SAULT STE. MARIE
DRINKING WATER SYSTEM

DWQMS OPERATIONAL PLAN
OPERATIONAL PLAN NUMBER 216-401

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 the 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 City of Sault Ste. Marie. 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):

QMS
Policy

System Level
Procedures &

Standard Operating Procedures
(*Related to Critical Control Points*)

Records

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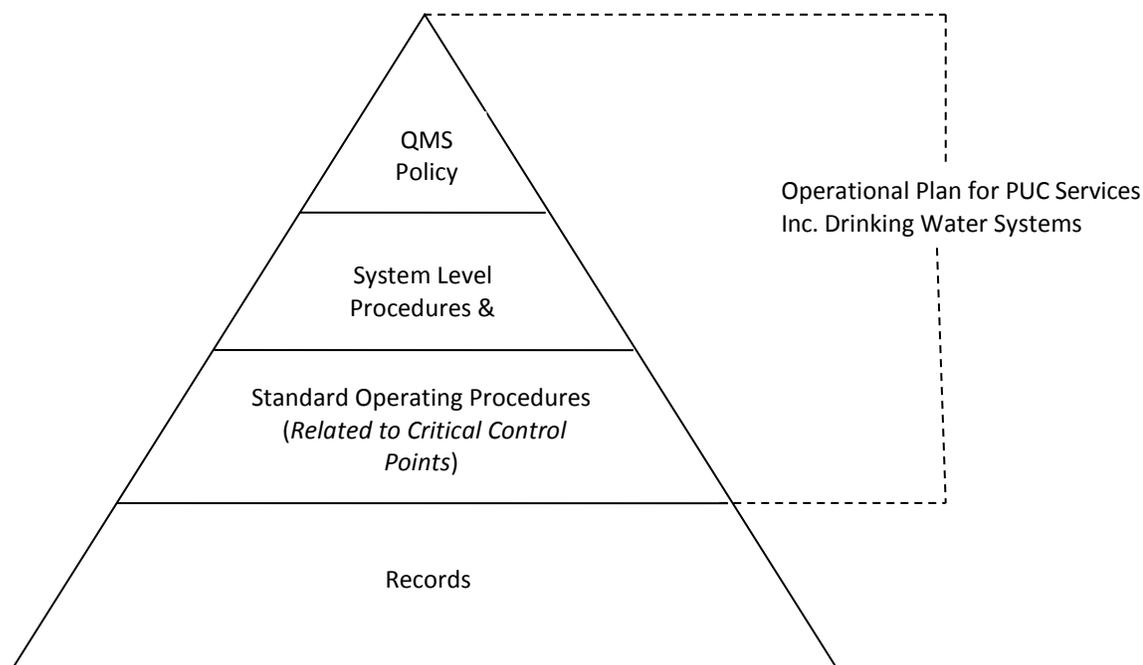
As described in Element 5 - Document and Records Control of the Operational Plan, the Table of Contents has been signed off to demonstrate that the "approval date" in the Operational Plan procedures has been approved. The "revision number" is located on each separate document within the Operational Plan.

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The Public Utilities Commission of the City of Sault Ste. Marie

PUC Services Inc., as the Operating Authority of the Sault Ste. Marie 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

PUBLIC UTILITIES COMMISSION

Agenda Item #   5.4   Date: December 17, 2009

Moved by: _DST_

Seconded by: _DHC_

Resolution:

"That the Commission endorse the Operational Plan which has been developed in coordination with the operating authority, PUC Services Inc., for the Sault Ste. Marie municipal drinking water system in accordance with the requirements of the Ministry of Environment's Drinking Water Quality Management Standard and presented at the regular meeting of December 17, 2009.

☑ Carried   ☐ Defeated   ☐ Deferred

☐ Referred   ☐ Amended   ☐ Officially Read Not
                                          Dealt With

_____
Chair

Action

☐ Chair   ☐ PUC Inc.   ☐ _____

☐ President   ☐ PUC Telecom   ☐ _____

☐ Secretary   ☐ PUC Services   ☐ _____

☐ Treasurer   ☐ PUC Energies   ☐ _____

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 record 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 15 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 disposal at the time that the records are no longer required.

2.4   Drawings

Engineering is responsible for maintaining electronic and paper copies of drawings. Drawings are kept for the life of the asset.

Distribution drawings are maintained by Engineering. Paper copies of drawings are located in the Water Distribution Department and at the Water Treatment Plant and made available to operational field staff.

Original physical plant drawings are stored in Engineering. Paper copies for each facility are located at the Water Treatment Plant.

2.5   Reference Materials

All reference materials pertaining to the Sault Ste. Marie DWS are labelled as indicated on SSM Form 05-20 Sault Ste. Marie - Reference Material. Reference materials may include but are not limited to drawings, equipment operating manuals, facility logbooks, applicable binders containing associated records, etc.

3   REFERENCES

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

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Overview of the Sault Ste. Marie Drinking Water System

The Sault Ste. Marie Drinking Water System (SSM DWS) is categorized as a Large Municipal Residential system under O. Reg. 170/03 where the treatment plant is a Class 3 WT subsystem and the distribution is a Class 2 WD subsystem. The Drinking Water System serves a population of approximately 74,000 (within the Urban Service Line area) of the City of Sault Ste. Marie and Rankin Indian Reserve. Typical annual water pumpage is in the order of 10 million cubic meters per year and maximum peak day is in the range of 40,000 cubic meters.

Water for the Sault Ste. Marie area is presently obtained from two independent sources. One source of supply is from six deep wells in 4 pumping stations located at the Steelton Pump Station, Goulais Pump Station, Shannon Pump Station and Lorna Pump Station. The well at Steelton is 25 meters deep, Goulais wells are 55 meters deep, Shannon well is 102 meters deep and Lorna wells are 53 meters deep. The water pumped from the wells is disinfected and pumped directly to the distribution system.

All four pump stations utilize chlorine for primary and secondary disinfection. Two of the well sites are located in the West areas of the city, while the other two are in the eastern part of the city. Water quality and quantity within the aquifer are both excellent with very little fluctuation of both throughout the year.

All wells are located in residential areas, with some light commercial/industrial sites nearby. Any new development or changes to existing sites within the recharge area of the aquifer is to be studied to determine the impact on the water supply.

Weekly operational and biological analysis support this statement, with turbidity averaging 0.12 NTU, average temperature of 9 degrees C. Periodically, bacterial results show some presence of total coliform and no detection of E.Coli.

The second source is from Lake Superior at Gros Cap. The intake structure, located in 15 meters of water is connected to the Raw Water Pumping Station by 830 meters of 1200mm diameter polyethylene pipe. The raw water from Lake Superior is pumped to the twin control tanks on Marshall Drive and then flows by gravity through a 750mm diameter concrete watermain to the Water Treatment Plant (filtration plant).

The difference in elevation between the pumping station at Gros Cap and the control tanks at Marshall Drive is 40 meters, while the difference in elevation between the control tanks and the treatment plant inlet is 20 meters. The filtration plant is of the direct filtration type incorporating chemically assisted coagulation (utilizing aluminum sulfate), flocculation and dual media filtration but with no sedimentation. The plant is located on the south side of Second Line between Town Line Road and Carpin Beach Road immediately east of the Little Carp River.

The surface water treatment plant is rated at 40,000 cubic meters/day, using chemically assisted filtration and chlorination for treatment and primary disinfection. Secondary disinfection is achieved through chlorination maintaining a free residual in the distribution system.

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Corrosion control and pH adjustment was implemented at all treatment sites in the Spring of 2015. Soda ash is applied at the Water Treatment Plant and carbon dioxide (CO_2) at the east end wells (Lorna and Shannon) to stabilize pH, while the west end wells (Goulais, Steelton) have no treatment. Blended phosphates are dosed at all treatment sites for mitigation of lead.

The complete water supply system, including the Gros Cap Pumping Station, deep wells and filtration plant, are monitored and controlled through a SCADA system from the Control Room at the Water Treatment Plant. There is a central process controller and data logging facility along with a graphic panel indicating the plant and the distribution system components.

Gros Cap Water Intake

The intake is located in Lake Superior upstream of all local industry, wastewater treatment plants and the St. Mary's River. The source is ideally situated in terms of its limited potential for microbiological contamination even as a source of raw water.

The intake is located over 800 meters off-shore of Gros Cap in approximately 15 meters of water. Raw water is transferred to the water treatment plant through a pumping station located at Gros Cap which is approximately 18 km west of Sault Ste. Marie. The raw water is low in temperature, suspended solids, alkalinity and hardness.

This source supplies up to 65 percent of the water for the community during the summer months. The water is cold and relatively pristine with very little fluctuations in quality throughout the year. Weekly operational checks and biological analysis support this statement as turbidity values range from a minimum value of 0.10 NTU to maximum values of 1.00 NTU, but average 0.40 NTU. Temperatures average 6 degrees C with a minimum value of 1 degree in the winter months to a maximum value of 20 degrees in the summer. In general, bacterial results show some presence of total coliform and rare presence of E.Coli.

There are very little residential and industrial influences within the immediate vicinity of the intake, but there is recreational boating and commercial shipping that could pose a potential hazard of contamination.

Distribution System

The distribution system is divided into two pressure zones; one below the escarpment and the second above. A 27,275 m3 reservoir located on Second Line west of Highway 17 North provides balancing storage for the pressure zone (Zone 1) below the escarpment. Pressure for Zone 2, above the escarpment, is provided by a 9,000 m3 reservoir located on Peoples Road at Coronation Drive. There are four booster stations throughout the distribution system. They include the Zone II, Coronation, Crimson Ridge, and the People's Road.

Sizes of mains vary from 900 mm diameter down to 50 mm diameter to provide a total length of approximately 470 km of distribution mains. Approximate breakdown of major pipe materials includes 51% cast iron, 26% ductile iron, 14 % PVC and 9% concrete pressure pipe.

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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) Director of Water Operations, 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.[2]
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. • CP's may be initiated if the rating value is >=10
M – *CCP#*	The identified CPs and CCPs are numbered sequentially and highlighted.

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[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

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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) Director of Water Operations, Manager of Water Treatment Operations, Manager of Water Distribution 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/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

SSM QMS-05 Document and Records Control
SSM Table 07-T1 Risk Assessment Rating & Best Management Practices
SSM Table 08-T1 Risk Assessment Form
SSM 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.

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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

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

4   APPENDICES

SSM QMS 09 Appendix A PUC Services Organizational Chart
SSM 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 WTP facility. 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 the 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 (for Treatment) records each employee's completed training hours in Springboard and in a Training Spreadsheet. The Office Assistant - Operations (for Distribution) records employees training in Springboard and in a database.

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.

DWQMS documents shall be reviewed by staff in the Springboard software.

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 licensed 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
– Water Distribution (WD) On-Call Operator 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)

Water Treatment (All Locations)

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 SSM Shift Operator will contact the Supervisor on call. A decision can be made to call out a Standby Operator or Maintenance Personnel or additional staff. Phone numbers are available to the SSM Shift Operator within the rolodex. If the on call person is unreachable, the SSM Shift Operator will contact the designated ORO.

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.

Annually, Water Treatment on-call schedule is developed for the upcoming year and is available in the SSM WTP Control Room. The current staff member that is on call is identified on the whiteboard for quick reference.

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 and informing the Control Room for the week affected. 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 Control Room receives emergency calls during after-hours as well as water system alarms through the SCADA system.

In the case of outside contracts, the on call person will contact the Town to make arrangements for contractors. The Town Officials are listed on QMS 18 Appendix A Emergency Contact Listing for each location.

Water Distribution

The WD Manager and Supervisor are the designated Overall Responsible Operator (ORO) unless otherwise designated. The SSM WTP Shift Operator has a listing (PUC Form 05-105 ORO Tracking) of the WD ORO at all times which is updated on the whiteboard in the SSM WTP Control Room.

All WD Operators are required to be licensed in order to operate the water distribution system. For after-hour emergencies a licensed WD Operator will be designated and scheduled as WD Operator On-Call according to *Water Distribution Stand Operating Procedure Departmental Standby WD-54-002*. The SSM WTP Shift Operator will be informed of the WD Operator On-Call which is updated on the whiteboard in the SSM WTP Control Room.

During regular hours, licensed WD Operators are assigned duties to perform maintenance and operational tasks on the water distribution system by the WD Supervisor. For emergencies during regular hours, the WD Supervisor will assign the appropriate on-duty staff to address the issue.

When an emergency occurs during non-regular hours, the SSM Shift Operator in the WTP Control Room will receive the emergency call. The Shift Operator will then contact the WD Operator On-Call to respond. Phone numbers are available to the SSM Shift Operator within the rolodex. The WD Operator On-Call will respond to identify and confirm the issue, and if possible address the emergency or place barriers to protect the distribution system and/or the public until the necessary resources can be assembled to effect repairs.

If the after-hours emergency requires additional work and resources, the SSM WTP Shift Operator will refer to the Water Department Callout Procedure to determine the required water distribution staff required. The WDO Callout Procedure includes contact numbers for key functions.

The WD Operator On-Call shall be the designated Operator in Charge (OIC) during non-regular hours until an appropriate Lead hand Operator has been assigned to the work. If required, the ORO will be contacted for operational instructions.

All emergency response notification shall be accordance with QMS-18 Emergency Response Protocol - Appendix B

3   REFERENCES

PUC Form 05-105 ORO Tracking

WD SOP#54-002 – Departmental Standby

Water Department Callout Procedure

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 PUC'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 meetings with municipal staff and/or Council, e-mails (i.e., between directors, managers and Councilors). As well, contact during emergency situations may be made directly between Top Management and the applicable municipal official (e.g., Mayor).

Sault Ste Marie Drinking Water System

The Manager provides monthly updates (President's Report) to applicable municipal staff which includes conditions. Generally, on a quarterly basis the Owner is updated on the state of the infrastructure. The report is a condensed version of the monthly report.

Communication from the owner back to Top Management could be through e-mails, Board meetings, meetings with PUC Services Inc. staff and/or motions of Council.

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 is through regular meetings that are generally held on a monthly basis. The department also includes a newsletter that is distributed to staff, where DWQMS progress and revisions are listed. Daily communications occur between Top Management and Managers. Management has an "open door" policy for communication to and from operational staff. Any minutes of meetings taken are maintained (as per Procedure QMS-05 Document and Records Control).

E-mails are another form of communication and are common between staff and Management.

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 another means of communicating between Manager and/or Supervisor and personnel.

Communication with the QMS Representative is through similar means as outlined for the Operating Authority Personnel. Additional communication is outlined in QMS-20 Management Review.

2.3   Suppliers

Communication is described in Procedure QMS-13 Essential Supplies and Services. Examples of the means of communication include purchase orders and contracts (which may include a copy of the QMS Policy). Communication is generally through emails and phone calls between management and/or Stores Clerks.

Copies of applicable operating procedures and the QMS Policy are provided with contracts and/or purchase orders to inform essential suppliers and contractors that there is a QMS maintained by Operations & Engineering.

2.4   Public / Consumers

Annual water reports (as required by the Ministry of the Environment, Conservation and Parks) will be available on the PUC website. A description of the DWQMS and QMS policy is accessible to all customers and on the PUC Services Inc. (Water Commission) website. Information is communicated to the public through notices, advertisements and/or inserts in billings.

Communication may also be through direct telephone calls and/or e-mails. The public may call directly to the water facilities and/or PUC Services Inc.(Customer Service). Calls received by Customer Service are forwarded to the appropriate water treatment or distribution operational 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

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).

Requisitioners may obtain supplies from controlled inventory or may requisition non-inventoried supplies. Non-inventoried supplies are identified by the requisitioner. The Purchasing Agent (or designate) is responsible for purchasing and managing stock inventory for PUC with input from representatives of Stores and other departments.

The requisitioner obtains specifications and/or certification of product requirements for supplies and services prior to issuance of purchase orders, standing purchase orders, tenders, etc.

Standard purchase specifications can be used to ensure frequently purchased supplies and services conform to required standards. Specifications will be determined on a case by case basis for less frequently purchased supplies and services or where no standard purchase specification has been developed. The manager approving the purchase requisition will ensure required product standards are met.

The approved requisition is forwarded to Purchasing who generates a Purchase Order to a supplier.

Stores receives 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.

Staff receiving the supplies conduct the following activities at the time of delivery:

- Check the received product against the Bill of Lading (B/L); identify any anomalies on the B/L; provide a copy of the B/L to the carrier;

- Perform receiving inspection (performed in conjunction with the requisitioner where applicable);

- Compare the delivery against the packing slip and PO;

- verify that the manufacturer/vendor matches the PO;

- Sault Ste. Marie DWQMS Operational Plan -

- ▪ verify that the full product description, including make, model, and catalogue number, matches the PO;

- ▪ Check for applicable certification labels and or marks in accordance with NSF, AWWA etc.

- ▪ Document anomalies on the packing slip;

- ▪ Count the product or items delivered;

- ▪ Spot check the contents;

- ▪ Notify the Purchasing Agent for resolution of anomalies;

- ▪ Forward supplier-provided documentation to the requisitioner for review and approval before acceptance of product where applicable. (e.g. NSF certificates for valves)

- ▪ Identify accepted product on the packing slip hardcopy, date and initial same;

- ▪ Transport accepted inventoried product to its storage location, ensuring the product bears appropriate identification;

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.

A copy of the relevant procedures/specifications, a copy of the Quality Policy and general information regarding the presence of a QMS are included in the appropriate "contract specifications" for capital works projects.

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 designated staff.

2.2   Stores

Supplies that are kept in stock (e.g., repair clamps, pipes, etc.) which includes quantities for emergency repairs are maintained by Stores.

During regular business hours, staff may come in and pick up appropriate material, which is tracked by Stores through completion of a material requisition.

For stock that is in inventory, the Issuing & Receiving Clerk completes the data entry on stock issued to a job to maintain minimum/maximum levels of stock.   When minimum level is broken, an auto- requisition is sent electronically to the Purchaser via Cayenta (computerized tracking system). For supplies needed while operators are on the job site, they may contact the Issuing & Receiving Clerk (during regular business hours) to see if the item is stocked otherwise Managers may purchase these goods directly.

After hours, Lead Hands call in to the Shift Operator requesting Stores staff meet them at Stores.

Emergency field purchases may be made directly from local suppliers. The competence of the purchaser shall ensure only quality purchases are made in emergency situations.

2.3 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)

– How the requirements are satisfied

2.4 Monitoring Supplies and Services

For products that are received at the Sault Ste Marie Water Treatment Plant, an Operator is present during receiving in order to inspect and receive the product. The Operator accepts the product and follows the steps listed:

1. Verify the contents with the enclosed packing slip

2. Date and initial the packing slip

- For chemicals: The Operator verifies that the product meets specifications and notifies the Shift Operators that a load and/or product has been delivered and is acceptable

- Sault Ste. Marie DWQMS Operational Plan -

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 to Stores. The Operator will then notify their Lead Hand/Supervisor who in turn will contact Purchasing and inform them of any issues or problems. Purchasing would then contact the supplier to return/replace the material.

When products are delivered to Stores the Issuing & Receiving Clerk ensures that it conforms to the order that was made. Any discrepancies are resolved by the Purchasing Agent.

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

SSM Form 13-01 Essential Supplies and Services
SSM QMS 13 Appendix A Essential Supply Listing
SSM QMS 13 Appendix B Letter to Essential Suppliers and Service Providers

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

Review and provision of the drinking water infrastructure needs is achieved through consideration of performance and condition of existing infrastructure along with forecasted needs related to potential growth.

   a)   Performance measures
   b)   Input from city council and annual meetings with the Board
   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

2.1   Review of Infrastructure Needs

The budget process is generally initiated in September each year by the Finance Department. Managers provide input and recommendations on infrastructure needs to Vice President of Operations and Engineering in order to develop a list of priority projects for the next year.

During the budget process, Managers and Supervisors may review Monthly, Quarterly, Annual Reports, input from engineering and operational staff, MECP Compliance Inspection Reports, water quality reports and maintenance records to assist in determining priority needs.

Engineering, Distribution and Treatment Departments look at infrastructure improvements by assessing condition of infrastructure, risk of failure, age, and ease of accessibility. Factors considered include operational knowledge, maintenance records, age and condition

Areas of main breaks are reviewed in conjunction with road reconstruction to be undertaken by the municipality. The municipality's 5 year road reconstruction program is reviewed to identify where watermain construction (rehabilitation and/or renewal) could be undertaken.

2.2   New Infrastructure

The need for new infrastructure is driven by the Planning and Engineering Departments of the municipality. The municipality maintains plans to determine how the area will grow (both short term and long term) and where the infrastructure and resources will be necessary. In general these growth plans are development-driven.

- Sault Ste. Marie DWQMS Operational Plan -

PUC Services Inc. provides specifications for new infrastructure to the applicable department. In addition, Managers and Supervisors will generally review designs prior to issuance of the Certificate of Approval.

2.3   Provision of Infrastructure

The Vice President reviews budget requests from Managers and holds meetings to discuss project priorities. The Vice President, Director and Managers discuss project impacts recognizing that all projects identified may not be undertaken due to various factors including financial limitations.

The finalized list of priority projects is forwarded to the Finance Department. Finance develops a preliminary budget which looks at projected revenue and capital to determine rate impacts. Senior Management reviews the draft budget and develops a final draft for presentation to the Commission.

Finance moves the budget forward to the Commission for review and approval. Generally approval is obtained in late fall of each year.

Projects that were approved but were not able to be constructed during the year, will be re-considered when setting the priority projects for the next year's budget.

3   REFERENCES

MOE Compliance Inspection Reports
Internal Reports

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: leak detection, exercising valves, dead-end flushing, hydrant winterizing and annual inspections.

Dead-end Flushing program - work orders are issued through the computerized maintenance system by the Water Distribution Supervisor. The work orders are provided to distribution operations staff to record completed work. The completed work orders are returned to the Water Distribution Supervisor and processed.

The preventative maintenance flushing program addresses the dead ends in the drinking water system. The Water Distribution Supervisor and Engineering review new infrastructure to determine additional flushing locations within the drinking water systems. The Water Distribution Supervisor is responsible for determining the frequency of the flushing program based on results of the sampling program.

Exercising Valve Program – valves are exercised annually within the distribution system, with a goal of achieving full system coverage over a five year cycle. Deficiencies are noted and work orders are issued for repair.

Valves exercised are documented in the valve operator data recorder which is down loaded after the daily activity. A valve maintenance sheet is used for valves operated manually within the system.

Hydrant Annual Inspections - work orders are issued through the computerized maintenance system by the Water Distribution Supervisor. The work orders are provided to distribution operations staff to record completed work. The completed work orders are returned to the Water Distribution Supervisor and processed.

Inspections on the hydrants are completed based on routes to ensure coverage of the entire distribution system on an annual basis. Deficiencies are noted on a completed hydrant maintenance field data form.

Work orders are issued to repair deficiencies. The completed hydrant maintenance field data form is sent to Engineering for entry into the hydrant database.

Leak Detection Program - a leak detection survey is conducted annually on a portion of the distribution system, with a goal of achieving full system coverage over a five year cycle. Deficiencies/leaks are noted and work orders are issued for repair.

Treatment

The facility preventative maintenance program has been implemented by the Manager 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 to be processed and entered on a tracking spreadsheet available on the corporate drive for reference.

Existing maintenance work orders that are currently in the computerized maintenance management system are handled similarly as above by issuance to the maintenance staff, but much of the work is scheduled by the supervisor on a priority basis through discussion with the trades, engineering, and operations groups.

2.2   UNPLANNED MAINTENANCE

Distribution

Work Requests are used to address unplanned maintenance activities. These unplanned activities may arise from a customer complaint, inspection or other emergency situation.

The Work Request is issued to the Water Distribution Supervisor for authorization. Once the Work Request is authorized then a work order is developed and issued. The Work Orders are provided to the Lead Hand and assigned to distribution operations staff. The work orders are used to record the work completed. The completed work orders are returned to the Water Distribution Supervisor and processed**.**

Treatment

Unplanned maintenance for equipment failures is typically brought to the attention of the maintenance group, operations lead-hand, and supervisor via e-mail or verbally. The concern is prioritized and entered into the weekly maintenance schedule.

2.3   EFFECTIVENESS OF MAINTENANCE

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

Effectiveness in part is tracked through:

- number of completed work orders
- 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 (greater than $500,000) require authorization of the Owner in accordance with the PUC Services Signing Authorities Policy. Minor unplanned maintenance can be performed without the consent of the Board, but notification is made to the Owner by the President during Board meetings.

2.5 REHABILITATION / RENEWAL

The 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.

Rehabilitation and renewal projects are developed on a continuous 5 year works plan. The program covers distribution, production and treatment.

Operations and Engineering 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 City's major road works program and typically watermains are replaced at that time. There is a capital works budget for these projects.

Treatment

The Water Treatment Supervisor and maintenance staff review potential capital projects in the Fall of each year for budget approval for the next calendar year. The list is prioritized to put forward the most critical projects with consideration of available resources to accomplish the work. This list is forwarded to the Manager of Engineering for evaluation prior to approval by the Vice-President of Operations & Engineering.

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, and

- 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 samples, tests and monitoring are undertaken according to regulation 170, and 169 or more often. The sampling program is coordinated by the Lead Hands.

There are multiple sampling points and monitoring points that are used for process control. A sampling, testing and monitoring schedule provides details of how PUC Services Inc. samples, tests and monitors the process from raw water to finished product.

Based on best practice, monitoring of water quality in dead ends is managed through use of the computerized maintenance system. Distribution Operators flow dead ends and take chlorine residual tests. Additional samples may be undertaken based on customer complaints of water quality in the distribution system.

The protocols for collecting and handling water samples (including the control limits) are provided in the standard operating procedures.

On a yearly basis Managers and Supervisors are responsible for reviewing the water quality sampling program for changes required to the water quality parameters, sampling frequency and sampling locations. The Supervisor is responsible for updating the sampling schedule based on this review.

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 for handhelds. Any adjustments made to process parameters are recorded in the applicable station log book.

Adverse conditions are identified through alerts from SCADA and/or lab notification. Should the analytical results indicate an adverse conditions 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

SCADA instrumentation (alarms) and handheld equipment are used to monitor drinking water quality in the plant and distribution system.

Monitoring is completed by operators, and when controlled by the SCADA system the shift operator is notified of alarms indicating when control limits are exceeded. All parameters for the SCADA system designs are reviewed by the Supervisor to ensure monitoring requirements are met. Automatic shut downs are put in place to prevent the control limits from being exceeded. SCADA tracks and monitors all parameters through trending for operator review.

Station logbooks or data entry sheets are used to track information from handhelds.

2.4   Reporting to the Owner

Sault Ste. Marie – Annual reports are made to the Owner (which includes the Services Board and Commission) regarding the drinking water system. In addition regular updates (referred to as the President's Report) and quarterly reports are provided to the shareholders (e.g., municipal council).

The Manager reports to the owner on the sampling, testing and monitoring for the system on an annual basis. The annual report of the drinking water system is provided to the owner on a yearly basis and this provides a summary of the results.

In accordance with relevant legislation, summary reports are provided and posted on the PUC Services Inc.'s website on an annual basis, with an emphasis on outlining problems/issues (abnormal conditions) that have occurred during the past year. The summary report includes a spreadsheet showing a summary of the results.

3   REFERENCES

QMS 05 Document and Records Control
SSM Form 05-04 SSM WTP Daily Report
SSM Form 05-25 SSM Lab Entry
SSM Form 16-01 DWQMS Sample Protocol
SSM-WT-009 AWQI Reporting
SSM-WT-012 Sampling Protocol
D04 Well Station Goulais Ave – Process Control Narrative
D05 Well Station Steelton – Process Control Narrative
D11 Well Station Shannon – Process Control Narrative
D12 Well Station Lorna Drive – Process Control Narrative
W03 WTP Water Treatment Plant – Process Control Narrative

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

The 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 event and alarm conditions on the SCADA display and records on the black board. The SCADA system records all status, events and alarms.

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

- Sault Ste. Marie DWQMS Operational Plan -

SSM QMS 17 Measurement Recording Equipment Calibration Maintenance
Uncontrolled when printed   Reviewed Date: February 22, 2019

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, Manager Water Distribution Operations, Director of Water Operations, Manager Engineering, VP Operations and Engineering 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
      o   Chlorine Gas – Tonners/Cylinders (Appendix D – WTP Chlorine E2 Plan)
   •   Mechanical or electrical failure which may disrupt 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 PUC Water System Emergency Preparedness Plan.

2.3 Emergency Response Training and Testing Requirements

The Managers are responsible for ensuring that appropriate staff receive 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
PUC Water System Emergency Preparedness Plan - Sault Ste. Marie
Municipal Emergency Plan
Form 05-16 SSM 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
Appendix 18-D   WTP Chlorine E2 Plan

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 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 the Internal Audit Checklist Form 19-02 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 the Audit Report Form 19-03 or similar document.

The Lead Auditor(s) records non-conformances from the internal audits on SSM Form 21-01 Corrective Action Report 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 SSM 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 corrective action has been taken, is effective, and been closed on SSM 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
SSM Form 21-01 Corrective Action Report
SSM Form 21-02 CAR Log QMS 05 Document and Records Control
SSM 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 that 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 attend 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