THE TOWNSHIP OF THE NORTH SHORE DRINKING WATER SYSTEM

DWQMS OPERATIONAL PLAN

OPERATIONAL PLAN NUMBER 282-401

Operational Plan Section &Title
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3. Commitment and Endorsement
4. Quality Management System Representative
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6. Drinking Water System
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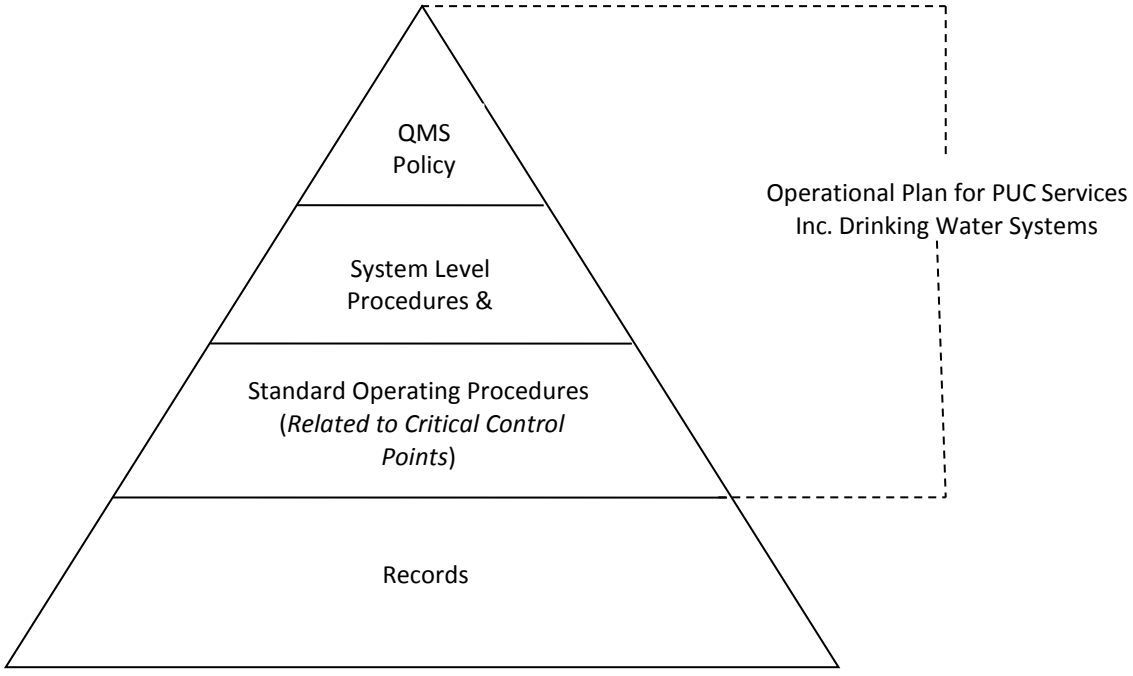
Overview of Operational Plan

The Operational plan is one portion of the mandated Drinking Water Quality Management System (DWQMS) that is enforced by the Ministry of Environment, Conservation and Parks for all Drinking Water Systems in the province of Ontario. This operational plan is a document created by PUC Services Inc. to help ensure that safe, reliable drinking water is provided to all the citizens, businesses, and visitors of The Township of the North Shore. The operational plan is a document that provides an understanding of the drinking water system, the responsibilities of the owner and operator (operating authority) of the water system, and a commitment to the provision of safe drinking water. This will allow PUC Services Inc. to plan, implement, check, and continually improve, helping to build confidence and security in the Drinking Water Systems (treatment and distribution) they operate.

The Quality Management System (QMS) has been developed to meet the requirements of the DWQMS. The QMS is based on the Plan, Do, Check and Improve principle. The Operational Plan is the documentation that addresses the 21 elements of the DWQMS. The QMS for PUC Services Inc. is comprised of the Operational Plan (documentation) and the records that demonstrate implementation of the Operational Plan. The following is the structure of the QMS (including the implementation records):



As described in Element 5 - Document and Records Control of the Operational Plan, the Table of Contents has been signed off to demonstrate that the "approval date" in the Operational Plan procedures has been approved. The "revision number" is located on each separate document within the Operational Plan.

The Township of the North Shore

PUC Services Inc., as the Operating Authority of the municipal drinking water system (including both treatment and distribution) is committed to:

- Providing safe drinking water to our customers and the communities we serve
- Complying with applicable legislation and regulations as related to the provisions of the Safe Drinking Water Act
- Maintaining and continually improving the effectiveness of our Quality Management System

This quality policy has been developed in accordance with the objectives of the Ministry of the Environment's Drinking Water Quality Management Standard and is aligned with our Corporate Mission.

The Owner endorses the Operational Plan through a Resolution. The Owner's commitment to an effective QMS is evidenced by the resources provided during implementation and maintenance of the Operational Plan and QMS.

The Owner and Top Management of the Operating Authority (as defined in QMS-09) are committed to the implementation, maintenance and continual improvement of a Quality Management System that meets the requirements of the Drinking Water Quality Management Standard. The QMS for the drinking water systems is documented in the Operational Plan. Endorsement by the Owner and Top Management acknowledges the need for and supports the provision of sufficient resources to maintain and continually improve the QMS. Top Management demonstrates their endorsement of the Operational Plan through reporting to the Owner on the results of Management Review and by the key signatures below.

Top Management's commitment to an effective QMS is evidenced by:

a) Ensuring that a QMS is in place that meets the requirements of the DWQMS,
b) Ensuring that the Operating Authority is aware of all applicable legislative and regulatory requirements,
c) Communicating the QMS according to procedures (QMS-12), and
d) Determining, obtaining or providing the resources needed to maintain and continually improve the QMS.

Date:	Signature & Title:
Jan 16, 2018	President & CEO PUC Services Inc, Robert Brewer
Jan. 16, 2018	Vice President of Operations and Engineering, Claudio Stefano
May 03/2012	Mayor, Randi Condie (Township of the North Shore)

1 PURPOSE

To identify a Quality Management System (QMS) Representative and outline their specific responsibilities.

2 PROCEDURE

2.1 Designation Process

2.1.1 Top Management appoints and provides authority to the Quality Management System Representative, irrespective of their other responsibilities. The authority, roles and responsibilities are provided in QMS-09.

2.1.2 A letter of appointment of the QMS Representative has been signed by Top Management and is included in Appendix 4-A.

3 REFERENCES

QMS-09 Organizational Structure, Roles, Responsibilities and Authorities

4 APPENDICES

QMS 04 Appendix A Management Representative Appointment

1 PURPOSE

To document a procedure that describes how:

a) Documents required by the QMS are kept current, legible, readily identifiable, retrievable; as well as stored, protected, retained and disposed of; and
b) Records are kept legible, readily identifiable, retrievable, as well as stored, protected, retained and disposed of

2 PROCEDURE

2.1 Documents

Controlled documents include the Operational Plan and its associated policies, procedures (including applicable Standard Operating Procedures), forms, exhibits, flowcharts or other documents that are subject to revision and are maintained on the Document Master List (Form 05-01).

Controlled documents (excluding drawings) of both internal (refers to documents created by the Operating Authority) or external origin are included on the Document Master List. The QMS Representative is responsible for maintaining the electronic list and ensuring an updated hard copy is included in the Operational Plan.

All electronic controlled documents (excluding drawings) for the QMS are available on the network drive. Data is pulled from remote servers and stored to disk nightly, in real-time the data backup is automatically replicated to Disaster Recovery site for off-site data protection. Data is also written to tape media for long term data retention and stored in a fire proof safe.

Documents have revision numbers and a date listed on them to identify the current version. The "revision number" is located on each separate document within the Operational Plan. Revisions are made to a document when a change in content occurs. A formatting, grammar, or spelling change does not require a revision change. Most recent document changes will be denoted by a red line.

The electronic documents are normally in Word and/or PDF format on the network drive under a software program called Springboard. If the document is printed from Springboard then the document is considered uncontrolled and not subject to revision.

The QMS Representative determines the distribution of controlled documents that are to be made available and assigned to job positions via Springboard.

All staff are responsible for ensuring that documents remain legible, readily identifiable, and of the current version. If a document has been damaged or made illegible, staff are responsible for downloading the most current version for replacement.

The DWQMS Office Assistant keeps all original documents, containing signatures, in file folders within the DWQMS filing cabinet.

Documents that are only available in hard copy are kept in a safe, dry location that will ensure no damage or deterioration.

2.2 Document Changes

Any employee can make a request for the creation or a change to a QMS document (e.g., system procedures in the Operational Plan). Changes to documents can be a result of change in procedure, results of an audit or suggestion for improvement.

The request is recorded in Part A on a Document Change Form (Form 05-02). Suggested changes can also be attached to the Document Change form.

The Document Change Form is then sent to the QMS Representative who will forward the Form to the appropriate management staff (responder) who initially approved the document.

Prior to processing document changes the QMS Representative will be responsible for ensuring that the changes will not affect the integrity of the QMS or the processes.

The responder notes the decision on the Document Change Form and forwards the form to the QMS Representative.

The QMS Representative ensures that Part C of the Document Change Form is completed, dated, and filed.

If the request is denied the responder will send notification to the requester advising of the decision and the reason why.

An employee also has the opportunity to suggest changes in the Springboard system. Comments or suggested changes come into the QMS Representative. A group comprised of the QMS Representative, Supervisor of Water Treatment Operations, DWQMS Office Assistant and applicable staff if needed for the area of concern will review the comments and make changes as required. The Springboard system provides a response to the individual making the comment. These comments are made available for all to see.

The Springboard system allows for an auditing trail which can be downloaded for auditing, tracking and document and record control.

The QMS Representative then updates the Document Master List (Form 05-01). The QMS Representative will send an updated document for review if there has been a significant change in

content. Management are responsible for advising any staff affected by the change.

Obsolete documents must be marked "Obsolete" if retained for legal and/or historical purposes.

The QMS Representative will review the Document Master List a minimum of once per year to verify that any documents that have not been revised since the previous review are still adequate.

2.3 Records

The Records Master List (Form 05-03) identifies all of the records that this procedure applies to. Records may be paper-based or electronic.

The electronic documents and records associated with the QMS are maintained on the network drive which is backed up daily with a weekly rotation of tapes. All electronic controlled documents (excluding drawings) for the QMS are available on the network drive. Data is pulled from remote servers and stored to disk nightly, in real-time the data backup is automatically replicated to Disaster Recovery site for off-site data protection. Data is also written to tape media for long term data retention and stored in a fire proof safe.

The QMS Representative, in consultation with department management, determines the retention time (active and storage) for records.

Electronic on-line data (i.e., production data, lab reports, SCADA) storage and management of these records is by daily and weekly backing up of electronic versions and a paper copy of records is filed, where necessary, as identified on Form 05-01.

QMS records are tracked on Form 05-03 Record Master List for retention times, and stored on the Springboard software server (RRAM). A paper copy may be required to be housed on site for operator reference and inspection purposes otherwise they are held at the WTO Office.

The person completing the record must ensure the record is legible, accurate and complete with regard to recording requirements.

When records are removed from the active filing system they are put into inactive storage for a period of 10 years. The records are identified, packed in suitable containers and stored in a safe, dry location that will ensure no damage or deterioration.

Disposal of records, where applicable, is approved by the department management in consultation with the QMS Representative. Management determines the method of disposition at the time that the records are no longer required.

2.4 Drawings

Drawings (electronic or paper copies) are kept for the life of the asset or 10 years, whichever is longer, and are then disposed of by being thrown out.

Distribution drawings are maintained by a Consulting Engineering if requested by the Township. Paper copies of drawings are located at the Municipal Office and are available to operational field staff.

Original physical plant drawings are stored at the Municipal Office.

3 REFERENCES

Form 05-01	Document Master List
Form 05-02	Document Change Form
Form 05-03	Records Master List

The Serpent River Water Treatment Plant Overview

The Serpent River water treatment plant is rated as a Class 1 Water Treatment subsystem, and categorized under O. Reg. 170/03 as a Small Municipal Residential system. The treatment plant draws water from the Serpent River. Historical records show that the plant was downstream from mining activity that is no longer in production. Previous treatment included ion exchange filters that have since been replaced with slow sand filters.

The plant intake consists of a 150mm diameter polyethylene pipe surrounded with 50mm of insulation and cased in a galvanized steel jacket. It extends approximately 25 feet out into the river with a slotted stainless steel screen flanged to the end. The pipe assembly is weighted with concrete blocks and fill concrete to prevent flotation and ice damage. The pipe is heat traced with the controlled located in the treatment plant. Depth of water at extreme low river level is 1 meter and up to 3 meters at high level.

The plant uses a slow sand filtration process and chlorination to achieve the primary treatment requirements. Two slow sand filters operate at a combined rate of 243 cubic meters/day. Alkalinity is adjusted by flowing the filtered water through crushed dolomite limestone. Water is disinfected using sodium hypochlorite in the clear well. Chlorine residual is measured at the end of the treatment process, at the high lift discharge at the end of the clear well.

Water enters the distribution system from the 124 cubic meter clear well. Pressure is maintained by six (6) hydro pneumatic tanks, also located at the water treatment plant. The distribution system is a mix of materials, the new parts of the system use PVC piping. Blow-off valves are located throughout the distribution system for flushing purposes.

The plant was designed to provide a consistently filtered and disinfected supply of water to the community. It is based on several assumptions regarding Serpent River water quality, amount of water consumed by each household, and on a reasonably low loss due to leakage.

The plant is designed to have very low maintenance requirements however regular inspections, daily monitoring, minimum maintenance and normal housekeeping duties are required to ensure long term trouble free operation.

The plant basically consists of the following:

- Low Lift Pumping
    - Insulated and heat traced intake pipe
    - Submersible pump located at the end of the intake rated at approximately 3 L/s
    - Water meter and throttling valve
    - Piping and valves to distribute to filters.

- Treatment
  - Two "slow sand" Filters
  - Two Limestone contact tanks
- Disinfection
  - Liquid (hypochlorite) chlorine feed system
- Storage
  - 124 cubic meter treated water clearwell
- High Lift Pumping
  - Duplex high lift pumps each rated at 4.2 L/s
  - Six hydro pneumatic tanks
- Standby Power
  - 20 Kw propane powered generator set
  - Automatic power transfer
- Instrumentation
  - Raw, combined filter and treated water flow meters
  - Turbidity meters for each filter and plant discharge
  - Chlorine analyzer on plant discharge
  - Chartless data recorder, modem
  - Auto dialer for process alarm

Table 1.1: Historical, seasonal or common event-driven fluctuations for Serpent River

Type of Fluctuation	Description	Operational Challenges/Threats
Historical Variation	Mine tailings runoff	• pH fluctuations • Limestone alkalinity treatment
Seasonal Variation	Flooding, heavy rainfall or spring runoff causing increase in turbidity	• Monitoring raw water quality • Increase chlorine demand • Increase backwash events
Seasonal Variation	Variation in water temperature	• Changes in chlorine demand • Maintain distribution residuals • THM control • CT control
Event Driven Fluctuation	Upstream spill	• Monitor raw water quality

Table 1.2: General characteristics of raw water in Serpent River

Parameters	Units	Results (range)
Alkalinity	mg/L	30 - 35
Aluminum	ug/L	56.4
Colour	TCU	14
Copper	ug/L	1.5
E.coli	CFU/100mL	0 - 70
Hardness	mg/L	25 - 35
Iron	ug/L	130
Manganese	ug/L	32
Nickel	ug/L	1.7
pH	pH	6.5 – 7.5
Potassium	ug/L	1300
Sodium	ug/L	3240
Total coliforms	CFU/100mL	0 - 570
TOC / DOC	mg/L	3 - 7

The Pronto East Water Treatment Plant Overview

The Pronto East Water Treatment Plant is rated as a Class 1 Water Treatment subsystem, and is categorized under O.Reg. 170/03 as a Small Municipal Residential system. The raw water supply for the Pronto East subdivision of the Township of the North Shore is obtained from the North Channel of Lake Huron. Upstream of the plant is a wastewater facility approximately 18 kilometers away.

A direct pressure pumping system, treatment plant and distribution system conveys the treated water to the subdivision service area. Minimal storage of treated water is provided by 6 pressure tanks.

The water treatment plant is supplied by pumps located in the shore well. Located within the water treatment plant building are raw water strainers, filtration units, associated chemical systems (sodium hypochlorite), ultra-violet irradiation units (UV), booster pump, pressure tanks, instrumentation, and control systems. The water treatment plant is located in the Pronto East subdivision. The design capacity of the water treatment plant is 80 m3/day.

The Pronto East WTP is supplied with raw water from Lake Huron through a 32 meter long, 300 mm diameter polyethylene intake pipe with a screened intake structure. The raw water flows into the wet well by gravity. In the event zebra mussels are detected a chemical injection line (to the intake structure) is available for sodium hypochlorite application to control zebra mussels.

Raw water is pumped via one of the three high lift pumps to the treatment plant, where a strainer removes the larger objects. Sodium hypochlorite is added for primary disinfection before entering the static mixer, with the dosage paced to flow. The water then gets distributed into a header assembly into two trains of six for a total of twelve (12) ultra-filtration membrane units.

The water then flows into another header assembly and into six (6) ultra-violet (UV) irradiation contactors. Six pressure tanks provide storage and flow balancing for the pumps. Sodium hypochlorite is added immediately after UV, prior to the pressure tanks and contact main to assist in THM control. The water is then routed through a contact loop with a volume of 2,070 L, which ensures adequate contact time for the CT of the disinfection process, prior to discharge to the distribution system. The contact loop is plug flow providing a baffling factor of 1.0.
CT can be calculated at anytime using the following formula:
CT = contact loop volume (2.07m3 /treated flow m3/min) X BF x chlorine residual mg/L

The water treatment plant also contains the online water quality analyzers, flow meters and a SCADA system for monitoring and recording the treated water parameters.

A propane fueled stand-by generator is provided to automatically maintain service for both the water treatment plant and sewage lift station in the event of a failure of the utility supply.

Table 2.1: Historical, seasonal or common event-driven fluctuations for Pronto East

Type of Fluctuation	Description	Operational Challenges/Threats
Historical Variation	• Variation in consumption	• CT control • THM control
Seasonal Variation	• Lake turnover	• Increase in turbidity • Monitoring raw water quality • Increase chlorine demand • Increase backwash events
Seasonal Variation	• Variation in water temperature	• Changes in chlorine demand • Maintain distribution residuals • THM control • CT control
Event Driven Fluctuation	• Upstream spill	• Monitor raw water quality

Table 2.2: General characteristics of raw water in Pronto East

Parameters	Units	Results (range)
Alkalinity	mg/L	30-50
Aluminum	ug/L	20-30
Colour	TCU	10-20
Copper	ug/L	50-100
E.coli	CFU/100mL	0-10
Hardness	mg/L	20-50
Iron	mg/L	5-10
Manganese	mg/L	0-1
Nickel	ug/L	15-20
pH	pH	7-8
Potassium	ug/L	0-2
Sodium	ug/L	2-10
Total coliforms	CFU/100mL	0-820
TOC / DOC	mg/L	2-7

1 Purpose

To document the procedure used to complete a risk assessment in order to identify the vulnerabilities within the drinking-water systems operated by PUC Services. The risk assessment process will:

- Identify potential hazardous events and associated hazards
- Assess and rank the risks associated with the hazards
- Identify control measures to address the hazards
- Identify critical control points within the drinking water system
- Identify a method to verify the risk assessment validity and assumptions at least once a year
- Ensure a risk assessment is conducted at least once every three years
- Consider the reliability and redundancy of the equipment

2 PROCEDURE

2.1 Annual Review Process

At least once per calendar year, or following a major process change, the QMS Representative facilitates a review of the currency of the information and validity of the assumptions used in the risk assessment process for the drinking water system. This is undertaken by a team comprised of (at a minimum) Manager of Water Treatment Operations, Supervisor of Water Treatment Operations and other applicable staff.

When reviewing the currency of the risk assessment information, the following may be considered:

- Process changes
- Reliability and redundancy of equipment
- Emergency situations
- Critical control point deviations (including adverses)
- QMS non-conformances related to standard operating procedures

Risk Assessment Methodology

The risk assessment is completed by filling out the Risk Assessment Form (Table 08-T1) in the order of the drinking water system steps so that the risk assessment outcomes are created (as per QMS-08). The previous years' completed form is used as a template during the annual review: newly identified hazards are inserted into the previous year's form and the columns are filled out as described below and removed hazards are deleted.

Column in Risk Assessment Form	Information in Column
A – *Step* B – *Hazard Description*	Column A is populated with the treatment process steps and distribution system components, and associated hazards are documented in Column B. At least annually the information in these columns is reviewed to ensure the drinking water system steps have been captured, and associated hazards are identified and described.
C – *Team Notes (includes Control Measures)*	The "Team Notes" section is used to provide additional information such as: • Brief description of the applicable prerequisite program • Description of applicable control measures • Standard Operating Procedures that address the hazard
D – *Likelihood* E – *Consequence* *F - Detectability*	The likelihood (L) and consequence (C) of the hazardous event occurring are assessed using the Risk Assessment Rating (Table 07-T1) as a guide. (D) Detectability, vulnerability and/or critical customers may also be considered when assigning the likelihood and/or consequence rating. Using this methodology, the higher number indicates a higher likelihood or consequence.
G – *Risk*	The risk (R) is then assigned for each hazard based on the calculation of the likelihood of the event occurring (L) plus the consequences of the event (C) plus the detectability of the event or R = L + C + D.
NOTE: use of control measures in determining risks	*In completing the table to this point consideration has been given for the use of control measures, which would likely affect (i.e., reduce) the likelihood of a hazardous event occurring. For the remainder of the table (columns H through L) the questions are answered without consideration of the use of control measures to better understand the potential risks through the identification of Critical Control Points (CCP).*
H through L – *CCP Screening Questions*	The five questions in these columns are then answered: 1) If the hazard is controlled by a best management practice (summarized in Table 07-T1), then the practice is noted in this column and the hazard may not[1] be a "Critical Control Point (CCP)" and it may not be necessary to answer the remaining four questions. 2) For a hazard to be identified as a CCP, the answers to the next three questions must be "yes" and the last question must be "no". • To answer "yes" to the third question ("If control was lost could someone be hurt?"), the calculated risk (Column G). 3) "Control Point (CP)" are identified as hazards that • Are controlled by a prerequisite program. • Have a calculated risk value that will be determined by a risk assessment review (initial SOPs have been developed for the CCPs). The calculated risk value determines the priority for SOP development.

[1] If the hazard is controlled by a best management program, it is generally not carried through as a CCP
[2] Please note the Ministry has designated certain hazards to be defined as CCP's regardless of score

	• CP's may be initiated if the rating value is >=10
M – *CCP#*	The identified CPs and CCPs are numbered sequentially and highlighted.

The outcome of the Risk Assessment is the completed Risk Assessment Form, which is an output generated for the Risk Assessment Outcomes QMS-08 Procedure Risk Assessment Outcomes. Additionally, the identified CCPs are summarized in Table 08-T2 (Summary of Critical Control Points).

2.2 Three-Year Review Process

Every three years a more comprehensive review of the drinking water system risk assessment process is conducted. This is an opportunity to review the risk assessment process and outcomes. For example, the reviewers could consider changes in microbial risks based on new research, or changes to the risk assessment process as a continual improvement feature. To undertake this more comprehensive review the QMS Representative facilitates a team comprised of (at a minimum) Manager of Water Treatment Operations, Supervisor of Water Treatment Operations and other applicable staff.

In the years where the three-year review process is completed, the annual risk assessment review will be completed at the same time.

2.3 Document and Records Management

The completed Risk Assessment Form (08-T1) is made available to the Vice President for review in the Springboard software.

The QMS Representative is responsible for ensuring that minutes are taken during the annual and three-year review meetings and that these are maintained as per Document and Records Control (QMS-05).

The QMS Representative is responsible for maintaining and making any necessary changes or updates to the Risk Assessment Form as per Document and Records Control QMS-05.

The QMS Representative is responsible for ensuring that any necessary changes are made to the training requirements, standard operating procedures, system procedures or other parts of the QMS resulting from changes to the Risk Assessment.

3 REFERENCES

NS QMS-05 Document and Records Control
NS Table 07-T1 Risk Assessment Rating & Best Management Practices
NS Table 08-T1 Risk Assessment Form
NS Table 08-T2 Summary of Critical Control Points

4 APPENDICES

Not Applicable

1. Risk Assessment Rating

Description	Likelihood of Hazardous Event Occurring	Rating
Rare	May occur in exceptional circumstances	1
Unlikely	Could occur at some time, historically has occurred less than once every 5 to 10 years	2
Possible	Has occurred or may occur once every 1 to 5 years	3
Likely	Has occurred or may occur on a yearly basis	4
Very Likely	One or more occurrences on a monthly or more frequent basis	5

Description	Consequence of Hazardous Event Occurring	Rating
Insignificant	Insignificant impact, little public exposure, little or no health risk and/or possible insignificant disruption	1
Minor	Limited public exposure, minor health risk and/or minor loss of service	2
Moderate	Minor public exposure, minor illness	3
Major	Major public exposure, serious illness (no risk of death) and/or major disruption of supply	4
Catastrophic	Major impact for large population, serious risk of death, complete failure of systems	5

Description	Detect ability of Hazardous Event	Rating
Very Detectable	Easy to detect, on-line monitoring through SCADA	1
Moderately Detectable	Moderately detectable, alarm present but not in SCADA, may require an operator to walk by and notice the alarm; problem is indicated promptly by in-house lab test results	2
Normally Detectable	Normally detectable, visually detectable on rounds or regular maintenance	3
Poorly Detectable	Poorly detectable, visually detectable but not inspected on a regular basis; nor normally detected before the problem becomes evident; lab tests results are not done on regular basis (e.g. quarterly)	4
Undetectable	Cannot be detected	5

Risk = Likelihood + Consequence + Detectability
Highest Risk = 15 (which is 5 + 5 + 5)
Control Points (CPs) may be initiated if the rating value is >= 10

2. Best Management Practices

Best Management Practices	Description
1. Premises	• Outside Property
	• Building
	• Sanitary Facilities
	• Water Quality
2. Transportation & Storage	• Receiving of Raw Materials
	• Ingredients, Packaging Materials
	• Storage
3. Equipment Performance & Maintenance	• General Equipment Design
	• Equipment Installation
	• Preventative Maintenance
	• Calibration of Equipment
4. Personnel Training Program	• Manufacturing Controls
	• Training
	• Hygienic Practices
	• Controlled Access
5. Sanitation	• Sanitation Program (documented by piece of equipment and room)
	• Pest Control Program

3. Risk Assessment Decision Tree for Determining Critical Control Points (CCP)

The following table provides details for the questions asked on Table 08-T1 Risk Assessment Outcomes.

Question	Explanation	No	Yes
1 (Column H): Is This Hazard Controlled by a Best Manufacturing Practice?	Listed above for reference	Proceed to the next question.	This is not a CCP, but you must identify how this hazard will be controlled before and after the process (in column H), and then proceed to the next identified hazard. If you feel that it is necessary, follow through the remaining questions.
2 (Column I): Is there a Control Measure?	Could a control measure(s) be used by the operator at any process step? Is there anything the operator can do to control the hazard?	This is not a CCP, but you must identify how this hazard will be controlled before and after the process (in column H), and then proceed to the next identified hazard.	Describe the control measure (in column H), and proceed to next question.
3 (Column J): If control was lost, could someone be hurt?	Is it likely that contamination with the identified hazard could occur in excess of the acceptable level or could increase to an unacceptable level? Is it likely that the product could become or could reach an unacceptable level of contamination?	This is not a CCP. Proceed to the next identified hazard.	Proceed to the next question.
4(Column K): Is there a step designed to deal with the hazard?	Is there a process step specifically designed to eliminate/reduce the likely occurrence of the identified hazard to an acceptable level? Will this process step reduce the risk to an acceptable level?	This **is** a CCP. Proceed to next question.	Proceed to next question.
5 (Column L): Is there a later step designed to deal with the hazard?	Will a subsequent step eliminate the identified hazard or reduce its likely occurrence to an acceptable level? Will another, subsequent process step reduce the risk to an acceptable level?	This **is** a CCP. Proceed to column N and identify as a CCP.	This is not a CCP. Identify the subsequent steps and proceed to the next identified hazard.

1 PURPOSE

To document a procedure ensuring that the Owner, Operating Authority and Top Management are defined, the organizational structure of the Operating Authority is described and the roles, responsibilities and authorities of Top Management and key positions within the Operating Authority are identified.

2 PROCEDURE

2.1 Identifying Key QMS Roles

The organizational structure of the Operating Authority is outlined in Appendix 9-A: PUC Services Organizational Chart.

Top Management (within the Operating Authority), QMS Representative and the Owner of the drinking water system are defined in Appendix 9-B.

Top Management is responsible for conducting management review as outlined in procedure QMS 20 Management Review.

The QMS Representative is appointed by Top Management and irrespective of other responsibilities has specific QMS related responsibilities and authorities as outlined in Table 09-T1.

The appointment letter for the QMS Representative is included in procedure QMS 04.

2.2 Organizational Roles, Responsibilities and Authorities

Specific responsibilities and authorities for positions with key roles in the Drinking Water Quality Management System are detailed in the various system procedures and standard operating procedures that form the Operational Plan.

Table 09-T1 provides a summary of the overall roles, responsibilities and authorities related to the provision of safe drinking water in the drinking water system.

3 REFERENCES

NS QMS 04 QMS Representative Appointment
NS QMS 20 Management Review
NS Table 09-T1 DWQMS Roles, Responsibilities and Authorities

4 APPENDICES

NS QMS 09 Appendix A PUC Services Organizational Chart
NS QMS 09 Appendix B Key QMS Roles

1 PURPOSE

To document a procedure that identifies:

a) competencies required for personnel performing duties directly affecting drinking water quality,
b) activities to develop and maintain competencies for personnel performing duties directly affecting drinking water quality, and
c) activities to ensure that personnel are aware of the relevance of their duties and how they affect safe drinking water.

2 PROCEDURE

2.1 Competencies

The Department Managers and Supervisors are responsible for identifying required competencies for employees performing duties directly affecting drinking water quality. The minimum levels of competencies required for personnel with duties affecting drinking water quality are identified in job descriptions.

Job descriptions are reviewed periodically for currency by the Department Managers. The Job Descriptions describe responsibilities and duties, accountabilities, job specifications, license requirements and minimum educational requirements for each position.

New or transferred employees undergo a probationary period. At the end of the probationary period the Department Supervisor evaluates the employee's competency to confirm them into the position.

Individual competency is assessed by management through consideration of the education, training, skills, experience and license level of each employee. Continuing competency is maintained through periodic assessment of training needs.

Competency for management positions is reviewed at least annually during performance reviews conducted by the manager one level up.

Copies of current operator licenses are posted in the facilities. Copies of training certificates are maintained and filed as per QMS-05.

2.2 Training Needs Identification

Department Managers and Supervisors identify training needs and ensure competencies are maintained for employees performing duties directly affecting drinking water quality based on the identified competencies.

Each individual employee is responsible for maintaining their individual licenses. This includes advising management of potential training needs.

The Lead Hands assist with the identification of training needs for the Operational staff. The Supervisor

provides the training and/or determines what training is required and ensures they receive this.

The need for training (to ensure competency is maintained) may also be determined based on the following:

- Comparison of the person's skills and abilities with the requirements of the job description and qualifications, in particular for new, temporary and transferred employees;
- Corrective action (e.g., resulting from internal audits or non-conformances) if the need for training is found to be a root cause (QMS-21);
- Changes due to updates to the risk assessment outcomes (QMS-08); and
- Changes in legislative/regulatory requirements.

2.3 Training Plan

Department Managers and Supervisors plan throughout the year the training for positions affecting drinking water quality for the next year. They refer to the required competencies, the completed training from previous years, and other currently available courses to develop the training plan for the year.

Department Managers and Supervisors review the training schedule annually to determine additional requirements (e.g., CEUs, on-the-job training, Ministry of Environment, Conservation and Parks Director approved courses) and to assist in monitoring the required training hours for positions with duties directly affecting the drinking water quality.

The Office Assistant – Water Services records the completed training hours in Springboard and in a Training Spreadsheet for each employee.

Training Records are maintained as per QMS-05 Document and Records Control.

2.4 Employee DWQMS Orientation

The Department Supervisor ensures a Drinking Water Quality Management Standard (DWQMS) awareness session is provided to new or transferred employees. The following types of information are included in the DWQMS awareness session:

- introduction to management systems and QMS Representative;
- review of pertinent procedures and Standard Operating Procedures; and
- review of QMS policy and ensuring that personnel are aware of the relevance of their duties and how they affect safe drinking water.

The Office Assistant (for Treatment) and Supervisor (for Distribution) records completion of the DWQMS awareness session and other applicable training.

2.5 Training Methods

Competency requirements can be satisfied through the use of in-house, off-site, or on-line training, attendance at seminars/conferences, presentations by subject matter experts, crew meetings, internal training sessions related to emergency and/or standard operating procedures or on-the-job training.

On-the-job training is determined by the Department Supervisors including what should be done, who they should work with in order to demonstrate and monitor how to perform various job duties using the appropriate documented procedures.

2.6 Effectiveness of Training

When external trainers conduct courses, the trainer may review and verify training effectiveness though various means (e.g., mini quiz or mini workshops are undertaken for CEU courses). If the employee is knowledgeable and able to demonstrate the skills, then the external trainer often issues a certificate to indicate the training was effective.

When internal training courses are conducted, the Department Managers and Supervisors talk to staff following completion of the course to determine the effectiveness of the training. In addition, they may ask the instructor to provide feedback on the trainee's understanding of the information.

Training needs may be identified through the Continual Improvement process (QMS-21), and documented in a Corrective Action Report (CAR). For these training needs, the employee's Supervisor is responsible for ensuring the training is completed and competency is achieved and reporting it to the QMS Representative.

On-the-job training is provided to employees through courses and job shadowing and is determined to be effective by the Department Supervisor.

3 REFERENCES

QMS-05 Procedure Document and Records Control
QMS-08 Risk Assessment Outcomes
QMS-21 Continual Improvement
Form 10-02 Training Assessment Form
Training Database
Corrective Action Report
Job Descriptions

4 APPENDICES

None

1 PURPOSE

To describe the means for ensuring there are sufficient personnel meeting the identified competencies are available for duties that directly affect drinking water quality.

2 PROCEDURE

Regular hours for the drinking water system are:

Water Distribution:

- Monday to Friday 8:00 am to 4:30 pm
- On call after hours and weekends (Standby Operator)

Water Treatment (Sault Ste Marie - only):

- 24 hours/365 days per year (SSM Shift Operator – 12 hour shift rotation)
- Monday to Friday – 8:00 am to 4:30 pm (regular day operators)
- On call after hours and weekends (Standby Operator)

Water Treatment: (Desbarats, Blind River, North Shore, Richards Landing)

- Monday to Friday – 8:00 am to 4:30 pm
- On call after hours and weekends (Standby Operator)
- 24 hours per day/365 days per year (SSM Shift Operator – accessible by phone)

Non-regular hours are:

Water Treatment (All locations):

- Monday to Friday 4:30 pm to 8:00 am (Standby Operator)
- Weekends Friday at 4:30 pm to Monday at 8:00 am (Standby Operator)
- Holidays 12:00 am to and 12:00 am (Standby Operator)

Only licensed operators are employed and they follow a rotating schedule to ensure there is coverage by licensed operators all day, every day. Operators are required to enter a cycle of on call duty that ensures an operator is available for emergencies at all times.

During regular hours, Operators are available to conduct inspections, calibrations, investigations, station checks, sampling and monitoring, maintenance and other work as assigned at the drinking water facilities, including the distribution system.

When problems occur during regular hours that are not able to be resolved, Operators can contact their Lead Hand or their immediate Supervisor. Supervisors/Managers are the designated Overall Responsible Operator (ORO) unless otherwise designated. When a problem or alarm occurs during non-regular hours, the Standby Operator will respond to investigate the alarm condition. Operators can contact their Lead

Hand or their immediate Supervisor if Maintenance Personnel or if additional staff are required. A list of phone numbers is made available to the Blind River/North Shore Operator. Consultation with the ORO may be required.

In the event that the designated ORO is unable to act for a period of time, a backup ORO is designated at that time. The SSM WTP Shift Operator has a listing (PUC Form 05-105 ORO Tracking) of the ORO at all times which is updated on the whiteboard in the SSM WTP Control Room.

At the end of the year, the Water Treatment Supervisor creates the on-call list for the next year and this is available to the Blind River/North Shore Operators.

Operators may request changes (i.e., due to vacation schedules) to the schedule during the year. These are made through the Water Treatment Supervisor and/or by making arrangements with another Operator. The Office Assistant updates the spreadsheet based on the change.

The person designated as on-call is the Operator in Charge (OIC) during non-regular hours unless they are an Operator in Training (OIT). In this case, the OIC will be designated.

The Standby Operator receives emergency calls during after-hours as well as water system alarms through the SCADA system.

If the after-hours situation requires work on the distribution system, the on call person notifies the Public Works Department. The Town Officials are listed on QMS 18 Appendix A Emergency Contact Listing for each location.

3 REFERENCES

PUC Form 05-105 ORO Tracking

4 APPENDICES

Not applicable

1 PURPOSE

To describe how the Quality Management System is communicated between the operating authority's top management and:

- Owner
- Personnel
- Suppliers
- Public/consumers

2 PROCEDURE

The Quality Policy is made available to all operating authority personnel and the public as it is posted in the facilities and on the Township's website.

The Quality Management System is communicated between top management and the owner, personnel, suppliers and public/consumers through various methods, such as: meetings (formal and informal), e-mails, telephone calls, website postings, log books, memos, and continual improvement forms, etc. The communication with each group varies and is described below.

2.1 Owner

Communication is through the annual meetings with municipal staff and/or Council, e-mails, phone calls, and meetings as requested. Contact during emergency situations may be made directly between PUC Services' Management and the applicable municipal staff/official.

Communication from the owner back to Management could be through e-mails, and Council meetings with PUC Services staff.

Communication on the Quality Management System is also achieved through the Owner retaining an uncontrolled copy of the Operational Plan. This is one means of informing the Owner about the Quality Management System.

2.2 Personnel

Communication with personnel may occur through a newsletter, meetings, memos, emails, work instructions, etc. These communications keep staff informed of the DWQMS progress and revisions. Management has an "open door" policy for communication to and from operational staff. Any minutes taken are maintained as per Procedure QMS-05 Document and Records Control.

Managers and/or Supervisors apprise staff of information (e.g., corporate) and are responsible for relaying specific information to staff. Information sessions (e.g., new Employee Orientation sessions, tailgate talks, formal information sessions) are additional means of communicating between supervision and personnel.

Communication with the QMS Representative is through similar means as outlined above. Additional communication is outlined in QMS-20 Management Review.

2.3 Suppliers/Contractors

Communication is described in Procedure QMS-13 Essential Supplies and Services. Examples of the means of communication include purchase orders and contracts which include a statement regarding the quality management policy in the footer. Communication with suppliers is also through emails, phone calls and sales calls.

2.4 Public / Consumers

Annual water reports (as required by the Ministry of Environment, Conservation and Parks) will be available at the Township Municipal office. The QMS policy and a description of the DWQMS are accessible to all customers. Information is communicated to the public through the Township's website and through the media.

Communication may also be through direct telephone calls and/or e-mails to the Township office and relayed to PUC Services staff.

3 REFERENCES

QMS-05 Document and Records Control
QMS-13 Essential Supplies and Services
QMS-20 Management Review

4 APPENDICES

Not applicable

1 PURPOSE

To document a procedure ensuring the quality of essential supplies and services, in as much as they may affect drinking water quality. The procedure shall include identification of these supplies and services and a means to ensure their procurement.

2 PROCEDURE

2.1 Procurement Process

Treatment and Distribution

The acquisition of goods and services related to the provision of drinking water is addressed by Purchase Orders which is administered by the Purchasing Department through the corporate financial tracking system (Cayenta).

The requestor/Manager obtains specifications and/or certification of product requirements for supplies and services prior to issuance of purchase orders, standing purchase orders, tenders, etc. The Purchasing Agent may look for the specifications if requested.

If required, the applicable Manager ensures that Standard Operating Procedures are developed and provided to establish conduct/ specifications of suppliers and contractors.

The Manager or Supervisor issues a requisition to Purchasing who generates a Purchase Order to a supplier of the product. Stores receives Distribution products and notifies the Supervisor or Manager if requested when it is in stock. In most cases, Water Treatment products are delivered directly to the water facility.

Standing Purchase Orders may be used to obtain frequently purchased products. These are issued by Purchasing based on specifications and/or certification of product requirements provided by the Manager. Lead Hands or Supervisors may purchase materials directly from suppliers and/or through Purchasing and the issuance of a Purchase Order.

The following statement is noted at the bottom of each purchase order to remind suppliers of our quality management policy, “PUC Services Inc. has implemented a quality management system for the provision of safe drinking water that meets the requirements of the Ontario Ministry of the Environment’s Drinking Water Quality Management Standard.”

Availability and quality of chemicals is ensured by having back-up suppliers and/or additional chemicals that are rotated through to ensure they have not expired. All supplies (including chemicals) are received by PUC Services and re-distributed to appropriate facilities by the Lead Hands.

2.2 Identification of Supplies & Services and Requirements

Form 13-01 Essential Supplies and Services for drinking water identifies the essential supplies and services critical to the provision of safe drinking water.

The form provides a description of the Procurement of Supplies or Services including:

- how do you ensure it is available, when required
- how do you ensure it is made available, when required (daily operations & emergencies)

The form also includes identification of the Quality Requirements:

- what requirements are needed related to quality of supply or service (e.g., product/service quality; performance of supplier/service provider; method of delivery; on-site activities) and
- how the requirements are satisfied.

2.3 Monitoring Supplies and Services

For products that are received at the Blind River Water Treatment Plant, an Operator is present during receiving in order to inspect and receive the product. The Operator accepts the product and verifies that it is correct and meets specifications

For products that do not meet the specifications or are incorrect (e.g., wrong material delivered), the Operator refuses the product by sending it back. The Operator contacts the supplier and identifies any problems and informs Purchasing of the issue.

Any problems that are encountered regarding the supplies and/or services are documented (generally by e-mail) and forwarded to the Purchasing Department. Managers, Supervisors and/or Operators may also contact suppliers or contractors directly if problems arise.

3 REFERENCES

NS Form 13-01 Essential Supplies and Services
NS QMS 13 Appendix A Essential Supply Listing

4 APPENDICES

Not Applicable

1 PURPOSE

To describe the annual review process that results in the provision of drinking water infrastructure. The objective is to annually review what infrastructure is necessary to operate and maintain the drinking water system and to determine if that infrastructure is in place as needed. The procedure also describes how the findings of the review are communicated to the Owner.

2 PROCEDURE

PUC Services will review infrastructure needs for the operation and maintenance of the drinking- water system on an annual basis. The Manager/Supervisor of Water Treatment Operations will complete this review from monitoring trends in the following:

a) Performance measures
b) Input from council, township staff, and the general public
c) Engineering consulting reports (when required)
d) MECP inspection reports and/or orders
e) Consider outcomes from Annual Risk Assessments
f) Input from operational staff
g) Feedback from reports by outside contractors
h) DWS Capital Equipment listing

2.1 Provision of Infrastructure

The infrastructure is reviewed annually by Operating Authority staff to evaluate current and future operational needs, with recommendations for the new budget year. Each annual review report generated is forwarded to the Township's CAO to assist with budget planning and discussed annually during the Management Review process and DWQMS Report to Owner.

PUC Services maintains regular communications of operations and maintenance issues that may arise throughout the year.

The Owner provides updates to the Manager Water Treatment Operations on capital works projects to be undertaken in order to discuss implementation issues. Any infrastructure issues that are identified but not approved and/or constructed by the Owner are carried forward to the subsequent year and raised during the next infrastructure review process.

3 REFERENCES

None

4 APPENDICES

None

1 PURPOSE

To document a procedure for infrastructure maintenance, rehabilitation and renewal programs for the drinking water systems. This is a continuation from the review and provision of infrastructure and is a summary of the infrastructure rehabilitation, renewal and maintenance programs and activities that are undertaken.

2 PROCEDURE

2.1 PREVENTATIVE MAINTENANCE

Maintenance programs are developed based on requirements established by the operating authority taking into account manufacturer's instructions, regulatory requirements, industry best practice and/or standards.

Standard Operating Procedures exist for some of the maintenance activities and these are available to Operations staff that are required to complete the maintenance activities.

Distribution

Maintenance programs for the distribution system include: exercising valves, flushing hydrants, blow-offs, or sample stations.

Exercising Valve Program – valves are exercised annually within the distribution system, with a goal of achieving full system coverage over the contract term. Deficiencies are noted and reported to the Township for repair by a contractor.

Hydrant Annual Inspections – hydrants and blow-offs are exercised annually within the distribution system, with a goal of achieving full system coverage over the annual cycle. Deficiencies are noted and reported to the Township for repair by a contractor.

Treatment

The facility preventative maintenance program has been implemented by the Manager/Supervisor of Water Treatment into the computerized maintenance system. All re-occurring work orders are issued to the Lead Hand who provides the work orders to treatment operations staff where work completed is recorded. The completed work orders are returned to the Water Treatment Office Assistant and processed.

2.2 UNPLANNED MAINTENANCE

Distribution

Notification is given to the Town to address any unplanned maintenance activities. These unplanned activities may arise from a customer complaint, inspection or other emergency situation.

The municipality is notified. Work may be completed by municipal staff or a contractor may be brought in to provide service for the Town. Licensed operational staff from PUC Services will be available upon request of the municipality to oversee any of the distribution activity.

Treatment

The facility preventative maintenance program has been implemented by the Manager/Supervisor of Water Treatment into the computerized maintenance system. Unplanned activity will occur after discussion as taken place between the Manger and the Lead Hand Water Treatment Operations. If necessary, a work order can be created after the work has been completed in unplanned maintenance situation. For example: to track additional costs to the contract or labour.

2.3 EFFECTIVENESS OF MAINTENANCE

The work order system supports tracking the effectiveness of maintenance activities.

Effectiveness in part is tracked through:

- Maintenance work plan tracking sheet
- percentage of overdue planned maintenance activities
- frequency of unplanned maintenance activities (e.g., mainbreaks)

Reports on the maintenance activities are forwarded to Top Management for review under Management Review Element (QMS-20).

2.4 COMMUNICATION TO OWNER

Major unplanned maintenance issues require authorization of the Owner. Minor unplanned maintenance can be performed without the consent of the council, but notification is made to the Owner at the quarterly meetings.

2.5 REHABILITATION / RENEWAL

The Town's capital works budget covers issues that are not operations and maintenance and includes extending the life of plant, replacement of plant and/or increases in capacity.

Rehabilitation and renewal works are identified and defined through the capital budget process.

The annual budget includes allowances for replacement of capital assets (e.g., hydrants, services). As well, planned replacement programs are identified for these assets.

Operations may also identify where additional programs (e.g., lead services, well upgrades) are required that may need additional operating budget.

Distribution

Distribution renewal projects are usually tied in with the Town's major road works program and typically watermains are replaced at that time. There is a capital works budget for these projects.

Treatment

Breakdown maintenance (e.g., pumps) and minor replacement are covered under the operating budget. Instrument Technicians provide reports on the state of the pumps based on the schedule for preventative maintenance.

The operating authority holds an annual infrastructure review considering the current status of all equipment, projected life expectancy and replacement cost for a future 10-year period. Each year a list of prioritized capital budget projects or required replacement equipment is forwarded to the Township for consideration of the next years' capital budget. If requested by the Township to perform the work, the operating authority will accomplish these tasks in accordance with the terms of the operating budget.

3 REFERENCES

QMS-05 Document and Records Control
QMS-20 Management Review
Standard Operating Procedures

4 APPENDICES

Not Applicable

1 PURPOSE

To document a procedure for sampling, testing and monitoring activities completed for all drinking water quality. The procedure describes how the sampling, testing and monitoring results are recorded and shared with the Owner, where applicable.

2 PROCEDURE

2.1 Sampling & Testing

Sampling, testing and monitoring is completed on the drinking water to:

- Provide operators with knowledge required to proactively operate the drinking water system, especially at Critical Control Points
- Ensure water quality is maintained as water moves through treatment process and travels through the distribution system
- Ensure compliance with applicable Ontario Drinking Water Regulations

For the purposes of this procedure, "sampling" is defined as the process of collecting water samples for laboratory analysis, and "testing" is considered to be the laboratory analysis. "Monitoring" consists of on-site data collection (e.g., SCADA instrumentation or handheld equipment) and analysis.

The sampling, testing and monitoring is completed according to regulation 170, and 169 or more frequent. The sampling program is coordinated by the Lead Hand and Supervisor.

Operators collect 2 (minimum) distribution samples each week and take chlorine residual tests. Additional samples may be collected at other locations based on customer complaints of water quality in the distribution system.

There are multiple sampling points and monitoring points that are used for process control from raw water to finished product.

The sampling frequency (monthly, quarterly, yearly) for the various parameters is identified in PRE-WT-012 Sampling Protocol and SRP-WT-012 Sampling Protocol.

An annual review of the sampling program is completed as required for changes in the regulations or operational processes.

The Supervisor is responsible for communicating any changes with department staff.

2.2 Sampling & Testing Results

Samples are submitted to an accredited and licensed lab. All results from the lab are received in digital format and maintained on the network drive and a copy is printed and managed as per QMS 05 (Document and Records Control).

In-house samples are analyzed following approved laboratory procedures. The results of these activities are recorded by Operators in the station log books or on the Lab Data Sheet. Any adjustments made to process parameters are recorded in the applicable station log book.

Flushing takes place annually and residuals are recorded in the facility logbook.

Adverse conditions are identified through alerts from SCADA and/or lab notification. Should the analytical results indicate an adverse condition the Standard Operating Procedures are followed that indicate how these adverse conditions are reported and addressed.

Sampling and testing records are managed in accordance with QMS-05 (Document and Record Control System Procedure).

2.3 Monitoring

Pronto East and Serpent River SCADA monitors all plant equipment and alarms alerting the operators by the auto-dialer when the control limits have been exceeded. Compliance data is reviewed daily and tracked on NS Form 05-06 Serpent River WTP Compliance Data and NS Form 05-11 Pronto East WTP Compliance Data from information on the SCADA generated daily report (Pronto East) or data acquisition from ReadWin (Serpent River). Any anomalies are verified by review of trending. Issues are brought to the supervisor's attention. Adverse conditions are reported and corrected as per PRE-WT-004 AWQI Reporting and SRP-WT-004 AWQI Reporting.

Facility logbooks or data entry sheets are used to track information.

There is remote access to the Pronto East and Serpent River SCADA from the Blind River and Sault Ste. Marie WTP's and WTO Office.

2.4 Reporting to the Owner

Annual reports are made to the owners regarding the drinking water systems and/or when an adverse or significant event occurs. In addition an annual report is presented to the owner and available for review at the municipal office.

3 REFERENCES

QMS-05 Document and Records Control
NS Form 05-17 Lab Entry Pronto East
NS Form 05-18 Lab Entry Serpent River
NS Form 16-01 DWQMS Sample Protocol
PRE-WT-012 Sampling Protocol for Pronto East DWS
SRP-WT-012 Sampling Protocol for Serpent River DWS
PRE-WT-004 AWQI Reporting
SRP-WT-004 AWQI Reporting

4 APPENDICES

Not Applicable

1 PURPOSE

To document the calibration and maintenance of measurement and recording equipment used for safe drinking water quality.

2 PROCEDURE

2.1 Calibration and Maintenance Frequency and Schedule

Measurement and recording equipment is maintained and calibrated as per equipment manufacturer's specifications or as required by O. Reg. 170-03; whichever is more frequent.

The frequency and responsibility for calibration and maintenance of each equipment type is summarized on Form 17-01. Calibration work orders are generated by the maintenance management system to operational staff to indicate when calibration of monitoring equipment is required.

The Supervisor and/or Manager are responsible for ensuring that the calibration is undertaken and the appropriate forms are completed by the Operator (for in-house calibration and maintenance) or the designated outside contractor.

The SCADA alarm system is maintained and calibrated through daily, weekly and yearly activities that Operators and the instrument technicians undertake for the alarms and settings.

SCADA alarm communication for remote sites is verified by a weekly test and operating the field sensors for annunciation at the control centre. At the start of each shift the Operator reviews the status of the alarm conditions on the SCADA display and records to system logbook.

2.2 Annual Review

On an annual basis the Manager/Supervisor undertakes a review of the schedule (refer to Form 17-01 Measurement and Recording Equipment Calibration Schedule) to confirm which work has been completed. At least once per year the Manager/Supervisor and the QMS Representative review the calibration and maintenance schedules to ensure the information is up to date.

3 REFERENCES

QMS-05 Document and Records Control QMS System Procedure
Form 17-01 Measurement & Recording Equipment Maintenance & Calibration Schedule

1 PURPOSE

The purpose of this procedure is to document how we maintain a state of emergency preparedness, including:

a) a list of potential emergency situations or service interruptions
b) processes for emergency response & recovery
c) emergency response training & testing requirements
d) Owner & Operating Authority responsibilities during emergency situations
e) references to municipal emergency planning measures
f) emergency communication protocol and up-to-date list of emergency contacts

2 PROCEDURE

2.1 Identification of Emergency Situations or Service Interruptions

On an annual basis the Manager Water Treatment Operations, Supervisor Water Treatment Operations and/or their designates will meet. The purpose of the meeting is to review the QMS-18 Appendix B which includes a list of emergency situations or service interruptions that have been identified and to examine current operations to determine if additional emergency situations or service interruptions exist.

In addition, during the risk assessment process (including the annual and three year reviews) the outcomes (QMS-08) are identified which include some emergency situations or service interruptions. This is another opportunity where the review process may identify emergency situations or service interruptions that can be added to the list from the above noted meeting.

Emergencies can stem from man-made or natural occurrences such as:

- Major service disruption - large scale watermain breaks affecting water supply
- Ice/snow storms or flooding (e.g., road closures)
- Hazardous material spillage
- Mechanical or electrical failure which may disrupt a the water supply system
- Power outage causing a disruption of service
- Adverse water quality – microbial or chemical contamination
- Large scale health issue (e.g., Pandemic)

The QMS Representative is responsible for maintaining and updating the potential emergency situations or service interruptions (see Appendix B).

2.2 Process for Emergency Response and Recovery

Based on the emergencies identified, the QMS Representative is responsible for ensuring that Standard Operating Procedures (SOPs) are developed.

The SOPs outline the roles and responsibilities for various staff and the activities related to the response and recovery from the emergency situation or service interruption.

The municipality has a municipal emergency plan that outlines communication procedures during emergency situations and the roles and responsibilities of the Owner, depending on the level of emergency.

The Emergency Coordinator is responsible for initiating communications with the municipality for emergencies that have escalated to a higher level of response than PUC Services Inc. Operations staff.

For escalation of emergencies, the Emergency Communications Protocol (Appendix B) should be referred to as it provides the emergency communication protocol for situations that have the potential to escalate to higher level impacts. The emergency list of contacts is included in the Water System Emergency Plan.

2.3 Emergency Response Training and Testing Requirements

The Managers are responsible for ensuring that appropriate staff receives emergency response training. Training is tracked as per QMS-10 Competencies.

In addition a debriefing after larger scale emergencies will be undertaken by the Manager responsible for the affected area and will include the QMS Representative and other applicable staff. Any corrective actions related to the QMS that are identified during the debriefing will be recorded as per QMS-21 Continual Improvement and utilizing Form 21-01.

Periodically the emergency procedures (response and recovery) will be evaluated and modifications made to the procedures where required based on the review and/or debriefing following emergency situations.

3 REFERENCES

QMS-08 Risk Assessment Outcomes
QMS-10 Competencies
QMS-21 Continual Improvement
Standard Operating Procedures
Water System Emergency Plan
Municipal Emergency Plan
NS Form 05-23 Serpent River Emergency Testing (Template)
NS Form 05-24 Pronto East Emergency Testing (Template)

4 APPENDICES

Appendix 18-A Emergency Contact List
Appendix 18-B Emergency Communications Protocol
Appendix 18-C Emergency Management SOP Table of Contents

1 PURPOSE

To document the procedure for internal audits that:

- Evaluates conformity of the QMS with the requirements of the DWQMS
- Identifies internal audit criteria, frequency, scope, methodology and record keeping requirements
- Considers previous internal and external audit results
- Describes how the QMS corrective actions are identified and initiated

2 PROCEDURE

2.1 Audit Team Structure and Roles

The audit team roles are as follows:

- The ***QMS Representative*** acts as a liaison between the audit team (through the Lead Auditor) and the auditees
- The ***Lead Auditor(s)*** is responsible for overseeing the internal audit process and ensuring qualified auditors conduct internal audits
- ***Auditors*** work with the Lead Auditor(s) to prepare for and conduct internal audits

2.2 Auditor Qualifications and Selection

The Lead Auditor(s) and Auditors must meet the following criteria:

- Knowledge of the DWQMS and the drinking water QMS
- Independent of the work that is going to be audited
- Ability to make objective observations and record the results
- Successfully complete an auditing course

The Lead Auditor(s) along with the QMS Representative will select internal auditors.

2.3 Audit Process

2.3.1 Schedule

Each element of the QMS for the drinking water system must be audited a minimum of once per calendar year. Additional audits can be scheduled based on the importance of the process or area, or in response to previous audits results (internal and external). Typically, the internal audit focuses on the previous calendar year.

The Lead Auditor(s) creates an Annual Internal Audit Schedule using Form 19-01, with assistance from the QMS Representative. The Lead Auditor or QMS Representative forwards the Audit Schedule to the Manager and Supervisors for review.

An email notification of the audit schedule is sent out by the QMS Representative or the Lead Auditor to the Manager and Supervisors.

2.3.2 Checklist

The Lead Auditor works with the QMS Representative to prepare an Internal Audit Checklist (Form 19-02) or other similar documents that record questions asked and points verified. If schedules permit, a pre-audit meeting will be held with the auditing team to review and approve the checklist and/or documents. The checklist defines the scope (i.e., applicable area of the QMS, time period to be audited, organizational unit and/or facility) and audit criteria (i.e., applicable manuals and standards).

The checklist reflects the current policies and procedures of the area that are being audited. A copy of the procedures with the points highlighted that are going to be checked can be attached to the checklist and referenced for the audit.

2.3.3 Audit

The audit is performed by the auditing team using PUC Form 19-02 Internal Audit Checklist or applicable document. Observations that provide evidence of conformance or non-conformance are noted on the Internal Audit Checklist.

2.3.4 Audit Findings

The results of the audit are reviewed by the audit team. Agreement is reached under the leadership of the Lead Auditor. The Auditors complete the summary of findings on PUC Form 19-03 Internal Audit Report or similar document.

The Lead Auditor(s) records non-conformances from the internal audits on NS Form 21-01 Corrective Action Report (CAR) which records:

- Audit report name
- Date
- Brief description of non-conformance

The Office Assistant, DWQMS tracks the internal audit non-conformances by recording the CAR number in the NS Form 21-02 CAR Log.

2.3.5 Closing Meeting

The results of the audit are presented at the closing meeting, if one is held. At a minimum the Supervisor responsible for the area audited and the Audit Team would attend.

The closing meeting will include the following:

- Thank the staff for their cooperation
- Review the commendable features
- Review documented observations – meets standards, opportunity for improvement, non-conformance
- Ensure the issue is understood and provide feedback for questions and concerns

2.4 Audit Report

The Auditors prepare an Internal Audit Report (PUC Form 19-03 Internal Audit Report), fill out any corrective actions that may be required from the audit, and determine due dates of corrective actions. The report has to be signed by the Lead Auditor and the person responsible for the audited area.

A copy of the report is given to the Division VP, Managers & Supervisors of the affected areas and the QMS Representative; the original is kept by the Lead Auditor(s) and used for follow up. The report is filed according to QMS 05 Procedure Document and Records Control.

2.5 Audit Follow Up and Report

The Lead Auditor makes sure that the audit follow up is carried out to verify that the action has been taken, is effective, and been closed on NS Form 21-02 CAR Log.

The results of the internal audits and the follow up audits are reviewed by management at the annual Management Review meeting as per QMS 20 (Management Review) or more frequently, if required.

3 REFERENCES

PUC Form 19-01 Annual Internal Audit Schedule
PUC Form 19-02 Internal Audit Checklist
PUC Form 19-03 Internal Audit Report
NS Form 21-01 Corrective Action Report
NS Form 21-02 CAR Log
QMS 05 Document and Records Control
QMS 20 Management Review

4 APPENDICES

Not Applicable

1 PURPOSE

To document the procedure for describing how the QMS will ensure its continuing suitability, adequacy and effectiveness. To ensure the necessary information is collected for Top Management to review and to provide review output of any decisions and actions related to the QMS and maintain records of the reviews.

2 PROCEDURE

2.1 Management Review

QMS-09 Organizational Roles, Responsibilities and Authorities identify the management team for Top Management. A Management Review will be held once per calendar year by Top Management to review the overall suitability, adequacy and effectiveness of the QMS. At a minimum, the Vice President Operations & Engineering, Director of Water Operations and the QMS Representative must be in attendance at the Management Review meeting. The President & CEO PUC Services Inc. should be provided with a report if not available for the meeting.

The QMS Representative communicates directly with Top Management on the QMS and is responsible for:

- establishing the date for the Annual Management Review meeting
- forwarding notification of the meeting to participants
- forwarding the agenda for the meeting to the participant
- tracking the status of action items identified during Management Review meeting
- reporting to the Owner

2.2 Management Review Input

Top Management will review information in the agenda on Form 20-01, where applicable on:

a) Incidents of regulatory non-compliance
b) Incidents of adverse drinking water tests
c) Deviations from critical control point limits and response actions
d) Efficacy of the risk assessment process
e) Results of audits (internal and external)
f) Results of relevant emergency response testing
g) Operational performance
h) Raw water supply and drinking water quality trends
i) Follow-up action items from previous management reviews
j) Status of management action items identified between reviews
k) Changes that could affect the QMS
l) Summary of consumer feedback
m) Resources needed to maintain the QMS
n) Results of the infrastructure review
o) Operational Plan currency, content and updates
p) Summary of staff suggestions
q) New Business – Other issues that impact on the quality management system

r) Date of Next Meeting

2.3 Management Review Output

Management review outputs will include identification of specific actions items to address deficiencies, personnel responsible for delivering those action items and proposed implementation timelines. During Management Review, Top Management will provide a record of any decisions and actions related to:

- Improvement of the QMS and related procedures
- Improvement of the Operating Authority's ability to implement consistently the QMS
- Human and financial resource needs

A summary will be compiled on Form 20-02 for reporting to the Owner. A presentation is held on a date selected by the Owner.

The QMS Representative will track the status of the action items identified during Management Review meeting and will report on this at subsequent meetings. The QMS Representative will track this on Form 20-01 by filling in the "status" column. A copy of Form 20-01 will be kept (as per QMS-05) as the minutes of the meeting with the "status" column left blank. The column will then be filled in by the QMS Representative as a means of tracking the status of the action items.

2.4 Recording of Management Review

Minutes of the meeting will be recorded on Form 20-01 and maintained as per QMS-05 Document and Records Control. These minutes will reflect the review inputs for the meetings. Copies of the minutes are distributed to Top Management by the QMS Representative.

The QMS Representative will ensure the results of the management review, the identified deficiencies, decisions and action items are conveyed to the Owner on Form 20-02.

3 REFERENCES

Form 20-01 Management Review Agenda & Meeting Minutes
Form 20-02 Report on QMS to Owner
QMS-05 Document and Records Control

4 APPENDICES

Not Applicable

1 PURPOSE

To document the procedure established for the Operating Authority to strive to continually improve the effectiveness of its Quality Management System through corrective actions, preventative actions to eliminate potential non-conformities and review of best management practices.

2 PROCEDURES

2.1 CORRECTIVE ACTION

Corrective action involves taking measures to eliminate causes of identified quality problems (e.g., related product, process or service) to ensure the problems do not recur.

Corrective action may be initiated as a result of the following indicators of a breakdown in the Quality Management System:

- Internal audits
- External audits
- AWQI's
- MECP Inspection Reports

Any employee can initiate corrective action by issuing a Corrective Action Report (CAR) Form 21-01.

The Issuer completes Part A of the CAR Form 21-01 and forwards the CAR to the QMS Representative. The QMS Representative will issue the CAR number and determine who is assigned as Team Leader to address the issue. The QMS Representative records the CAR in the CAR Log Form 21-02 and notes the CAR number on the report.

The Team Leader creates a cross-functional team which includes the Manager of the affected area (minimum of 2 people) and completes Part B of the CAR.

The Team Leader is responsible for the process which includes:

- describing and implementing the corrective action
- investigating who is involved in the corrective action
- determining the root cause of the problem or potential problem
- identifying actions required to correct the non-conformance
- identifying and making changes to documentation as per QMS-05 Document & Record Control
- ensuring that the necessary actions are taken in an appropriate timeframe
- completing the Corrective Action Report (Form 21-01)

The Team Leader forwards the CAR Form 21-01 to the QMS Representative to determine that the corrective action has been taken and is effective. The QMS Representative completes Part C of the CAR.

The QMS Representative reviews the CAR Log during Management Review and records if any further action is required.

CAR and CAR Log are maintained as per procedure QMS-05 Document and Record Control.

2.2 PREVENTATIVE ACTIONS

Preventative Actions may eliminate the occurrence of potential non-conformities in the Quality Management System. Sources of Preventative actions may include:

- Opportunities for Improvement
- Staff suggestions
- Customer complaints
- Risk assessment outcomes
- Emergency response training outcomes
- Management reviews

The QMS Rep is responsible for ensuring preventative actions identified are implemented and their effectiveness monitored in the Preventative Action Log.

Continual improvement can also be initiated through review and implementation of Best Management Practices relevant to operations of the drinking water system. Best management practice may be a program, process or procedure which, if implemented, may assist the owner and operating authority of a drinking water system in the delivery of safe, high quality drinking water; provide mechanisms to optimize efficiencies within the drinking water system and/or QMS, and provide information to assist in future planning for the systems.

2.3 BEST PRACTICES

Best practices may be identified:

- Annual MECP inspections
- MECP publications and notification emails
- OFI's from a third-party audit
- Annual risk assessments
- Information received through formal training or workshop
- Industry-published best practice documents

3 REFERENCES

Form 21-01 Corrective Action Report
Form 21-02 Corrective Action Report Log
PUC Form 21-03 Preventative Action Log
PUC Form 21-04 Best Practice Reference Listing
QMS-05 Document and Record Control

4 APPENDICES

Not Applicable