled tasks are typically defined by manufacturer's literature when available and revised (or created) as needed according to operator experience / observations. Planned maintenance tasks are communicated to the person responsible, by the Chief Operator Completed maintenance is logged in the appropriate log book.

Unplanned Maintenance:

Unplanned maintenance tasks result from equipment malfunction or breakage. Unplanned maintenance is authorized by the Water and Sewer Supervisor, the Operations Manager, or the Overall Responsible Operator of the affected facility. The Overall Responsible Operator typically responds to unplanned maintenance during normal working hours while the rotational on-call operator responds during off-hours. Documentation of unplanned maintenance tasks is recorded in the appropriate log book.

Measures to prepare for and expedite unplanned maintenance include equipment redundancy (back-up units), spare parts inventory, availability of updated plans / water atlas, as well as documented repair and safety procedures.

Renewal / Capital Upgrades:

Replacement of aging fixed heavy equipment, as well as upgrades, expansions, and in-ground systems improvements are planned by the Water and Sewer Supervisor, Municipal Engineer and Manager of Operations. All major expenses are identified in the Capital budget and require approval by City of Kenora Mayor and Council.

Where practical, replacement of aging in-ground infrastructure is coordinated with road reconstruction activity conducted by contractor or City Departments.

16) Sampling and Monitoring

The City of Kenora uses a sampling program for the City of Kenora Water Supply System based on legislative requirements. This program is described in detail in the procedure entitled Sampling, Monitoring and Analysis. Operators sample according to the AWWA Standards for Disinfecting Water Mains throughout any maintenance project undertaken within the City of Kenora water distribution system.

Specific sampling and monitoring procedures are established for operating the City of Kenora Water Supply System under abnormal circumstances. A detailed set of instructions for sampling and monitoring in response to adverse water quality is posted in the laboratory. These steps ensure that all legislative requirements are met at any time that the plant is producing water with parameters outside of compliance limits.

Laboratory results are acquired from in-house analyses, as well as from a selected accredited laboratory. In-house laboratory results are entered into an annual spreadsheet by a plant operator and then stored at the WTP. Bacteriological and chemical results from the accredited laboratory are stored at the WTP.

Copies of bacteriological and chemical analytical results are provided to members of the public upon request. In-house laboratory results may also be provided upon request. All analytical results are reviewed and stored at the WTP. The annual report is provided to the owner and the MOE and any water system who is supplied with water from the City of Kenora system and is also available to any interested member of the public, at City Hall or on the City of Kenora's .website.

17) Measurement and Recording Equipment Calibration and Maintenance

Methods of measurement and recording equipment calibration and maintenance are described in detail in the procedure GEN-P5.

18) Emergency Management

The procedure entitled Emergency Condition outlines the conditions at the City of Kenora Water Supply System that are considered to be major emergencies. This procedure also lists those persons responsible for initiating the response and recovery measures, as well as the process to be followed as emergencies escalate. Specific instructions for responding to emergencies, including emergency situations that have the potential to result in acute drinking water health risks, are included in the plant and distribution system operations manuals. Each operator is required to review the written emergency procedures and contingency plans annually. When practical, emergency procedures are tested on an annual basis.

Emergency Contact List

Operations Manager - Richard Perchuk - 807-543-2672(home)

- 807-467-1183(cell)

Water & Sewer Sup. – Warren Ortlieb - 807-547-2345(home)

- 807-467-7463(cell)

(ORO) Water Treatment - Jim Campbell - 807-547-2091(home)

- 807-466-1545(cell)

(ORO) Water Distribution – Warren Ortlieb - 807 - 547-2345(home)

- 807 – 467-7463(cell)

-Randy Polischuk - 807-548-1608(home)

- 807-467-1253(cell)

19) Internal Audits and Management Reviews

Internal Audits and Management Reviews are conducted at least once every twelve months to determine the effectiveness of the QMS, and to explore opportunities for improvement. Internal Audits and Management Reviews, in addition to Third-party Audits, are mechanisms used to fulfill the "check" and "improve" imperatives of the quality management system.

Detailed procedures for conducting internal audits (GEN-P6), and management reviews (GENP7) are attached as Appendices M and N respectively.