Ontario Clean Water Agency
Agence Ontarienne Des Eaux

OPERATIONAL PLAN

For the Manitouwadge Water Treatment Plant and Distribution System

Revision 0, 15-December-2016

DISCLAIMER STATEMENT

This Operational Plan is designed for the exclusive use of *Corporation of the Township of Manitouwadge*

This Operational Plan has been developed with OCWA's operating practices in mind and utilizing OCWA personnel to implement it.

Any use which a third party makes of this Operational Plan, or any part thereof, or any reliance on or decisions made based on information within it, is the responsibility of such third parties. OCWA accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this Operational Plan or any part thereof.

Any documents developed and owned by OCWA which are referred to in this Operational Plan (including, but not limited to, OCWA's QEMS and its associated Standard Operating Procedures, policies, Facility Emergency Plans, and audit protocol) remain the property of OCWA. Accordingly, these documents shall not be considered to form part of the Operational Plan belonging to the owner of a drinking-water system under Section 17 of the *Safe Drinking Water Act, 2002*.

OPERATIONAL PLAN

Manitouwadge Water Treatment Plant and Distribution System

Owned by the *Corporation of the Township of Manitouwadge*
Operated by the Ontario Clean Water Agency

This Operational Plan defines and documents the Quality & Environmental Management System (QEMS) for the *Manitouwadge Water Treatment Plant and Distribution System* operated by the Ontario Clean Water Agency (OCWA). It sets out the OCWA's policies and procedures with respect to quality and environmental management in accordance with the requirements of the Province of Ontario's Drinking Water Quality Management Standard (DWQMS).

This Operational Plan expands on OCWA's corporate QEMS Refrence Manual. Linkages between OCWA corporate and facility requirements are identified where appropriate.

OPERATIONAL PLAN REVISION HISTORY

Date	Revision	Description of Revision
15-Dec.-2016	0	Operational Plan issued

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1 OCWA's Quality & Environmental Management System (QEMS)

OCWA is the contracted Operating Authority for the *Manitouwadge Water Treatment Plant.*

OCWA's Quality & Environmental Management System (QEMS) is structured and documented with the purpose of:

1. Establishing policy and objectives with respect to the effective management and operation of water/wastewater facilities;
2. Understanding and controlling the risks associated with the facility's activities and processes;
3. Achieving continual improvement of the QEMS and the facility's performance.

2 Quality & Environmental Management System (QEMS) Policy

The Ontario Clean Water Agency, its Board of Directors, Officers and entire staff are committed to the principles and objectives set out in our Quality & Environmental Management System (QEMS) Policy.

OCWA's Policy is to:

- Deliver of safe, reliable and cost-effective clean water services that protect public health and the environment.
- Comply with applicable legislation and regulations.
- Promote client, consumer and stakeholder confidence through service excellence, effective communications and reporting.
- Train staff on their QEMS responsibilities.
- Maintain and continually improve the QEMS.

Our Board of Directors, Officers and entire staff will act to ensure the implementation of this Policy and will monitor progress of the Quality & Environmental Management System (QEMS).

OCWA's QEMS policy is readily communicated to all OCWA personnel, the owner and the public through OCWA's intranet and public websites.

3 Commitment & Endorsement of OCWA'S QEMS & Operational Plan

This Operational Plan supports the overall goal of OCWA and the *Corporation of the Township of Manitouwadge* to provide safe, cost-effective drinking water through sustained cooperation. OCWA will be responsible for developing, implementing, maintaining and continually improving its QEMS with respect to the operation and maintenance of the *Manitouwadge Water Treatment Plant and Distribution System* and will do so in a manner that ensures compliance with applicable legislation and regulations. Through the endorsement of this Operational Plan, the *Corporation of the Township of Manitouwadge* commits to cooperating in any reasonable request of OCWA to facilitate this goal.

Top management of both OCWA and the *Corporation of the Township of Manitouwadge* has approved the QEMS for the drinking water system as documented in this Operational Plan.

Operating Authority Approval

Bradley McMahon Date
Operations Manager

Jeff St. Pierre Date
Northwestern Regional Hub Manager

Owner Endorsement & Approval

Andy Major Feb. 22, 201: Date
Mayor

Margaret Hartling Feb 22, 2017. Date
CAO

4 Quality Management System Representative

All personnel have a role and associated responsibilities within OCWA's QEMS.

The role of QEMS Representative for the *Manitouwadge Water Treatment Plant and Distribution System* is shared between the Operations Manager and Process and Compliance Technician (PCT).

The Operations Manager is ultimately responsible for activities related to the operation of the drinking water system and for establishing and maintaining processes and procedures required for the overall administration of the facility's QEMS.

The Operations Manager is also involved in the day to day maintenance of the QEMS with responsibilities such as the approval of the QEMS Procedures (QP's) and other document changes as well as arranging for training sessions.

To assist in fulfilling the specific duties set out for the QEMS Representative, the PCT is responsible for:

- Reporting on QEMS performance and identifying opportunities for improvement,
- Ensuring that current versions of documents related to the QEMS are in use, and
- Ensuring personnel are aware of all applicable legislative and regulatory requirements that pertain to their operational duties.

Operations Manager and PCT are responsible for promoting awareness of the QEMS to all facility personnel.

5 Document and Records Control

Refer to Appendix A for QEMS Procedure QP-01 Document and Records Control.

6 Drinking Water System

Description of the Drinking Water System

Corporation of the Township of Manitouwadge owns the Manitouwadge Water Treatment Plant and Distribution System and has contracted the Ontario Clean Water Agency to be its Operating Authority.

The Water Treatment Plant is a Class I facility with a Class I Distribution System. This system is not interconnected to any other drinking water system with a different owner.

The Water Treatment Plant and Distribution System serves the Township of Manitouwadge with a population estimated at 2100 persons.

Raw water is extracted from five (5) wells, considered to be GUDI with adequate in-situ filtration. The first well-head site consists of wells #1 and #2, which are located at the pump house within the WTP boundaries. A 400 kW diesel engine generator is located at the WTP to provide emergency power. Wells #3 and #4 are located at the second well-head site adjacent to the west end of Manitouwadge Lake southeast of Oshweken Road. The second well-head site is equipped with a 300 kW diesel engine generator for the emergency power. Well #5 is located in a separate building approximately 30 m southwest of well #3, for a total of three well-head sites. Each well is equipped with a submersible pump rated at 30.3 L/s.

The raw water pumped from the wells is controlled by the treated water reservoir level. When the reservoir level falls to the 'low operating level,' the duty well pump will start drawing water until the reservoir reaches its 'high operating level.' Other well pumps will activate if required in order to meet water demands. The speed of the pumps are controlled by VFDs providing a more flexible and efficient operation.

The Manitouwadge WTP consists of a two-stage disinfection process, involving UV and chlorine disinfection. There are three UV reactors, one at each well-head site. UV treatment (primary disinfection) is provided at the well-head site as soon as the duty raw water well starts. Two UV reactors of rated flow rate of 63 L/s are provided for well-head sites #1 & #2 and another UV reactor with a rated flow rate of 31.5 L/s is provided for well-head site #3. The UV reactors operate using a 254 nm spectrum, and were specifically designed to achieve maximum inactivation of pathogens at a minimum dosage rate of 42 mJ/cm^2.

After the primary disinfection, water is passed through an aerator unit. There are two aerator units located at the main water treatment plant. The first aerator unit treats water coming from well-head site #1, whereas the second aerator treats water coming from both well-head sites #2 & #3. The aerator units are provided to scrub off the naturally occurring hydrogen sulfides and CO_2 in addition to controlling the pH of the raw water.

Water from the aerators is combined and transmitted through a common header; 400 mm diameter pipeline located at the main water treatment plant. Sodium hypochlorite (12% NaOH) is injected at the common header to provide secondary disinfection. There are two (2) microprocessor-controlled metering pumps capable of delivering 3.78 L/hr of sodium hypochlorite (12% NaOH). Following chlorination, 22.56 m downstream in the common header, water flow is split through a joint reducer and transmitted through two 44.3 m long pipes of 300 mm in diameter that feeds into the reservoir.

Water is stored in a concrete underground reservoir consisting of two cells separated by a sluice gate. There are two clear-wells joint to each separate cell, located underneath the high-lift pumps. The water is pumped from the clear-wells to the distribution system. The two clear-wells are also separated by sluice gates, which provide the operational flexibility for the maintenance purposes. The dimensions of both reservoir and clear-well combined is approximately 43 m long, 20 m wide and 5 m in height. The total volume for storage by the unit is approximately 4,060 m^3. Water is distributed and supplied by four high lift pumps with VFD's. Two turbine fire pumps are used as a back up to the high lift pumps. Each high lift pump has a total rated capacity of 40.5 L/s. Fire pumps are also rated at 40.5 L/s.

Average daily and peak flows are 854.17 m^3/day (10 L/s) and 1,218.9 m^3/day (14 L/s), respectively. The WTP's average day flow demand is well below its rated capacity of 10,472 m^3/day (121 L/S) (approximately 20% of the rated capacity). Consequently, the operator only requires one well pump and one high lift pump to meet water demands under normal circumstances. A secondary standby well pump is selected to meet the additional demand. Similarly, a fire pump would be used in case of an increase in water demands.

Monitoring equipment includes five flow meters to measure the water coming from each well. There are two additional flow meters; one (1) flowmeter that measures the combined flow of all

five wells before it enters the reservoir and one (1) treated water flow meter prior to the distribution network. A free chlorine analyzer is used to measure the free chlorine residual at the point of entrance to the distribution system. A turbidimeter is also set up at the same location as the free chlorine analyzer in order to measure the turbidity of the treated water just before the distribution

Source Water

The Raw Water supply comes from the five GUDI ground water wells. There are no critical upstream or downstream process relied upon to ensure the provisions of safe drinking water.

General Characteristics

The raw water is deemed to be of good quality as it has low turbidity (ranging from 0.05-0.37NTU) and fairly constant temperature (ranging from 6.8-8.0 °C).

Raw Water Characteristics Well 1&2 (based on 5yr data)

Characteristic	Minimum	Maximum	Annual Average
Temperature (°C)	6.8	8	7.2
Turbidity (NTU)	0.05	0.37	0.18
E. coli (CFU/100 mL)	0	0	0
Total Coliforms	0	0	0

Raw Water Characteristics Well 3,4 &5 (based on 5yr data)

Characteristic	Minimum	Maximum	Annual Average
Temperature (°C)	6.8	8	7.2
Turbidity (NTU)	0.06	0.35	0.17
E. coli (CFU/100 mL)	0	0	0
Total Coliforms	0	0	0

Traditionally there have been elevated sodium levels in wells 1 and 2, and elevated hardness in the source water at all wells. There are also elevated naturally occurring hydrogen sulfides in the source water.

Common Fluctuations

The raw water is relatively consistent in quality.

Threats

Potential sources of raw water contamination include fuel spills contaminating the aquifer from nearby facilities and home owners.

Operational Challenges

Due to extreme cold temperatures in the winter, the system is subject to water breaks.

Process Flow Chart

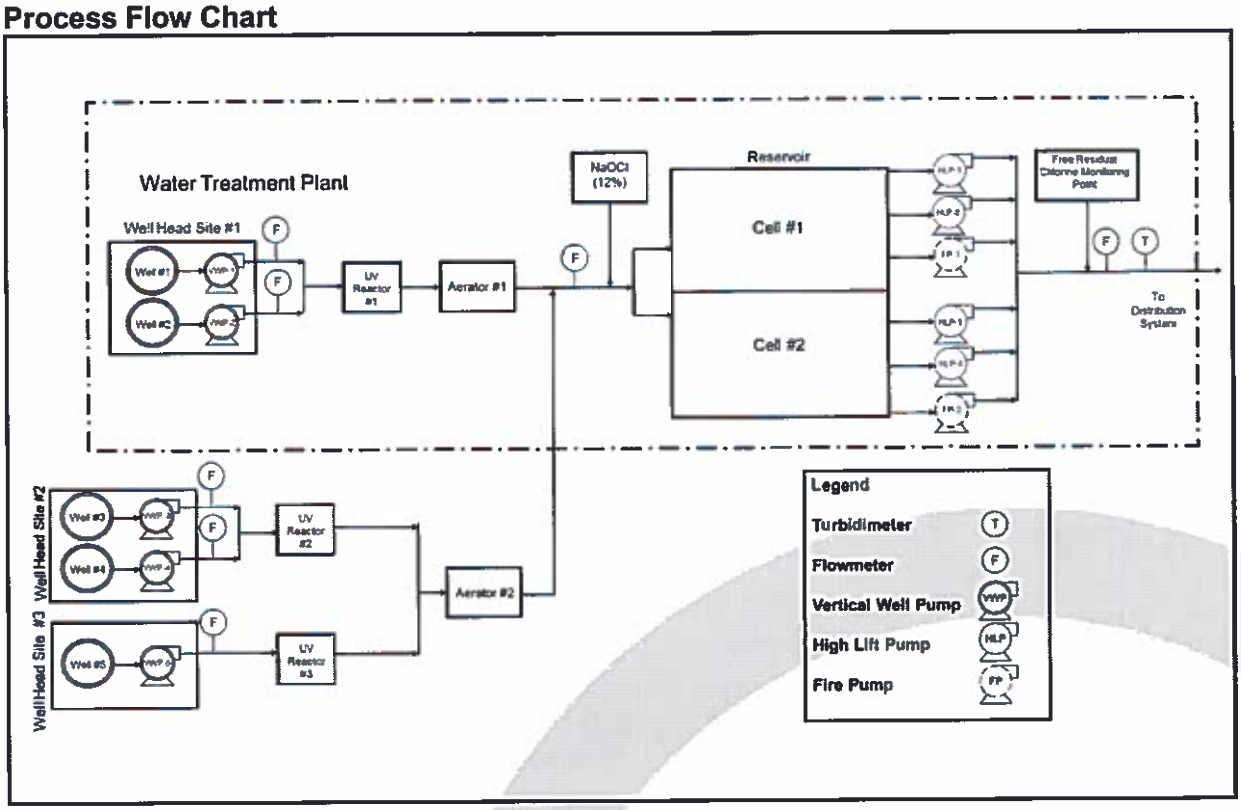
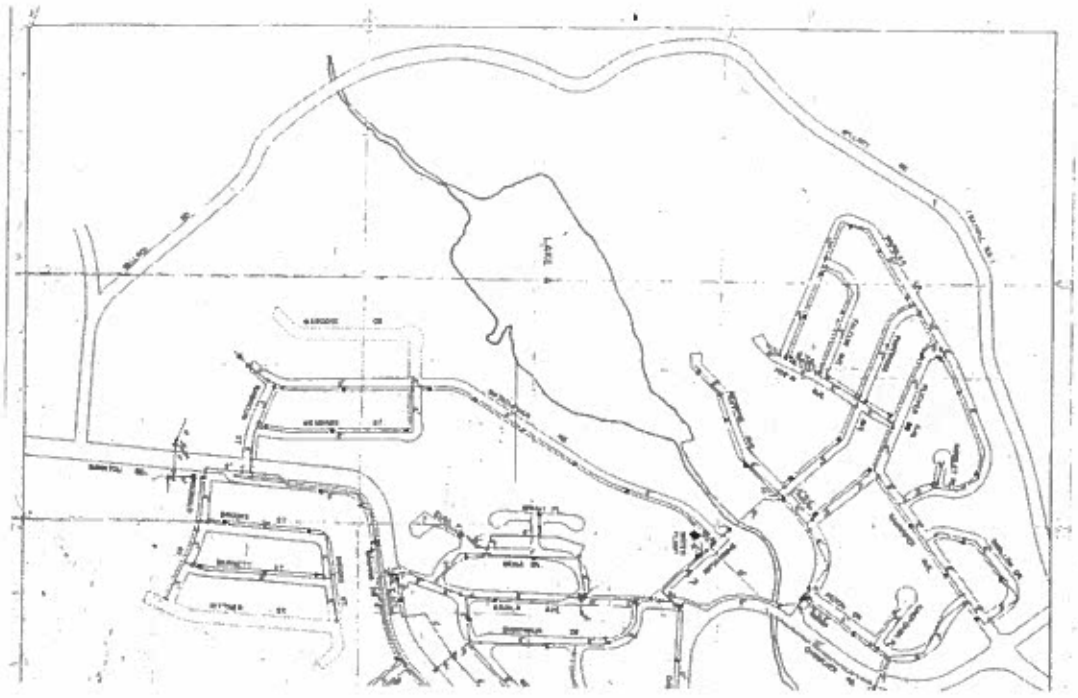


Figure 1: Water Treatment Process flow



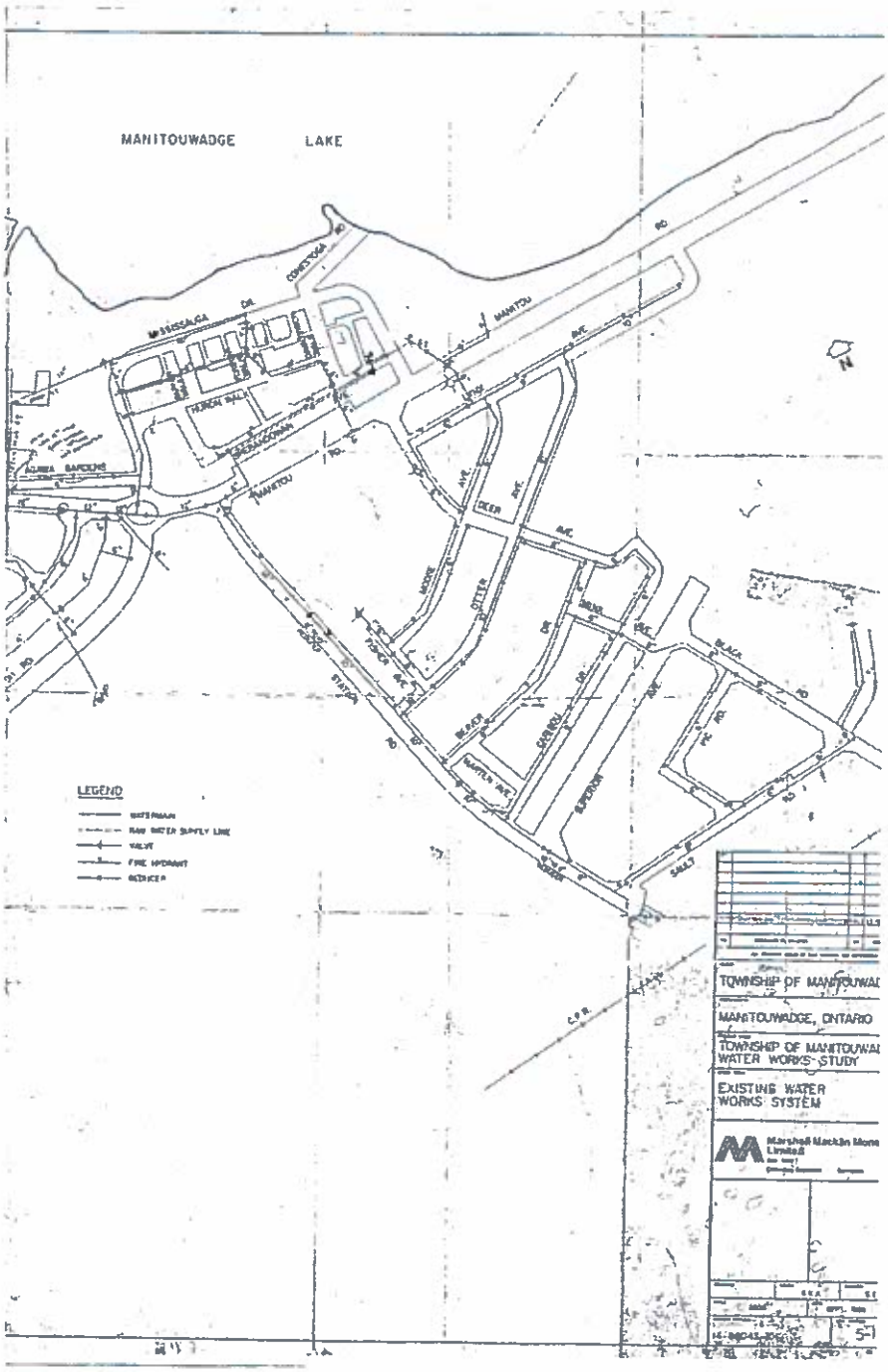


Figure 2 and 3: Distribution system

7 Risk Assessment

Refer to Appendix B for QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes.

8 Risk Assessment Outcomes

Refer to Appendix B for Summary of Risk Assessment Outcomes.

9 Organizational Structure, Roles, Responsibilities and Authorities

Organizational Structure and Top Management

OCWA provides operation, maintenance and management services for hundreds of water and wastewater facilities throughout the Province of Ontario. Direct operational activities are primarily delivered through the Agency's Operations Division. Corporate level divisions that carry out administrative functions for the Agency are expanded upon in the QEMS Reference Manual.

To best meet the needs of each facility and its owner, OCWA's Operations Division is structured as follows:

- *Hub* – Facilities are grouped together geographically to form hubs. The Operations Manager has oversight responsibility for a number of the facilities contained within a particular hub.
- *Regional* – Hubs are further grouped together to form regions, each headed by a Regional Manager. Regional Managers play a critical role within OCWA's QEMS in that they act as a key link between corporate and facility level management.
- *Provincial* – Regions fall into either the Southern Ontario or Northern Ontario subdivisions, each under the direction of a VP of Operations.

The chart, QEMS Organizational Structure for the *Manitouwadge Water Treatment Plant and Distribution System* ***(Appendix C)***, reflects the lines of responsibility and authority for OCWA's QEMS at both the facility and corporate level.

OCWA has defined two levels of Top Management within its structure, which, through a shared responsibility for conducting periodic management reviews, ensure the maintenance and continual improvement of OCWA's QEMS:

Facility Level Top Management – consisting of the Operations Manager. The Operations Manager, in accordance with QEMS Procedure QP-11 Management Review, holds a special meeting at least once per year to review the effectiveness and performance of the QEMS implemented at the facility and to initiate appropriate facility management action to maintain and improve the QEMS. The results of the meeting are provided to the Regional Manager for consideration by corporate level Top Management and to initiate appropriate action with respect to the Agency's broader QEMS.

Corporate Level Top Management – consisting of Regional Managers, VPs of Operations, Director of Risk, Compliance & Training, President & CEO and OCWA's Board of Directors. Each has specific corporate oversight responsibilities for the Agency's QEMS, which are described in the QEMS Reference Manual. The overall performance and effectiveness of OCWA's QEMS is formally reviewed and reported to corporate level Top Management on an annual basis in the form of the Annual Compliance Report. It is also monitored on an ongoing basis through scheduled meetings of OCWA's Operations Committee, Senior Management Committee and Board of Directors. Through these reporting and monitoring activities, corporate level Top Management identifies opportunities for improvement, initiates action plans and assigns responsibility for their completion.

QEMS Roles, Responsibilities and Authorities

OCWA management defines the roles, responsibilities and authorities under its QEMS for all employees whose work could have a significant impact on drinking water quality. These are communicated to all personnel to ensure that individual roles and responsibilities and how they relate to those of the rest of the organization are understood.

Specific QEMS-related roles, responsibilities and authorities of Operations personnel for the facility are summarized in the table below. Additional duties of employees are described in their job specifications.

Corporate level roles, responsibilities and authorities are defined in the QEMS Reference Manual.

Responsibilities and authorities for implementing and maintaining individual elements of the facility's QEMS are outlined in the QEMS Procedures referenced throughout this Operational Plan.

Position	QEMS Roles, Responsibilities and Authorities
All Operations Personnel	• Work in accordance with OCWA policies, procedures and plans • Document all activities • Participate in QEMS training • Be aware of all the environmental and public health risks at the facility • Consider risks and ramifications of all actions • Participate in testing and development of SOPs and contingency plans • Implement action plans to rectify deficiencies identified in audits

	and inspections of the facility • Take all appropriate training to ensure competence in their job • Identify and bring forward to the Operations Manager opportunities for improving the facility's QEMS • Perform duties in compliance with applicable legislation and regulations
Regional Manager (Corporate Level Top Management)	• Ensure appropriate facility resources to maintain and continually improve the QEMS • Review major issues/deficiencies (including those from audit and inspection reports) and provide further direction to address/resolve • Ensure that each facility in the region has a site-specific emergency plan that meets the corporate standard • Participate in/respond to regular facility Management Reviews, as appropriate • Report to corporate level Top Management on the status of the QEMS implemented at the facilities in his/her region • Liaise with the owner on relevant components of the QEMS including OCWA's roles, responsibilities and authorities for the facility, as appropriate
Operations Manager (Facility Level Top Management and QEMS Representative)	• Delegate responsibilities, deploy resources and supervise sound operation and maintenance of the facility and of the QEMS • Arrange for/review annual internal audits (compliance and QEMS) • Develop action plans to respond to the findings of the internal audits and MOE inspections and verify action plan completion • Establish, test and update a site-specific emergency plan for each facility • Lead regular facility Management Reviews • Report to the Regional Manager on the performance and effectiveness of the QEMS implemented at the facility • Liaise with the owner on relevant components of the QEMS including OCWA's roles, responsibilities and authorities for the facility • Establish a training plan for staff to address regulatory requirements and the QEMS as part of the PPR process • Fulfill defined duties of the QEMS Representative (refer to element 4) • Designate the Overall Responsible Operator (ORO) and Back-up ORO.
Process & Compliance Technician (PCT) (QEMS Representative)	• Fulfill duties assigned by the Operations Manager • Participate in the completion of annual internal audits and develop/monitor/implement action plans to respond to the findings • Participate in MOE inspections and assist in the response to required actions or recommendations • Actively participate in the development and maintenance of facility emergency plans • Participate in regular facility Management Reviews

	• Report to the Operations Manager on QEMS implementation and identify the need for additional processes and procedures • Liaise with the owner on relevant components of the QEMS • Deliver/participate in training on regulatory requirements and the QEMS • Implement, monitor and support corporate QEMS programs • Support Operations Manager on all aspects of the QEMS and fulfill assigned duties of the QEMS Representative (refer to element 4) •
Senior Operator/Mechanic	• Fulfill duties assigned by the Operations Manager • Participate as a technical advisor to staff and management and provide specialized training on technical or other issues. • Prepare and/or coordinate staff work assignments and follow up to ensure completion • Assist management in providing recommendation for annual capital forecasts and gathering information for operational reports as required • Assist in the preparation of facility manuals and documenting operating processes and procedures for staff • Actively participate in the development and maintenance of facility emergency plans and assist with emergencies as required. • Act for management during vacations or periodic absences. • Perform duties of Operator/Mechanic as required • Maintain the facility log book according to regulatory requirements • May act as Operator-in-Charge (OIC)
Operator/Mechanic	• Fulfill duties assigned by the Operations Manager • Monitor facility processes through visual inspection, the SCADA system or by taking readings from the process control equipment • Operate and adjust equipment/processes to maintain compliance with applicable regulations, permits, certificates and established operating procedures • Collect samples and perform laboratory tests and equipment calibrations as required • Regularly inspect operating equipment, perform routine preventive maintenance and repairs and prepare and complete work orders as assigned. • Participate in facility inspections and audits • Train and direct new staff on the facility processes, equipment and procedures. • Maintain the facility log book according to regulatory requirements • May act as Operator-in-Charge (OIC)
Instrumentation Technician	• Provide advice and technical expertise on the services required for process control and automation systems • Formulate technical plans and proposals for deployment and delivery of process control and automation systems in support of operational activities • Coordinate, maintain and provide technical services in regards to

	process control and automation systems including preventive maintenance procedures • Discuss and advise on detailed system and programming requirements, modify existing and new software in response to plant requests, train plant operations and maintenance staff, analyze and resolve problems/error conditions, document changes/modifications and configure, install and support related software, hardware and network for such systems • Conduct inspections of the process control and automation systems to validate that all is operating within established parameters • Install and commission new electrical/electronic equipment and automation systems.

10 Competencies

The following table presents the competencies required by OCWA personnel whose duties directly affect drinking water quality.

Position	Required Competencies
Operations Manager	• Operator certification in good standing; minimum OIT; ideally the certification level of the facilities managed. • Experience in water treatment operations, maintenance as well as facility financial planning and administration • Advanced knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures • Knowledge and awareness of the DWQMS • Advanced technical knowledge of principles, practices, technologies and methodologies for water treatment • Familiarity with complex mechanical equipment and electronic controls • Strong initiative, analytical, evaluating and problem-solving skills to assess administrative and technical needs and capabilities • Well-developed priority-setting and time management skills • Project management, work planning and scheduling skills • Good oral and written communication skills • Proficiency in office and operational computerized systems • Management/supervisory experience • Valid Class G Driver's License
Senior Operator/Mechanic	• Operator certification in good standing; minimum OIT; ideally the certification level of the facility. • Extensive knowledge and experience of water treatment processes to operate the facility • Experience and knowledge of the maintenance and repair of a variety of equipment and structures • Good working knowledge of legislation, regulations, codes, policies, guidelines and procedures related to operations and maintenance • Knowledge and awareness of the DWQMS

	• Basic mathematics and chemistry • Good knowledge of computers, monitoring and operating systems • Good knowledge to use and understand operating and maintenance manuals, blueprints and other technical specifications • Planning and organizational skills to lead projects and provide technical direction to staff • Demonstrated leadership and decision making skills required to direct an operational team • Problem solving and evaluative skills to provide technical guidance and resolve operational issues • Planning skills to regularly inspect and monitor the facility, processes and equipment and perform routine preventative maintenance • Good oral and written communication skills • Ability to work in a team and take initiative when required. • Valid Class G Driver's License
Operator/Mechanic	• Operator certification in good standing; minimum OIT; ideally the certification level of the facility. • Good knowledge of water treatment processes to operate the facility • Experience and knowledge of the maintenance and repair of a variety of equipment and structures • Good working knowledge of legislation, regulations, codes, policies, guidelines and procedures related to operations and maintenance • Knowledge and awareness of the DWQMS • Basic mathematics and chemistry • Familiarity with computers, monitoring and operating systems • Knowledge to use and understand operating and maintenance manuals, blueprints and other technical specifications • Planning, scheduling and problem-solving skills to regularly inspect and monitor the facility, processes and equipment and perform routine preventative maintenance • Good oral and written communication skills • Ability to work in a team and take initiative when required. • Valid Class G Driver's License
Process & Compliance Technician	• Operator certification in good standing; minimum OIT; ideally the certification level of the facility. • Extensive knowledge of compliance requirements related to water treatment processes • Good knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures to monitor program delivery and ensure compliance • Knowledge and awareness of the DWQMS • Good knowledge and understanding to apply impact of changes to legislative and regulatory requirements on programs and operational processes • Excellent knowledge of computers, operating programs and systems • Evaluative and analytical skills to monitor and assess facility performance against legal requirements and corporate goals • Excellent oral and written communication skills to provide technical advice related to compliance to a variety of staff and officials and to prepare analytical reports • Presentation skills to prepare and present informational material

	• Auditing skills/experience • Problem-solving skills to resolve compliance issues • Ability to work with a team and take initiative when required • Valid Class G Driver's License
Instrumentation Technician	• Theoretical and practical knowledge/experience/training in water/wastewater treatment operation processes, design, instrumentation, process control and automation systems • Knowledge and awareness of the DWQMS • Technical evaluation and design skills necessary for process control and automation optimization and deployment • Experience in delivering technical guidance for hardware/software selection • Thorough understanding of network and telecommunications environment, standards and operating systems, computer language, ladder logic and relational and document based database management systems • Ability to monitor, review and troubleshoot network, hardware, software and instrumentation performance • Analytical and evaluative problem-solving skills to assess client, process and control requirements • Well-developed organizational, time and project management skills • Superior interpersonal skills • Good oral and written communication skills • Valid Class G Driver's License

OCWA's recruiting and hiring practices follow those of the Ontario Public Service (OPS). As part of the OPS, competencies, which include education, skills, knowledge and experience requirements, are established when designing the job description for a particular position. As part of the recruitment process, competencies are then evaluated against the job description and based on this evaluation; the hiring manager selects and assigns personnel for specific duties.

Certified operators are responsible for completing the annual number of required training hours for the highest type and class of subsystem where the operator works and completing mandatory courses required by *Safe Drinking Water Act* (SDWA) O. Reg. 128/04 Certification of Drinking Water System Operators and Water Quality Analysts. The Operations Manager takes reasonable steps to ensure that every operator has the opportunity to attend training to meet the annual training hour requirements.

OCWA's Operational Training Program is maintained by the Risk, Compliance & Training Division and aims to:

- Develop the skills and increase the knowledge of Operations staff and management,
- Provide Operations with information and access to resources that can assist them in performing their duties, and
- Assist OCWA operators in meeting the regulatory requirements with respect to training.

The Program consists of both continuing education and on-the-job training and is delivered using a combination of methods (e.g., traditional classroom courses and custom/program-based courses/sessions). A formal evaluation process is in place for all sessions under the Operational Training Program and is a critical part of the Program's continual improvement.

Facility personnel receive site-specific training on relevant operational and emergency response procedures to ensure effective operational control of processes and equipment which may impact the safety and quality of drinking water.

Awareness of OCWA's QEMS is promoted through the OCWA Employee Orientation Program for new employees, hub/regional level training sessions and meetings and the Agency's Environmental Compliance course. It is recommended that the Environmental Compliance course be attended by all new staff and at least every five years to ensure staff are kept current on any changes to regulatory requirements and to reinforce their roles and responsibilities under OCWA's QEMS. Other mandatory and recommended training requirements are listed as part of the Employee Orientation Program available on OCWA's intranet or through the Human Resources department.

Individual OCWA employee training records are maintained and tracked using a computerized system, the Training Summary database, which is also administrated by the Risk, Compliance & Training Division. Training records maintained at the facility are controlled as per QEMS Procedure QP-01 Document and Records Control.

As part of OCWA's annual Performance Planning and Review (PPR) process, employee performance is evaluated against their job expectations. Professional development opportunities and training needs (which could include formalized courses as well as site-specific on-the-job training or job shadowing/mentoring) are identified by the facility's management team as part of this process (and on an ongoing basis).. In addition to this process, OCWA employees may at any time request training by both internal and external providers by submitting a "Request for Staff Development" form to the Operations Manager for approval.

11 Personnel Coverage

Refer to Appendix D for QEMS Procedure QP-03 Personnel Coverage.

12 Communications

Refer to Appendix E for QEMS Procedure QP-04 Communications.

13 Essential Supplies and Services

Refer to Appendix F for QEMS Procedure QP-05 Essential Supplies and Services.

14 Review and Provision of Infrastructure

Refer to Appendix G for QEMS Procedure QP-06 Review and Provision of Infrastructure.

15 Infrastructure Maintenance, Rehabilitation and Renewal

Planned Maintenance

OCWA, under contract with the owner, maintains a program of scheduled inspection and maintenance of infrastructure for which it is operationally responsible.

Routine planned maintenance activities include:

Pump inspection,
Analyzer calibrations and verifications,
Flow meter calibrations,
Weekly inspections of the facilities,

Planned maintenance activities are scheduled using a computerized Work Management System (WMS) that allows user to:

- Enter detailed asset information
- Generate and process work orders
- Access maintenance and inspection procedures
- Plan, schedule and document all asset related tasks and activities
- Access maintenance records and asset histories

Planned maintenance activities are communicated to the person responsible for completing the task through the issuance of WMS work orders. Work orders are generated by the WMS program on a monthly basis and are distributed accordingly. Completed work orders are entered into the WMS. Records of these activities are maintained as per QEMS Procedure QP-01 Document and Records Control.

The designated WMS Super User maintains the inventory of equipment in WMS and ensures that appropriate maintenance plans are in place. Maintenance plans are developed according to the manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements. Equipment Operation and Maintenance (O&M) manuals are accessible to staff at the locations specified in QEMS Procedure QP-01 Document and Records Control.

Unplanned Maintenance

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Operations Manager and delegated to the ORO or OIC. Unplanned maintenance activities are recorded in the logbook.

Rehabilitation and Renewal

Rehabilitation and renewal activities including capital upgrades are determined on an annual basis in consultation with the Owner (refer to QP-06 Review and Provision of Infrastructure).

A list of required replacement or desired new equipment is compiled and prioritized by the Operations Manager and is presented to the Owner for review and comment.

All major expenditures require the approval of the Owner.

Program Monitoring and Reporting

To assist in monitoring the effectiveness of program, Regional Managers and Operations Managers are able to generate monthly summary reports for each facility. In addition, OCWA's Executive Management Team is provided with hub and regional summary reports on an ongoing basis.

Maintenance needs for the facility are determined through review of manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements and are communicated by means of annual, quarterly, monthly, weekly and seasonal work orders.

16 Sampling, Testing and Monitoring

Refer to Appendix H for QEMS Procedure QP-07 Sampling, Testing and Monitoring.

17 Measurement and Recording Equipment Calibration and Maintenance

Refer to Appendix I for QEMS Procedure QP-08 Measurement and Recording Equipment Calibration and Maintenance.

18 Emergency Management

Refer to Appendix J for QEMS Procedure QP-09 Emergency Management.

19 Internal QEMS Audits

Refer to Appendix K for QEMS Procedure QP-10 Internal QEMS Audits.

20 Management Review

Refer to Appendix L for QEMS Procedure QP-11 Management Review.

21 Continual Improvement

In conjunction with the internal QEMS audit and Management Review processes documented above, OCWA uses action plans to continually improve its QEMS. Through these processes, areas of concern as well as opportunities for improvement are identified at the drinking water systems operated and maintained by OCWA.

Appendix A

QP-01 Document and Records Control

DOCUMENT and RECORDS CONTROL

1.0 Purpose

to describe how OCWA's QEMS documents are kept current and how QEMS documents and records are kept legible, readily identifiable, retrievable, stored, protected, retained and disposed of.

2.0 Scope

The procedure applies to QEMS Documents and QEMS Records pertaining to the Corporation of the Township of Manitouwadge Water Treatment Plant as identified in this procedure.

3.0 Responsibility

Operations Manager
Process & Compliance Technician (PCT)
All Facility Staff
Information Technology Department
Corporate Compliance Group

4.0 Definitions

Document – includes a sound recording, video tape, film, photograph, chart, graph, map, plan, survey, book of account, and information recorded or stored by means of any device

Record – a document stating results achieved or providing proof of activities performed

QEMS Document – any document required by OCWA's QEMS as identified in this procedure

QEMS Record – any record required by OCWA's QEMS as identified in this procedure

Controlled – managed as per the conditions of this procedure

Retention Period – length of time that a document or record must be kept; starts from the date of issue for QEMS records or from the point of time when a QEMS document is replaced by a new or amended document

5.0 Procedure

5.1 Documents and records required by OCWA's QEMS are listed in Table 1.

5.2 Internally developed QEMS documents and QEMS records (whenever possible) are generated electronically to ensure legibility and are identified through a header/title and issue date. Handwritten records must be legible and permanently rendered in ink or non-erasable marker.

5.3 Additional controls for QEMS Procedures within this Operational Plan are used to ensure appropriate review and approval. These include the use of authorized approval, alpha-numeric procedure code, issue date, revision number and revision history.

Authorized personnel for review and approval of QEMS Procedures for the Manitouwadge Water Treatment Plant:

Review	PCT, Senior Operator, Overall Responsible Operator
Approval	Operations Manager

5.4 Current QEMS documents and records are readily accessible to Operations personnel and to internal and external auditors/inspectors at document control locations established by the QEMS Representative. The designated document control location(s) for identified QEMS documents and records are defined in Table 1.

Document control locations are established in areas that provide adequate protection to prevent unauthorized use/access, damage, deterioration or loss of QEMS documents and records. Copies of QEMS documents and records located outside of designated control locations are considered uncontrolled.

5.5 Access to OCWA's computer network infrastructure is restricted through use of individually-assigned usernames and passwords and local area servers. Network security is maintained by OCWA's Information Technology department.

Access to facility QEMS records contained within internal electronic databases and applications (e.g., OPEX, PDC, and WMS) is administered by designated application managers/trustees, requires the permission of the Operations Manager and is restricted through use of usernames and passwords.

SCADA records are maintained and accessible to all staff when required.

5.6 Any employee of the drinking water system may request in writing a revision to improve an existing internal QEMS document or the preparation of a new document. Written requests should indicate the reason for the requested change. The need for new or updated documents may also be identified through the Management Review or system audits.

The QEMS Representative communicates any changes made to QEMS documents to relevant facility personnel and coordinates related training (as required). Changes to corporately controlled QEMS documents are communicated and distributed to facility QEMS Representatives by OCWA's Corporate Compliance Group through e-mails, OCWA's weekly electronic bulletin and provincial, regional, hub or facility-level training sessions.

5.7 When a QEMS document is superseded, the hardcopy of the document is promptly removed from its location and forwarded to the QEMS Representative or designate for disposal or retention (as appropriate).

5.8 The authorized method for disposal of hardcopy documents and records after the specified retention requirements have been met is shredding.

5.9 QEMS documents and records are retained in accordance with applicable regulations and legal instruments. QEMS documents and records without legislated minimum retention periods and relevant corporate retention periods are listed in Table 2.

5.10 QEMS documents and records are reviewed for evidence of control during each internal system audit as per QEMS Procedure QP-10 Internal QEMS Audits.

6.0 Related Documents

QP-10 Internal QEMS Audits

7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure issued

Table 1: Designated location for documents and records required by OCWA's QEMS

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
Internal QEMS Documents	
Operational Plan (includes QEMS Procedures)	E – Shared drive on Hb-park
QEMS Reference Manual	E – OCWA Intranet
QEMS Policy	HC – facility WTP, NWO Hub Office E – OCWA intranet
Emergency Response Plan	E – OCWA intranet
Facility Emergency Plan - Emergency-Supplier Contact List	HC – facility WTP E – Shared drive on Hb-park
Standard Operating Procedures (Referenced in Operational Plan and QEMS Procedures) - Adverse Water Quality SOP - Facility Sample Schedule SOP	HC – facility WTP E – Shared drive on Hb-park
On-Call Schedule	HC – facility WTP
External QEMS Documents	
Equipment –Operations & Maintenance Manuals - (OEM)	HC – facility WTP
Engineering schematics/plans/drawings	HC – facility WTP
DWWP/MDWL	HC – facility WTP E – Shared drive on Hb-park
Permit to Take Water	HC – facility WTP E – Shared drive on Hb-park
Operator certificates	HC – facility WTP
Municipal Emergency Plan	HC – Municipal Administration Office
Municipal by-laws	HC – Municipal Administration Office
Applicable federal and provincial legislation	E – available on the www
QEMS Records	
Daily rounds sheets	HC – at facility
Call-In Reports	E – WMS program
Facility Operations Logbook(s)	HC – facility WTP
Visitor's Logbook	HC – facility WTP
Operator training records	HC – filed with Admin Assistant NWO Hub Office E - Electronic records are maintained in OCWA's Training Summary database
Maintenance records (includes work orders)	E - Electronic records are maintained in the WMS database
3rd Party Calibration records	E – Shared drive on Hb-park
In-house Calibration records	HC – facility WTP
Laboratory sample analyses	E - Shared drive on Hb-park
Additional laboratory sampling records	E - Shared drive on Hb-park
In-house lab results – Rounds Sheets	HC – facility WTP
SCADA records	E – Facility HMI
Internal Audit Protocol	E – OPEX database
Internal QEMS Audit Reports	E – Shared drive on Hb-park

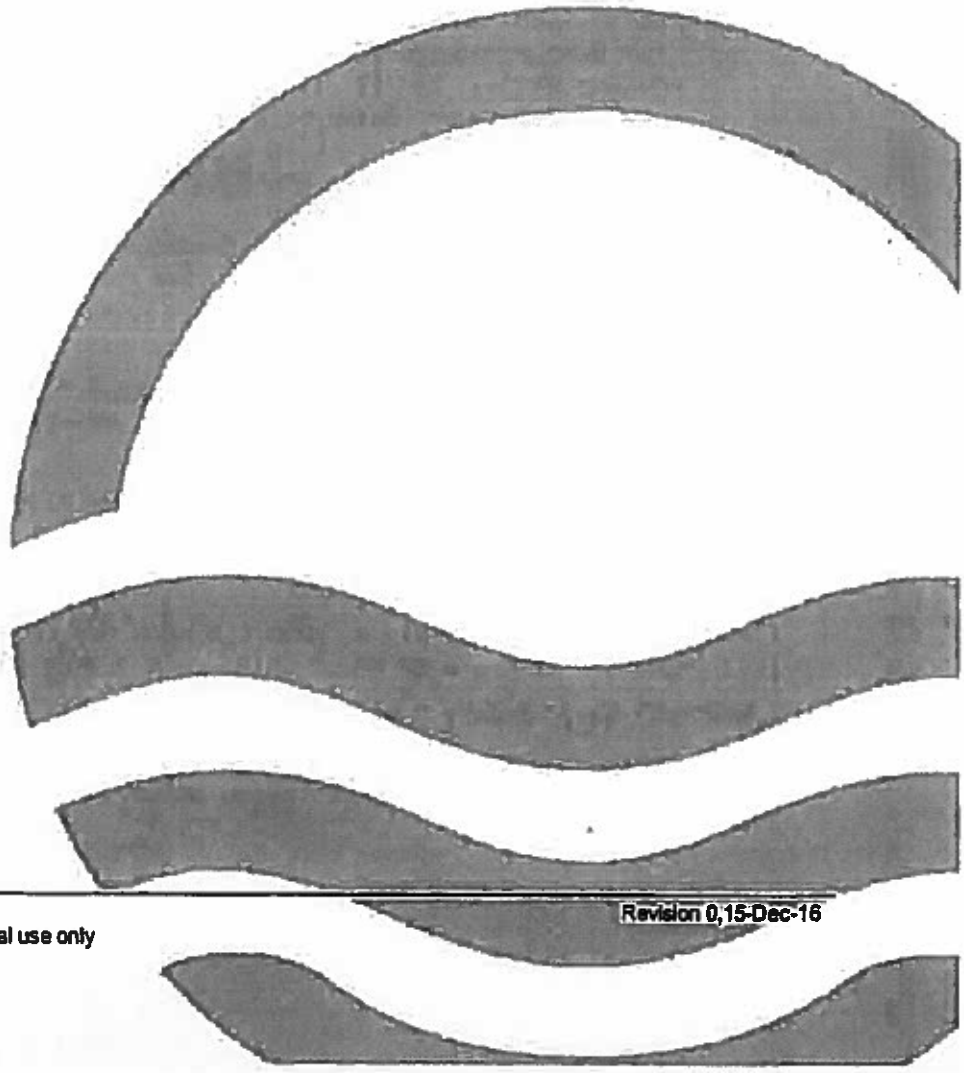
Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
External audit and inspection reports	E – Shared drive on Hb-park
Management Review documentation Minutes and Action Plans	E – Shared drive on Hb-park
Annual Reports	E –Shared drive on Hb-park
Municipal Summary Reports	E – Shared drive on Hb-park
Adverse Water Quality Incidents (AWQI) - Notice of Adverse Test Results	HC – facility WTP HC – NWO Hub office
Infrastructure review (capital/maintenance works recommendations) - Annual and Six Year Capital Plans	E - Shared drive on Hb-park
OPEX Incident Reports - Community complaint records	E – OPEX database

Table 2: Relevant corporate retention periods

Type of Document/Record	Minimum Retention Time	Requirement Reference
DWQMS Operational Plan	10 years	Director's Direction under SDWA
Internal QEMS Audit Reports	10 years	OCWA Requirement
DWQMS Records not specified	3 years	OCWA Requirement
Management Review Minutes	10 years	OCWA Requirement
Other documents and records	Retained as per applicable legislation	SDWA O. Reg. 170/03, O. Reg. 128/04

Appendix B

QP-02 Risk Assessment and Risk Assessment Outcomes



QEMS Ontario Clean Water Agency	QEMS Procedure	Proc.: QP-02 Issued: 15-Dec-16 Rev.#: 0 Pages: 1 of 3
Reviewed by: David Hoffman	Approved by:	

RISK ASSESSMENT and RISK ASSESSMENT OUTCOMES

1.0 Purpose

To define the process for conducting a drinking water risk assessment and for documenting and reviewing the results of the assessment at the facility level.

2.0 Scope

Applies to all OCWA-operated municipal residential drinking water systems and is limited to the assessment of potential drinking water health hazards. OCWA's approach to addressing other potential hazards is set out in QEMS Procedure QP-09 Emergency Management.

3.0 Responsibility

Operations Manager
Process & Compliance Technician (PCT)
Risk Assessment Personnel

4.0 Definitions

Drinking Water Health Hazard – means, in respect of a drinking water system,

a) a condition of the system or a condition associated with the system's waters, including anything found in the waters,
   i. that adversely affects, or is likely to adversely affect, the health of the users of the system,
   ii. that deters or hinders, or is likely to deter or hinder, the prevention or suppression of disease, or
   iii. that endangers or is likely to endanger public health,
b) a prescribed condition of the drinking water system, or
c) a prescribed condition associated with the system's waters or the presence of a prescribed thing in the waters

Critical Control Point (CCP) – An essential step or point in the subject system at which control can be applied by the Operating Authority to prevent or eliminate a drinking water health hazard or reduce it to an acceptable level

Hazardous Event – an incident or situation that can lead to the presence of a hazard

Hazard – a biological, chemical, physical or radiological agent that has the potential to cause harm

Control Measure – includes any processes, physical steps or other practices that have been put in place at a drinking water system to prevent or reduce a hazard before it occurs

Likelihood – the probability of a hazard or hazardous event occurring

Consequence – the potential impact to public health and/or operation of the drinking water system if a hazard/hazardous event is not controlled

5.0 Procedure

5.1 The Operations Manager assigns personnel to conduct the risk assessment (e.g., Process & Compliance Technician (PCT), Maintenance staff, Operators).

5.2 Using the system's process diagram, identify hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water in Table 1[1] for each activity/process step.

5.3 For each of the hazardous events, specify control measures currently in place at the facility that eliminate the hazard or prevent it from becoming a threat to public health.

Note: Some hazards/hazardous events may have step-by-step contingency plans associated with them. These contingency plans are developed as per OCWA's Emergency Management Program and are further described in QEMS Procedure QP-09 Emergency Management.

5.4 To ensure that potential drinking water health hazards are addressed and minimum treatment requirements as regulated by SDWA O. Reg. 170/03 and the *Procedure for Disinfection of Drinking Water in Ontario* are met, OCWA has established mandatory Critical Control Points (CCPs).

As a minimum, the following must be included as CCPs at all OCWA-operated facilities (as applicable):

- Processes necessary to achieve the required log removal or inactivation of pathogens (i.e., chemical and/or UV disinfection system, filtration process[2] for surface water and GUDI systems)
- Processes necessary for maintaining a disinfectant residual in the distribution system (includes re-chlorination points)
- Fluoridation system

Identify the above processes (as they apply) as mandatory CCPs in the 'CCP?' column in Table 1.

5.5 To determine if there are any additional CCPs for the system, evaluate and rank the hazardous events (as set out below in steps 5.6 and 5.7) for the remaining activities/process steps (i.e., those not included as OCWA's minimum CCPs).

5.6 Taking into consideration existing control measures (including the reliability and redundancy of equipment), assign each hazardous event a value for the likelihood and a value for the consequence of that event occurring based on the following criteria:

Value	Likelihood of Hazardous Event Occurring
1	**Rare** – Estimated to occur every 50 years or more (usually no documented occurrence at site)
2	**Unlikely** – Estimated to occur in the range of 10 – 49 years
3	**Possible** – Estimated to occur in the range of 1 – 9 years
4	**Likely** – Occurs monthly to annually
5	**Certain** – Occurs monthly or more frequently

[1] Tables referred to in this procedure are contained within the facility-specific Summary of Risk Assessment Outcomes
[2] Filtration process includes related processes (e.g., chemical coagulation, rapid mixing, flocculation, sedimentation)

Value	Consequence of Hazardous Event Occurring
1	**Insignificant** – Little or no disruption to normal operations, no impact on public health
2	**Minor** – Significant modification to normal operations but manageable, no impact on public health
3	**Moderate** – Potentially reportable, corrective action required, potential public health impact, disruption to operations is manageable
4	**Major** – Reportable, system significantly compromised and abnormal operations if at all, high level of monitoring and corrective action required, threat to public health
5	**Catastrophic** – Complete failure of system, water unsuitable for consumption

Multiply the likelihood and consequence values to determine the risk value (ranking) of each hazardous event and record all values in Table 1. Hazardous events with a ranking of 12 or greater are considered high risk.

5.7 Review the hazardous events and rankings documented in Table 1 and identify any activity/process step as an additional CCP if <u>all</u> of the following criteria are met:

- ✓ The associated hazardous event has a ranking of 12 or greater
- ✓ The associated hazardous event is reduced to an acceptable level through control measure(s)
- ✓ Operation of the control measures can be monitored and corrective actions can be applied in a timely fashion
- ✓ Specific control limits can be established for the control measure(s)
- ✓ Failure of the control measures would lead to immediate notification of Medical Officer of Health (MOH) or Ministry of the Environment (MOE) or both.

5.8 List identified CCPs (required minimum and any additional CCPs established by the risk assessment) in Table 2. Set related critical control limits (e.g., limits for turbidity, chlorine residual, temperature, pH) for each CCP as appropriate.

5.9 Ensure procedures have been developed and implemented at the facility to:

- Monitor the critical control limits
- Respond to, report and record deviations from the critical control limits.

List these procedures in Table 2.

5.10 The information recorded in the Summary of Risk Assessment Outcomes is maintained at the facility level on an ongoing basis and is reviewed at least annually as part of the Management Review process.

5.11 The Operations Manager ensures that a risk assessment is conducted and documented at least once every thirty-six months.

6.0 Related Documents

Summary of Risk Assessment Outcomes (facility-specific)
QP-09 Emergency Management

7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure issued

Summary of Risk Assessment Outcomes

Manitouwadge Water Treatment and Distribution System

Table 1: Risk Assessment Table

Note: Processes referred to in section 5.4 of QP-02 Risk Assessment and Risk Assessment Outcomes must be identified as mandatory Critical Control Points (CCPs) as applicable for all OCWA-operated facilities. Mandatory CCPs are not required to be ranked.

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Source Water	Sewage trunk line break contaminating source water	Chemical or biological contamination of aquifer	Monitor sewage flow rates at lift station, physical inspections. -Use wells in unaffected area	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Flooding of well head	Chemical or biological contamination of aquifer	None – Well heads are above creek and lake flood plain. Staff would take appropriate response measures including -Construct sandbag dike -Supply for storage -Use alternate supply of water (bottled)	1	4	4	
	Industrial and/or residential contamination of the local sub-basin catchment area	Chemical or biological contamination of aquifer	None – staff would take appropriate response measures including -Supply from storage -Test and seek professional advice regarding impact to aquifer -Use alternate supply of water (bottled)	2	4	8	
	Wells run low	Loss of supply	Supply from storage Well heads located in two separate locations – use wells from other location Use alternate supply (bottled)	1	4	4	
Site Security	Unauthorized persons break in to plant and/or well head and vandalize equipment or sabotage water	Biological/Chemical contamination, Quantity/quality	Sites are fenced. Buildings are alarmed notifying operator	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
Well head	Power failure at well pump	Loss of supply	Supply from storage Use alternate supply of water (bottled) Generator power supply	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Severity	Risk Score	CCP?
	Collapse of well casing	Loss of water supply Contamination	Redundant wells (5 wells in use) Impose water restrictions Supply from storage	1	4	4	☒ No
	Well Pump failure	Loss of supply	Supply from storage Redundancy 5 wells available Well pumps alarmed	2	4	8	
	Failure of alarms or communications at well pumps and plant	Loss of water supply	Run pumps on manual Supply from storage	2	3	6	
Primary disinfection -UV system	Failure of UV bulbs	Unknown quality of disinfection	Alarm to operator Unit shuts down automatically on failure Scheduled maintenance				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	Failure of UV ballast	Unknown quality of disinfection	Alarm to operator Redundancy – each well location UV has a separate PLC Spare ballast on hand Scheduled maintenance				
	Failure of PLC controlling UV	Unknown quality of disinfection	Alarm to operator Unit shuts down automatically on failure Redundancy – each well location UV has a separate PLC Scheduled maintenance				
Aeration system	Container rupture	Change in aesthetic water quality	Redundancy – two aeration units	1	2	2	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Hatch Gasket Failure	Change in aesthetic water quality	Inspections Scheduled maintenance	3	2	6	
	Heater Failure	Change in aesthetic water quality	Redundancy – back-up coils Scheduled maintenance	2	2	4	

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Severity	Risk Value	CCP?
Chlorination system	Sodium hypochlorite pump failure and sodium hypochlorite line breaks	Loss of disinfection Inadequate inactivation of pathogens	Alarm to operator Handheld residual readings Redundancy (2 pumps secondary) Scheduled maintenance				☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	Low supply of sodium hypochlorite	Low chlorine residual Inadequate inactivation of pathogens	Operator monitors supply Source backup supply from other Hub facilities				
	Failure of chlorine analyzer	Unknown quality of disinfection	Handheld residual readings Alarmed to operator Scheduled maintenance				
Clear well	Loss of structural integrity of clear well	Potential biological contamination	Isolate leaking reservoir Redundancy – 2 clear wells Use alternate supply of water (bottled)	1	4	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
High lift pumps	Failure of high lift pump	Low pressure in distribution Potential biological contamination	Redundancy (3 pumps per well) with automatic switch	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Turbidity meter failure	Unknown quality of treated water	Alarm to operator Scheduled maintenance Handheld readings	2	1	2	
Distribution	Breakage of single pipe from clear well to distribution system	Reduced flow Inability to meet demand Low pressure	Isolate Use alternate supply of water (bottled)	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No
	Breakage of single pipe from reservoir to distribution system	Reduced flow Inability to meet demand Low pressure	Isolate Supply from well Use alternate supply of water (bottled)	2	3	6	
	Major fire in municipality	Low pressure in sections of distribution Low supply levels Loss of CT	Redundancy (4 pumps) with automatic switch and 2 fire pumps.	3	2	6	

Activity / Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Score	CCP?
	Cross-connection to household or industrial plumbing	Biological or chemical contamination	Inspections Cl2 residual measurements in distribution	3	3	9	
	Failure of valves controlling flow to distribution	Reduced flow Inability to meet demand Low pressure	Isolate Use alternate supply of water (bottled)	2	3	6	

Table 2: Identified Critical Control Points (CCPs)

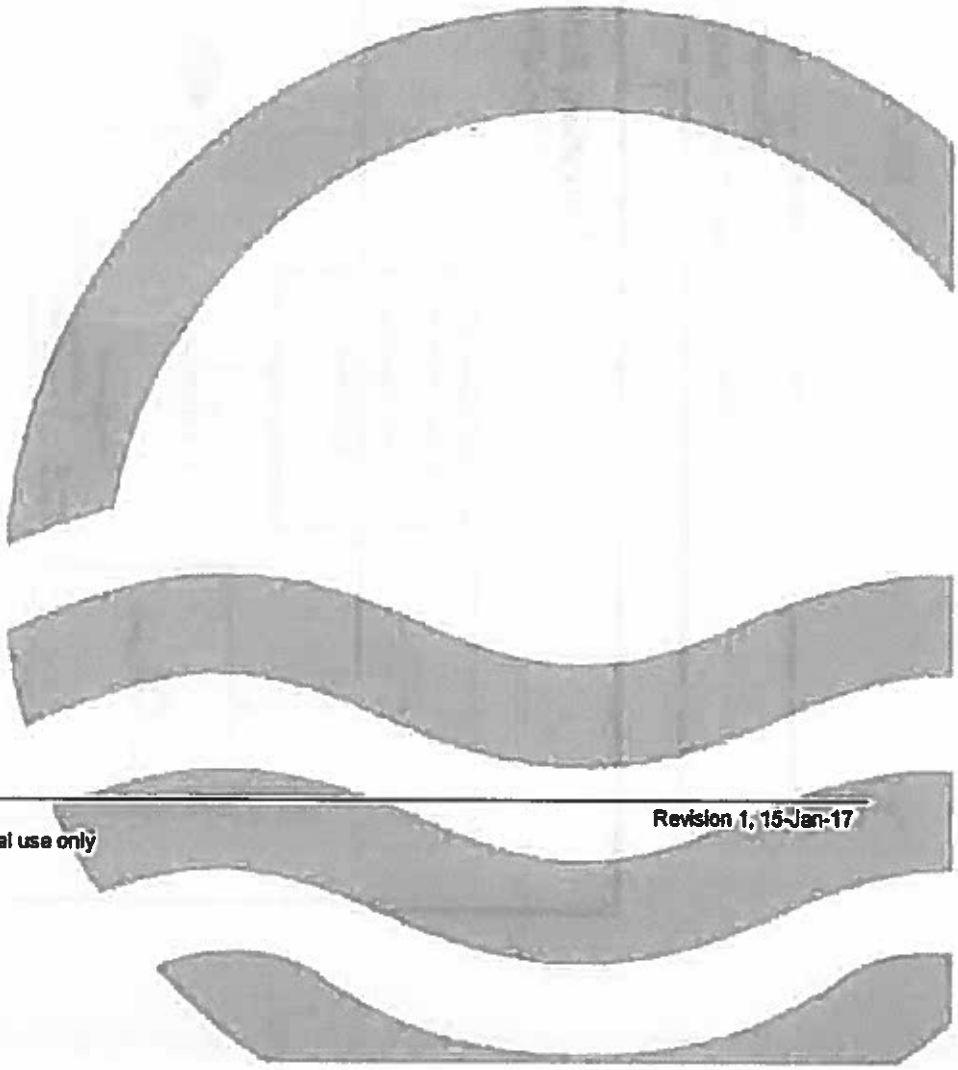
CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Primary disinfection -UV system	Bulb life 12000 hrs	Scheduled maintenance Daily operator checks 72 hr Trend review	Logbook recording Trending data Adverse Water Quality SOP Internal Reporting
Chlorination system	Free chlorine residual -Low – 1.0 mg/l -High – 4.0 mg/l	Hypo pump auto start with low lift pump Auto Shut down low lift if hypo failure Continuous online analyzer alarmed Scheduled maintenance Daily operator checks 72 hr Trend review	Logbook recording Trending data Adverse Water Quality SOP Internal Reporting

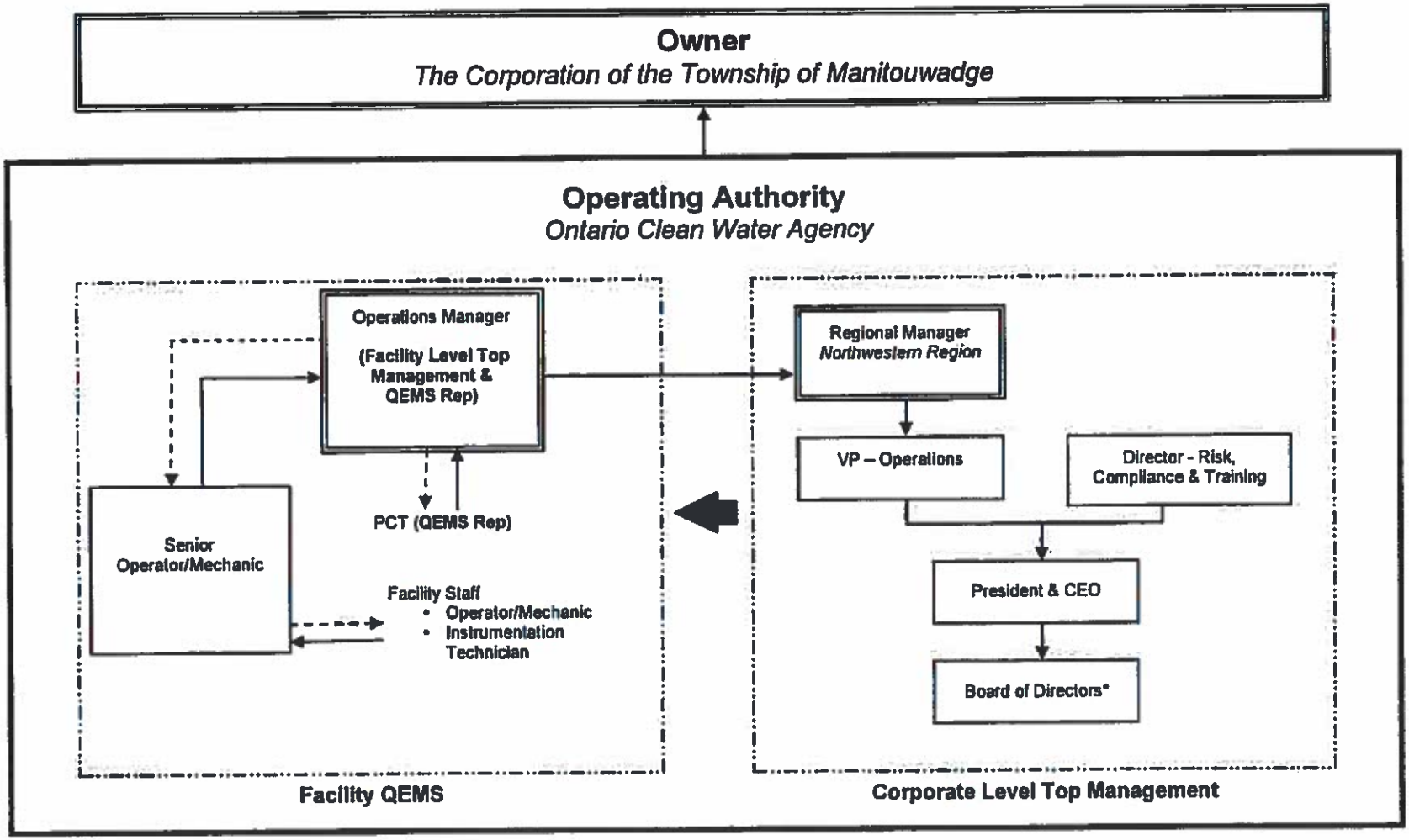
Revision History

Date	Revision #	Reason for Revision
Dec 15 2016	0	Initial risk assessment with distribution

Appendix C

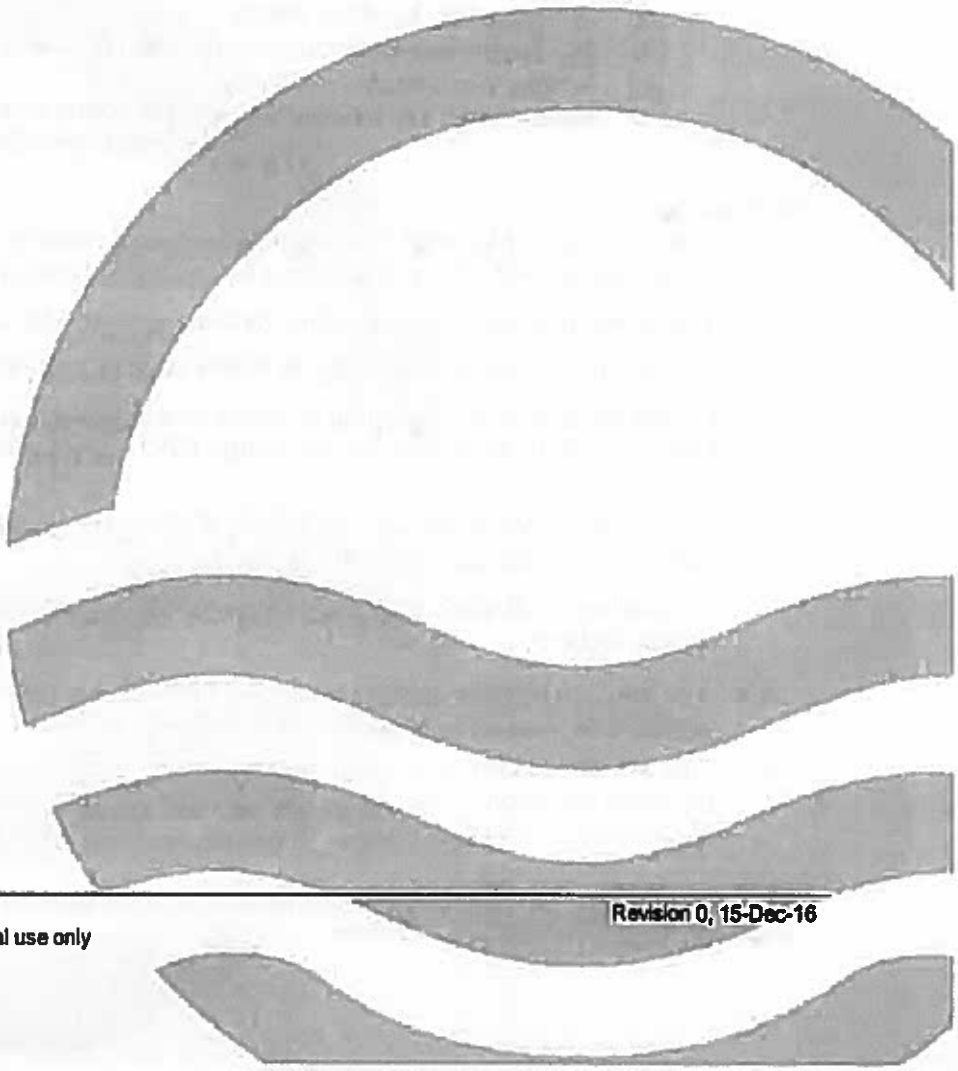
QEMS Organizational Structure for the Manitouwadge Water Treatment Plant and Distribution System




Owner
The Corporation of the Township of Manitouwadge
Operating Authority
Ontario Clean Water Agency
Operations Manager
(Facility Level Top Management & QEMS Rep)
PCT (QEMS Rep)
Senior Operator/Mechanic
Facility Staff
Operator/Mechanic
Instrumentation Technician
Facility QEMS
Regional Manager
Northwestern Region
VP – Operations
Director - Risk, Compliance & Training
President & CEO
Board of Directors*
Corporate Level Top Management
Endorsement & Approval of the Facility's QEMS & Operational Plan
Overall Leadership & Support for OCWA's QEMS
Reports To
Supervises/Directs
Delineates Corporate & Facility Level Functions
* Represents the highest level of OCWA's Top Management

Appendix D

QP-03 Personnel Coverage



PERSONNEL COVERAGE

1.0 Purpose

The procedure describes how to ensure sufficient and competent personnel are available for duties that directly affect drinking water quality.

2.0 Scope

Applies to operations personnel at the *Manitouwadge Drinking Water System.*

3.0 Responsibility

Operations Manager
Senior Operator

4.0 Definitions

Competency – an integrated set of requisite skills and knowledge that enables an individual to effectively perform the activities of a given occupation *

Essential Services – services that are necessary to enable the employer to prevent,

(a) danger to life, health or safety,
(b) the destruction or serious deterioration of machinery, equipment or premises,
(c) serious environmental damage, or
(d) disruption of the administration of the courts or of legislative drafting.

(*Crown Employees Collective Bargaining Act*, 1993)

5.0 Procedure

5.1 The Operations Manager ensures that personnel meeting the competencies identified in the Operational Plan are available for duties that directly affect drinking water quality.

5.2 The *Manitouwadge Drinking Water System* is staffed by OCWA personnel as follows:

7:00 a.m. to 3:30 p.m. Monday to Friday and on-call 24hr/day, 7 days/wk

5.3 OCWA personnel are assigned to act as and fulfill the duties of Overall Responsible Operator (ORO) and Operator-In-Charge (OIC) in accordance with SDWA O. Reg. 128/04.

The Regional Manager will designate the overall responsible operator (ORO). The ORO is recorded as such in the facility logbook.

All qualified staff shall ensure they sign as OIC for each shift and is recorded in the facility logbook.

5.4 The Senior Operator assigns an on-call operator for the time that the facility is un-staffed (i.e., evenings, weekends and Statutory Holidays).

5.5 The SCADA system is programmed to contact a call-centre operator whenever there is an alarm condition. The call-centre operator contacts the on-call operator through a designated on-call Cell Phone. If the nature of the alarm requires additional staff, the

* Based on the *2005 National Occupational Guidelines for Canadian Water and Wastewater Operators* and International Board of Standards for Training, Performance and Instruction

on-call operator can request assistance from any of the other certified operators. The on-call operator records details of the call-in in the facility logbook and in the Call-In Report form.

5.6 The Operations Manager or designate is responsible for approving vacation time for staff in a manner which ensures sufficient personnel are available for the performance of normal operating duties.

5.7 OCWA's Operations staff is represented by the Ontario Public Service Employees Union (OPSEU). In the event of a labor disruption, the Operations Manager, together with the union, identifies "essential services" required to operate the facility so that the quality of drinking water is not compromised in any way.

6.0 Related Documents

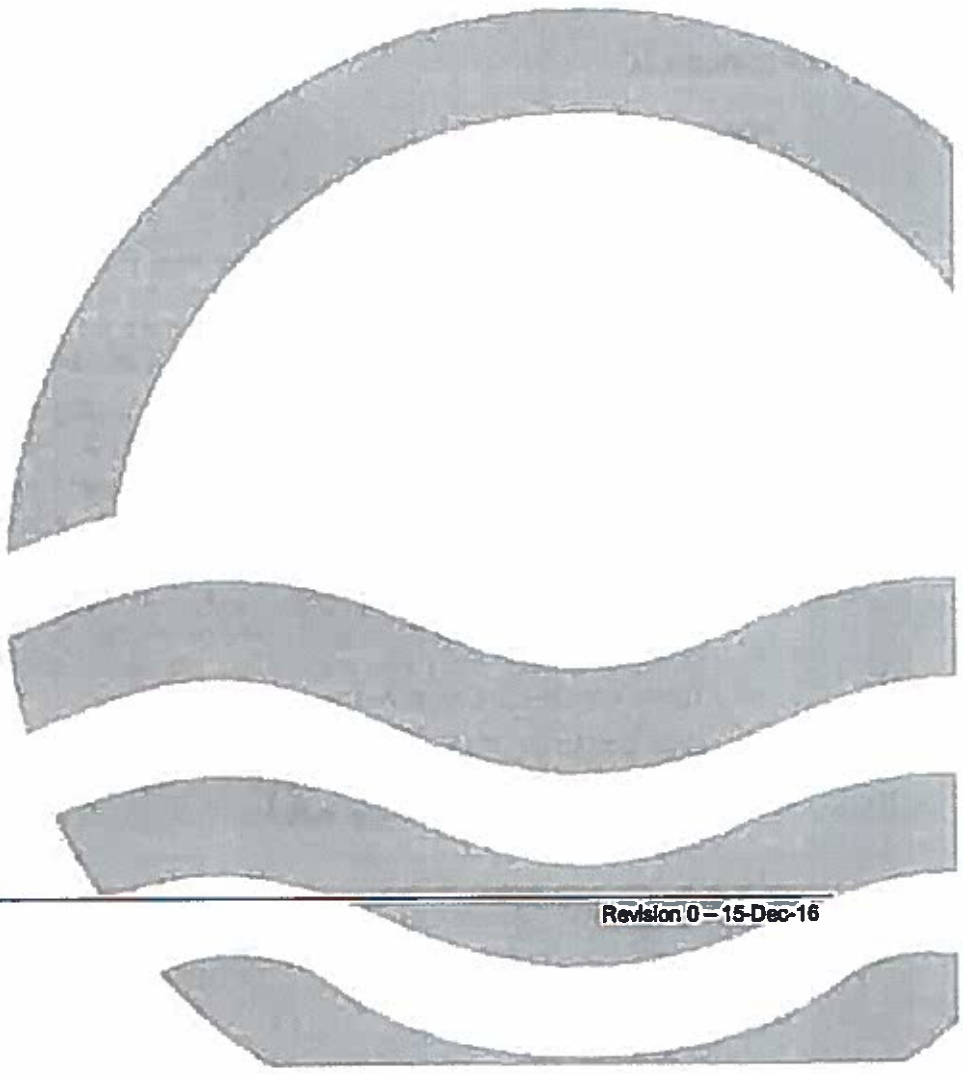
Facility Logbook
On-Call Schedule
Call-In Reports
Vacation Schedule

7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure issued

Appendix E

QP-04 Communications



QEMS Ontario Clean Water Agency	QEMS Procedure	Proc.: QP-04 Issued: 15-Dec-16 Rev.#: 0 Pages: 1 of 2
Reviewed by: David Hoffman	Approved by:	

COMMUNICATIONS

1.0 Purpose

To describe the procedures for QEMS-related communications between the facilities's Management and OCWA personnel, the owner, suppliers and the public.

2.0 Scope

This procedure applies to facility level internal and external communications regarding the Quality & Environmental Management System (QEMS) implemented at the *Manitouwadge Drinking Water System*.

3.0 Responsibility

Operations Manager (Facility Level Top Management)
Process & Compliance Technician (PCT)
Regional Manager (Corporate Level Top Management)

4.0 Definitions

None

5.0 Procedure

5.1 The Operations Manager or designate and PCT are responsible for identifying and coordinating any site-specific communications in relation to the status/development of the facility's QEMS. They are also responsible for ensuring that the Regional Manager is promptly informed regarding QEMS-related matters with Agency-wide significance.

5.2 Upon hire, OCWA personnel are scheduled to attend the Environmental Compliance course which provides general awareness training on OCWA's QEMS.

The Operations Manager ensure facility personnel receive site-specific training on the Operational Plan, QEMS Procedures and other related operating instructions and procedures as part of the orientation process.

Revisions to the QEMS and associated documentation are communicated to relevant employees at meetings, through internal memos or e-mails on an as-needed basis. The Operational Plan and procedures are available to all facility employees as per Table 1 of QP-01 Document and Records Control.

Changes to the Operating Plan are communicated to the Township of Manitouwadge via email. The Township of Manitouwadge makes the plan available to the public at the town office and the municipal web site.

5.3 The continuing suitability, adequacy and effectiveness of OCWA's QEMS are communicated to the owner as part of the Management Review process (refer to QEMS Procedure QP-11 Management Review). Ongoing QEMS updates are provided to the owner during regularly scheduled meetings and through electronic and verbal communications.

5.4 Communication requirements for ensuring suppliers and contractors understand the relevant OCWA QEMS policies, procedures and expectations are described in QEMS Procedure QP-05 Essential Supplies and Services.

5.5 Media enquiries must be directed to the facility's designated media spokesperson. The Regional Manager is the media spokesperson for the Manitouwadge Drinking Water System. The media spokesperson coordinates with facility and corporate personnel (as appropriate) and the Owner in responding to media enquiries.

5.6 OCWA's QEMS and QEMS Policy are communicated to the public through OCWA's public website. The QEMS Policy is also posted at facility and hub office.

Facility tours of interested parties must be approved in advance by the Operations Manager. A record of any tour is made in the facility logbook.

Formal complaints, whether received from the consumer, the community or other interested parties, are documented in the OPEX database. As appropriate, the Operations Manager or designate ensures that the Owner is informed of the complaint and/or an action plan is developed to address the issue in a timely manner. The PCT ensures that consumer feedback is included for discussion at the Management Review.

5.7 Internal and external communication responsibilities and reporting requirements for emergency situations are set out under OCWA's Emergency Management Program (i.e., Facility Emergency Plan and OCWA's Emergency Response Plan). Refer to QEMS Procedure QP-09 Emergency Management.

6.0 Related Documents

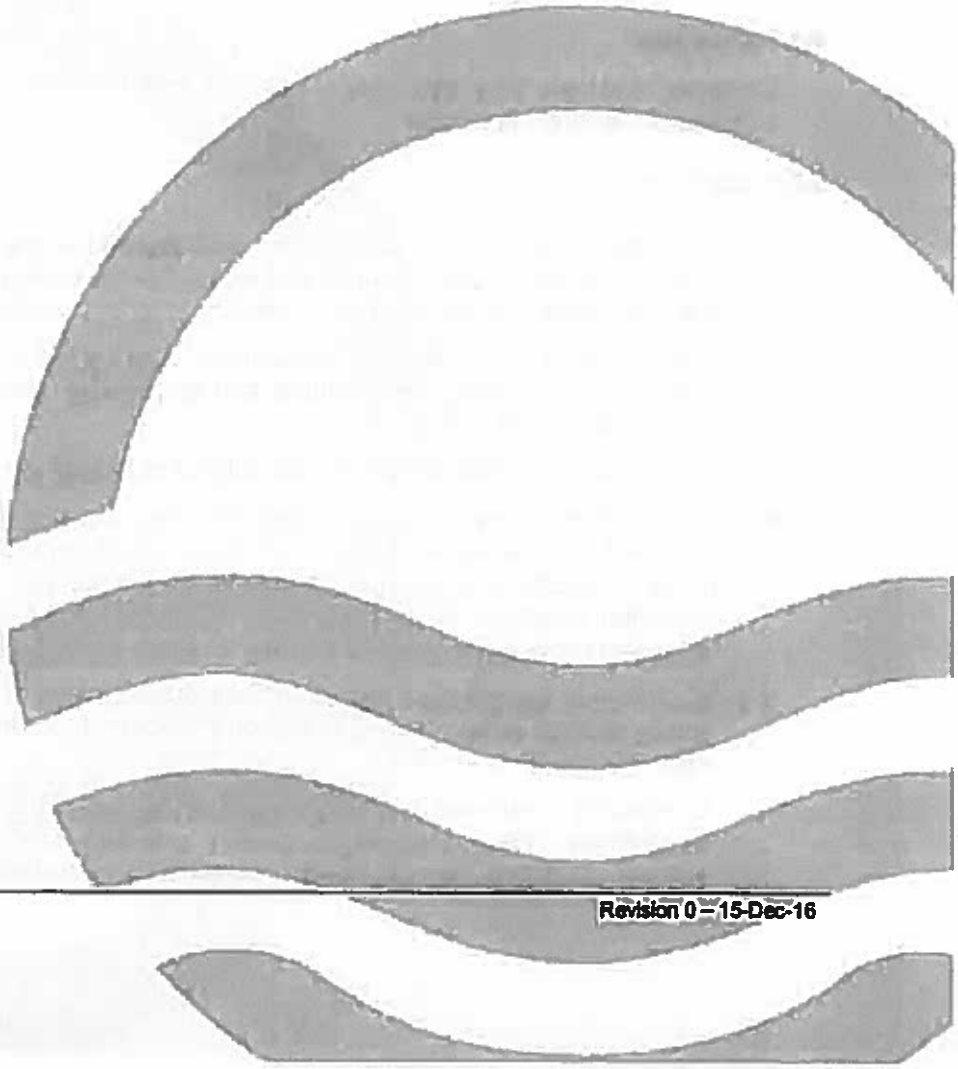
Facility Logbook
QP-05 Essential Supplies and Services
QP-09 Emergency Management
QP-11 Management Review
Facility Emergency Plan
Emergency Response Plan
OPEX Incident Reports
QEMS Policy

7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	1	Procedure issued

Appendix F

QP-05 Essential Supplies and Services



ESSENTIAL SUPPLIES and SERVICES

1.0 Purpose

To describe OCWA's procedures for procurement and for ensuring the quality of essential supplies and services.

2.0 Scope

Applies to essential supplies and services pertaining to the *Manitouwadge Drinking Water* System as identified in this procedure.

3.0 Responsibility

Corporate Procurement and Administration
Operations Manager
Senior Operator
Operator

4.0 Definitions

Essential Supplies and Services – supplies and services deemed to be critical to the delivery of safe drinking water

5.0 Procedure

5.1 Essential supplies and services for the Manitouwadge Drinking Water System are listed in the Emergency Contact List located in the Facility Emergency Plan binder. The list is reviewed and updated as required by the Operations Staff or the PCT.

5.2 Purchasing is conducted in accordance with OCWA's Corporate Procurement and Administration policies, procedures and guidelines, which are adopted from those of the Ontario Public Service.

Purchases of capital equipment are subject to formal approval by the facility's owner.

5.3 As part of the corporate procurement process, potential suppliers/service providers are informed of relevant aspects of OCWA's QEMS through the tendering process and through specific terms and conditions set out in our agreements and purchase orders. Essential suppliers/service providers (including those contracted locally) are sent a letter that provides an overview of the relevant aspects of the QEMS.

5.4 Contractors are selected based on their qualifications and ability to meet the facility's needs without compromising operational performance and compliance with applicable legislation and regulations.

Contracted personnel including suppliers may be requested or required to participate in additional relevant training/orientation activities to ensure conformance with facility procedures and to become familiar with OCWA workplaces.

If necessary, appropriate control measures are implemented while contracted work is being carried out and communicated to all relevant parties to minimize the risk to the integrity of the drinking water system and the environment.

5.5 All third-party drinking water testing services are provided by accredited and licensed laboratories.

5.6 Calibration services are provided by qualified personnel.

5.7 Chemicals purchased for use in the drinking water treatment process must meet AWWA Standards and be ANSI/NSF certified.

The facility orders and receives ongoing deliveries of chemicals to satisfy current short-term needs based on processing volumes and storage capacities.

5.8 Process components/equipment provided by the supplier must meet applicable regulatory requirements and industry standards for use in drinking water systems prior to their installation.

6.0 Related Documents

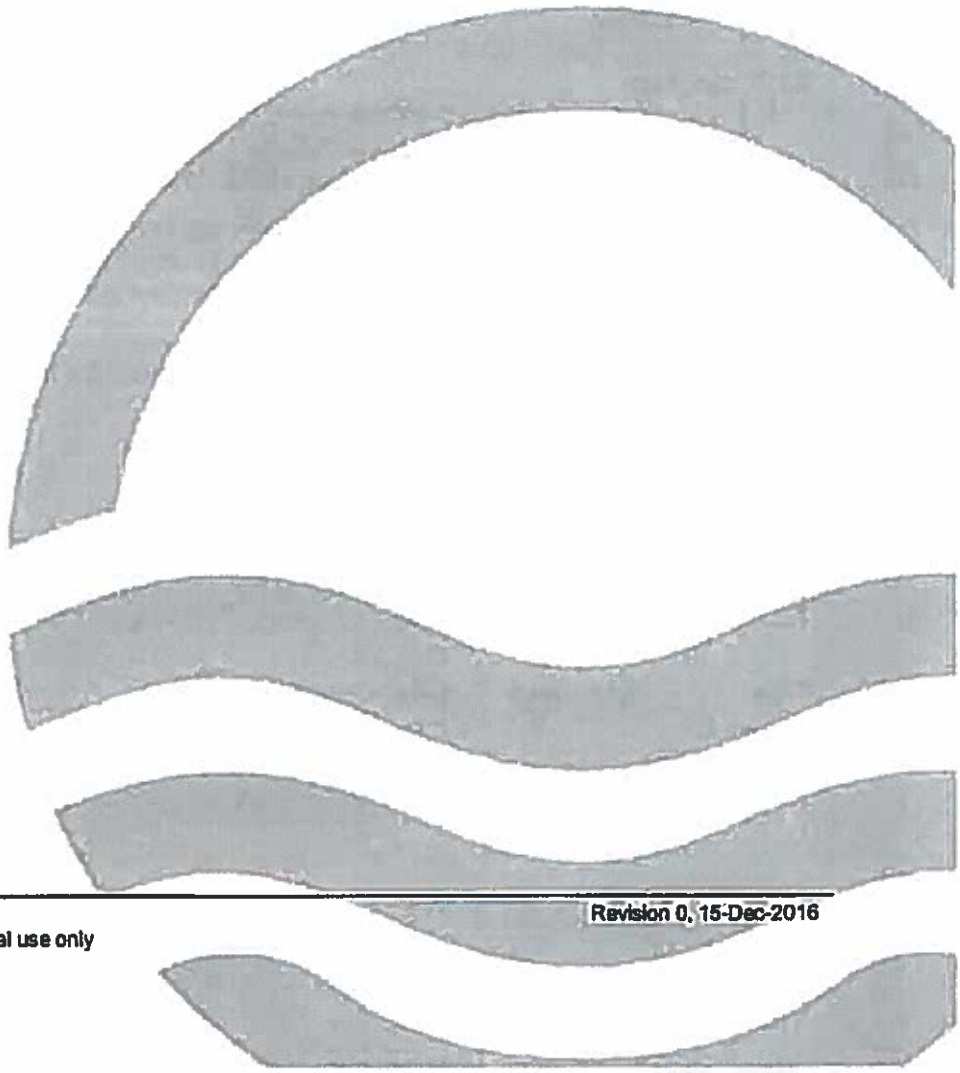
None

7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure Issued

Appendix G

QP-06 Review and Provision of Infrastructure



QEMS Ontario Clean Water Agency	QEMS Procedure	Proc.: QP-06 Issued: 15-Dec-16 Rev.#: 0 Pages: 1 of 1
Reviewed by: David Hoffman	Approved by:	

REVIEW and PROVISION of INFRASTRUCTURE

1.0 Purpose

to describe OCWA's procedure for reviewing the adequacy of infrastructure necessary to operate and maintain a drinking water system.

2.0 Scope

Applies to the *Manitouwadge Drinking Water System*

3.0 Responsibility

Operations Manager
CAO
Superintendent

4.0 Definitions

Infrastructure – the set of interconnected structural elements that provide the framework for supporting the operation of the drinking water system, including buildings, workspace, process equipment, hardware, software and supporting services, such as transport or communication

5.0 Procedure

5.1 On an annual basis, the Operations Manager or Designate and Operational Staff conduct a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system.

5.2 The output of the review is a *Capital Projects List* that is submitted by email to the owner for review/comment along with recommendation for meeting. Together with the owner, timelines and responsibilities for implementation of priority items are determined and documented.

5.3 The Operations Manager ensures that results of the review are included as input to the Management Review process.

6.0 Related Documents

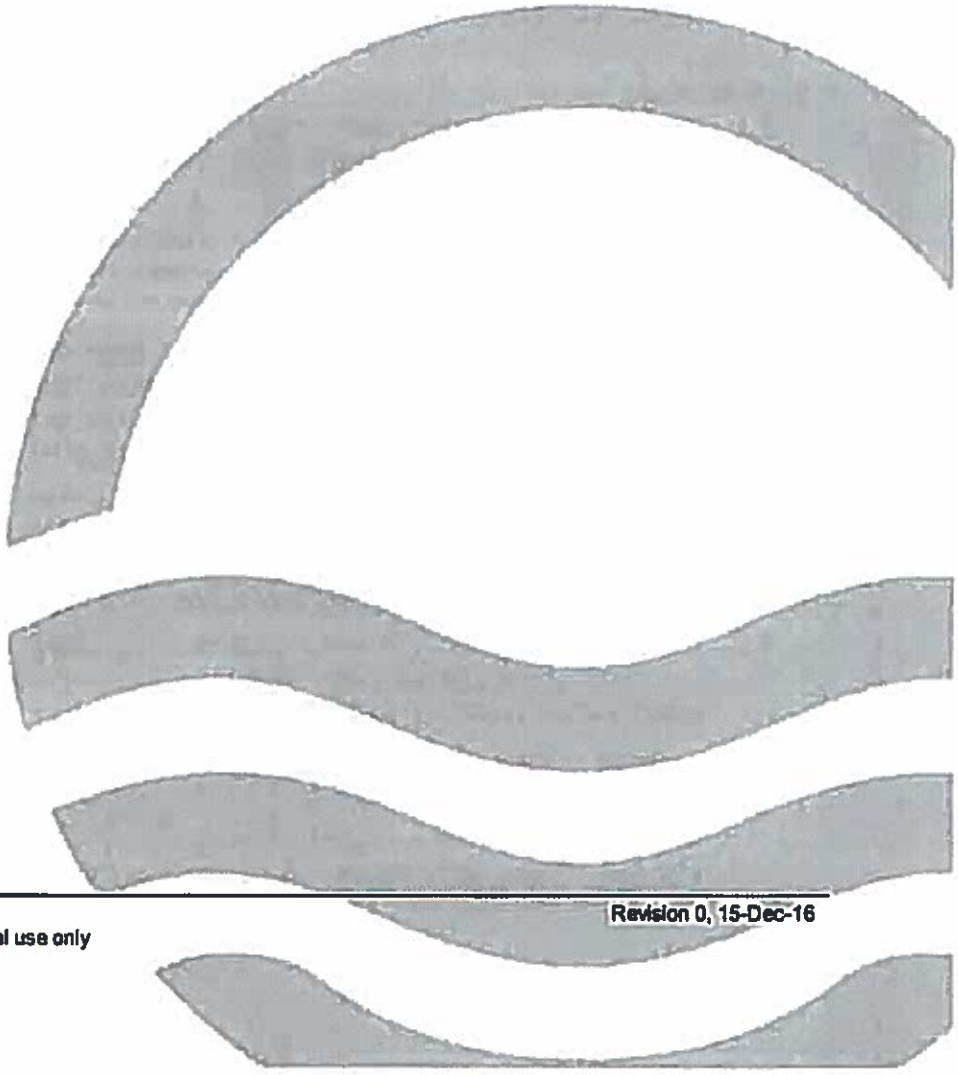
Minutes of Management Review
Capital Plan

7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure issued

Appendix H

QP-07 Sampling, Testing and Monitoring



SAMPLING, TESTING and MONITORING

1.0 Purpose

to describe the procedure for sampling, testing and monitoring for process control and finished drinking water quality.

2.0 Scope

This procedure applies to sampling, testing and monitoring of the Manitouwadge Drinking Water System.

3.0 Responsibility

Operations Manager
Process & Compliance Technician (PCT)
Operators

4.0 Definitions

Challenging Conditions – any existing characteristic of the water source or event-driven fluctuations that impact the operational process as identified and listed under the Drinking Water System section in the facility's Operational Plan

5.0 Procedure

5.1 All sampling, monitoring and testing is conducted at a minimum in accordance with SDWA O. Reg. 170/03. Adverse water quality incidents are responded to and reported as per the SOP on Adverse Water Quality.

Additional sampling requirements for the facility are defined in the, Certificate of Approval. Any additional sample requirements that may be imposed through MOE orders and inspection reports will be added to the sampling calendar when applicable.

5.2 Samples are submitted to an accredited and licensed laboratory according to the facility's sampling calendar (SOP). The sampling calendar is maintained by the PCT and is updated as required. This calendar is found in SOP Manitouwadge Water Treatment Sampling Schedule, as per Table 1 of QP-01

5.3 Continuous monitoring equipment is used to sample and test for turbidity and treated water free chlorine residual. Test results from continuous monitoring equipment are captured by the facility computer system and are reviewed by a certified operator in accordance with the requirements of SDWA O. Reg. 170/03.

5.4 The facility computer system also collects and records information on raw water flow from each well and treated water flow rates which is related to process control and finished drinking water quality.

In-house process control activities are conducted on a regular basis by the certified operator(s) on duty.

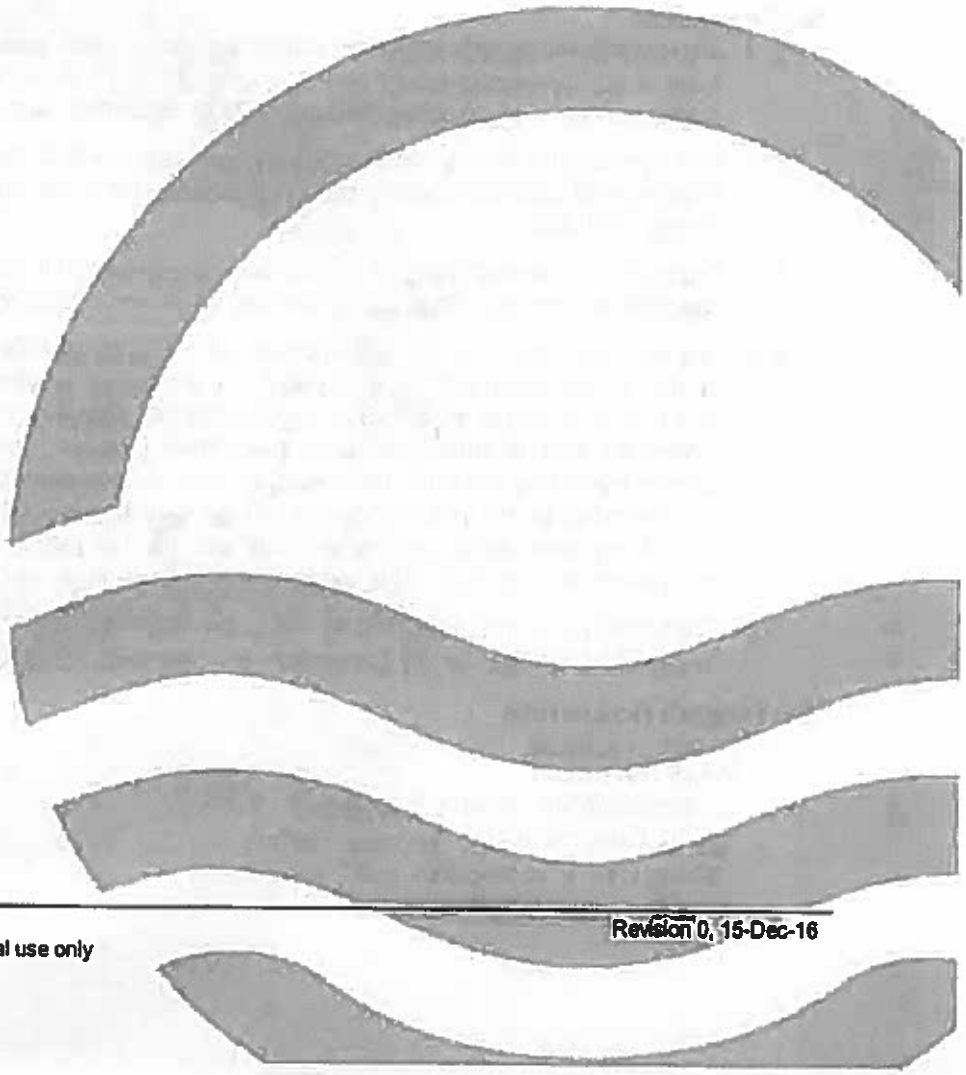
In-house samples are analyzed following approved laboratory procedures. The results of these activities are recorded on the corresponding round sheet and are entered into

7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure issued

Appendix I

QP-08 Measurement and Recording Equipment Calibration and Maintenance



MEASUREMENT and RECORDING EQUIPMENT CALIBRATION and MAINTENANCE

1.0 Purpose

to describe the procedure for the calibration and maintenance of measurement and recording equipment.

2.0 Scope

The procedure applies to the measurement and recording equipment at the *Manitouwadge Drinking Water System.*

3.0 Responsibility

Operations Manager
Senior Operator
Operators

4.0 Definitions

None

5.0 Procedure

5.1 All measurement and recording equipment calibration and maintenance activities are performed by appropriately trained and qualified personnel or by a qualified third-party calibration service provider (refer to QP-05 Essential Supplies and Services).

5.2 The *Operations staff* establishes and maintains a list of measurement and recording devices and associated calibration schedules using the automated Work Management System (WMS).

5.3 Calibration and maintenance activities are carried out in accordance with procedures specified in the manufacturer's manual, and instructions specified in the WMS.

5.4 Any measurement device which does not meet its specified performance requirements during calibration must be removed from service (if practical) until repaired or replaced. The failure must be reported to the Operations Manager as soon as possible so that measures can be taken to ensure that drinking water quality has not been compromised by the malfunctioning device. Any actions taken as a result of the failure are recorded in the facility logbook. The Operations staff, with assistance from the PCT if required, ensures that any notifications required by applicable legislation are completed and documented within the specified time period.

5.5 Calibration and maintenance records and maintenance/equipment manuals are maintained as per QP-01 Document and Records Control.

6.0 Related Documents

Facility Logbook
WMS Records
Calibration/Maintenance Records
QP-01 Document and Records Control
QP-05 Essential Supplies and Services
Maintenance/equipment manuals

the PDM program as required. Any adjustments made to process parameters are recorded in the facility log book.

5.5 Sampling, testing and monitoring activities based on conditions most challenging to the system are described in the sampling SOP. There is no relevant sampling, testing or monitoring requirements upstream of the Water Treatment Process.

5.6 Sampling, testing and monitoring results are readily accessible to the owner at the facility and Northwestern Ontario Hub Office and are available via email upon request. Laboratory results are emailed to the owner and operating authority by the laboratory.

As a minimum, owners are provided with an annual summary of sampling, testing and monitoring results through the SDWA O. Reg. 170/03 section 11 and schedule 22 reports and through the Management Review process outlined in QP-11 Management Review.

In addition, updates regarding sampling, testing and monitoring activities are provided as per the operating agreement and during regular client meetings.

6.0 Related Documents

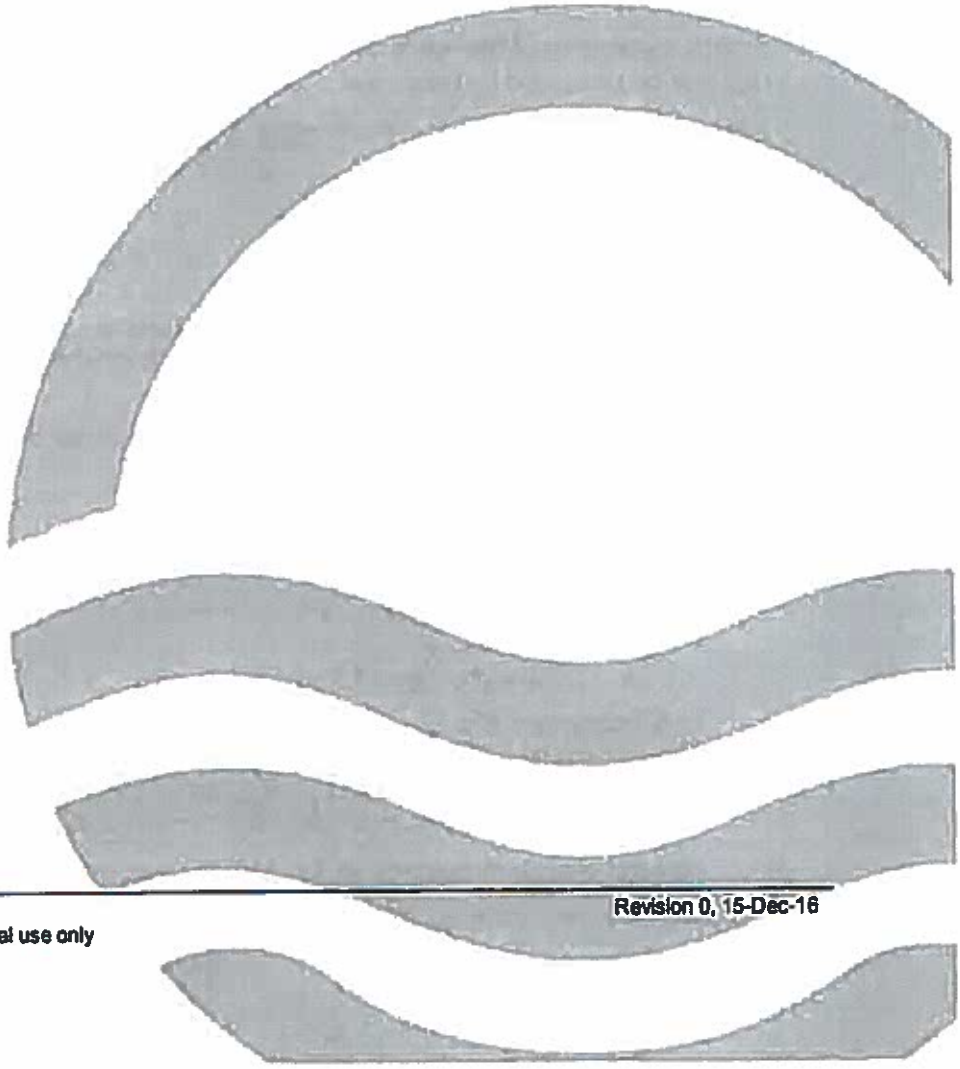
Facility Logbook
QP-01 Document and Records Control
QP-11 Management Review
Laboratory Analysis Reports
Annual Report
Municipal Summary Report
SOP on Adverse Water Quality
Manitouwadge Sampling SOP (Calendar)

7.0

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure issued

Appendix J

QP-09 Emergency Management



EMERGENCY MANAGEMENT

1.0 Purpose

to describe the procedure for maintaining a state of emergency preparedness at the facility level under OCWA's Emergency Management Program.

2.0 Scope

Applies to potential operations emergency situations or service interruptions identified for the *Manitouwadge Drinking Water System*.

3.0 Responsibility

Corporate Compliance Group
Operations Manager
Process & Compliance Technician (PCT)
Operations Staff

4.0 Definitions

Facility Emergency Plan – a facility level plan for preparedness for operations emergencies that can be managed by plant staff and local resources

Emergency Response Plan – a corporate level plan for preparedness for serious operations emergencies

5.0 Procedure

5.1 The Corporate Compliance Group maintains the corporate level Emergency Response Plan and the OCWA template for establishing a plan for facility level emergencies (the "Facility Emergency Plan" template). The Operations Manager (or designate) ensures that a site-specific Facility Emergency Plan is established and kept up-to-date for each facility in the Hub.

5.2 OCWA has established a list of mandatory contingencies for potential emergency situations or service interruptions. These are:

- Unsafe Water
- Loss of Service
- Security Breach
- Spill Response
- Critical injury
- Critical shortage of staff

The Operations Manager (or designate) ensures that a site-specific contingency plan defining the processes for response and recovery is in place for each of the mandatory contingencies (as applicable) and that additional contingency plans to address site-specific risks and hazards are identified and developed.

Site-specific contingencies for the *Manitouwadge Drinking Water System* include:

- *Adverse Water Quality SOP*

5.3 Each contingency plan must be reviewed at a minimum annually and at least one plan must be tested each year. Training on the Facility Emergency Plan is provided on an ongoing basis.

5.4 Roles and responsibilities for emergency management at OCWA operated facilities are set out in the Facility Emergency Plan under the "Roles and Responsibilities" section. Specific roles and responsibilities related to a particular emergency situation or service interruption, including those of the owner where necessary, are set out in the relevant contingency plan. Additional information on emergency roles and responsibilities may also be contained in OCWA's operating agreements with the municipal owner.

5.5 Relevant sections of the Municipal Emergency Plan, which may also contain additional information on emergency roles and responsibilities, are contained in the "Appendices" section of the Facility Emergency Plan and are incorporated into contingency plans when appropriate.

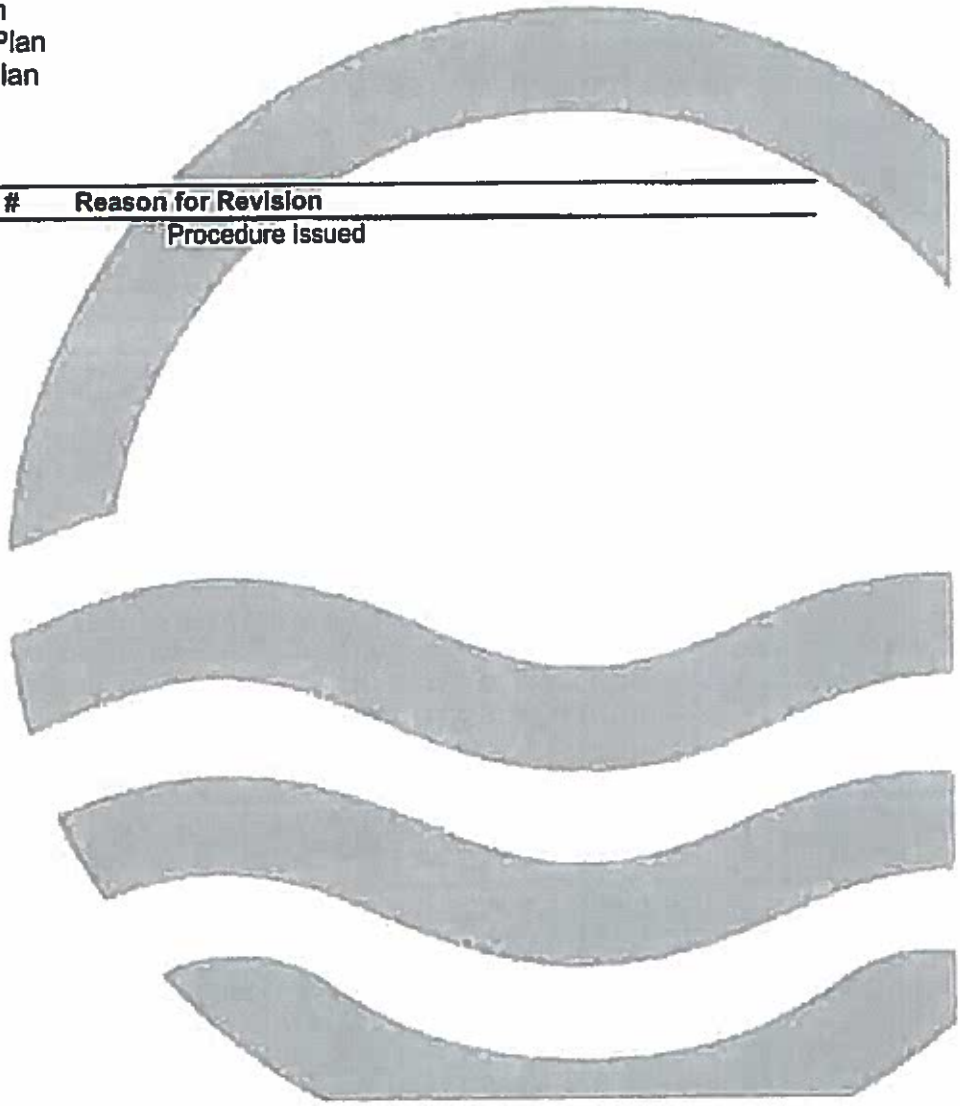
5.6 An emergency contact list is contained within the Facility Emergency Plan and is updated at least annually. Protocols for communication during emergency situations or service interruptions are set out in the individual contingency plans and in OCWA's Emergency Response Plan.

6.0 Related Documents

Facility Emergency Plan
Emergency Response Plan
Municipal Emergency Plan

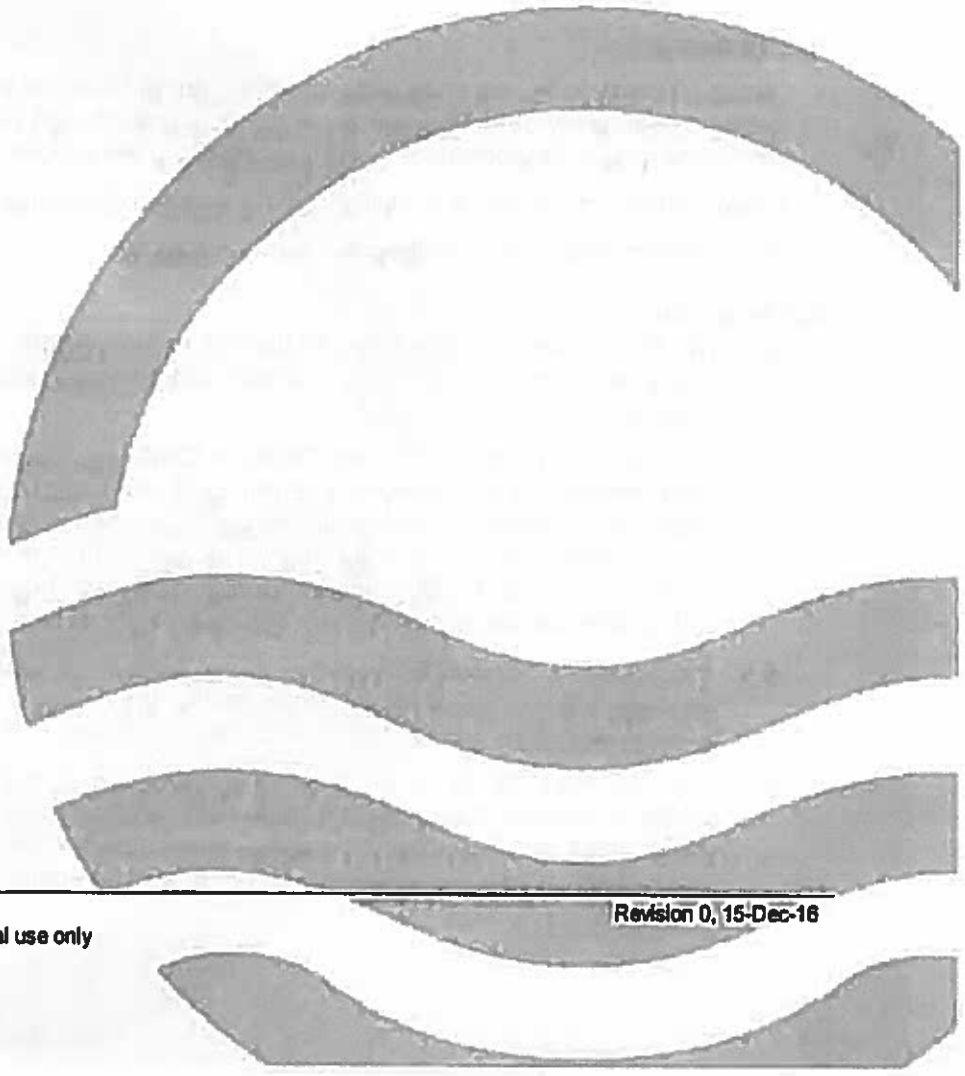
7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure Issued



Appendix K

QP-10 Internal QEMS Audits



INTERNAL QEMS AUDITS

1.0 Purpose

To describe the procedure for conducting internal audits at the facility level that evaluate the conformance of OCWA's Quality & Environmental Management System (QEMS) to the requirements of the Drinking Water Quality Management Standard (DWQMS).

2.0 Scope

This applies to all activities within the scope of the QEMS implemented at the *Manitouwadge Drinking Water System*, as documented in the Operational Plan.

Note: this procedure does not include the facility's internal compliance audits conducted in accordance with OCWA's Internal Audit Program.

3.0 Responsibility

Operations Manager
Corporate Compliance Group
Process & Compliance Technician (PCT)

4.0 Definitions

Internal QEMS Audit – a systematic and documented internal verification process that involves objectively obtaining and evaluating documents and processes to determine whether a quality management system conforms to the requirements of the DWQMS

Internal Auditor – person with skills, training and/or experience to conduct an internal audit

Non-Conformance – non-fulfillment of a requirement

5.0 Procedure

5.1 The Operations Manager ensures that an internal QEMS audit is conducted for the facility on an annual basis by personnel with adequate skills, training and/or experience.

5.2 In consultation with Operations, OCWA's Corporate Compliance Group establishes the audit criteria and develops the internal audit protocol to be used by the facility's auditor(s). Protocol questions are designed to encompass all of the requirements of the DWQMS. Additional information is included in the protocol to provide clarification on the purpose and application of the requirement. The protocol is reviewed annually and updated as necessary by the Corporate Compliance Group.

5.3 The auditor(s) reviews the facility's approved policies and procedures, the results of previous internal and external QEMS audits, the status of corrective and preventive actions and other QEMS-related documentation prior to the audit.

5.4 The auditor(s) follows the audit protocol and engages in activities that may include asking questions, observing operations and reviewing documents and records. Non-conformities with reference to specific documents and details are recorded on the audit protocol along with any additional comments and suggestions.

5.5 Upon completion of the final audit report, the auditor(s) reviews the results and identified nonconformities with the Operations Manager. The audit report and supporting documentation are filed by the QEMS Representative and retained as per QP-01 Document and Records Control.

5.6 When a Non-Conformance is identified through the internal audit process, an action plan to rectify the issue is developed by the Operations Manager or designate, specifying responsibility and a target date for resolution. The Operations Manager or designate monitors progress of the action plan related to the identified Non-Conformance until it is fully resolved.

The QEMS Representative ensures that any necessary revisions to QEMS procedures and policies are completed and communicated to relevant facility personnel.

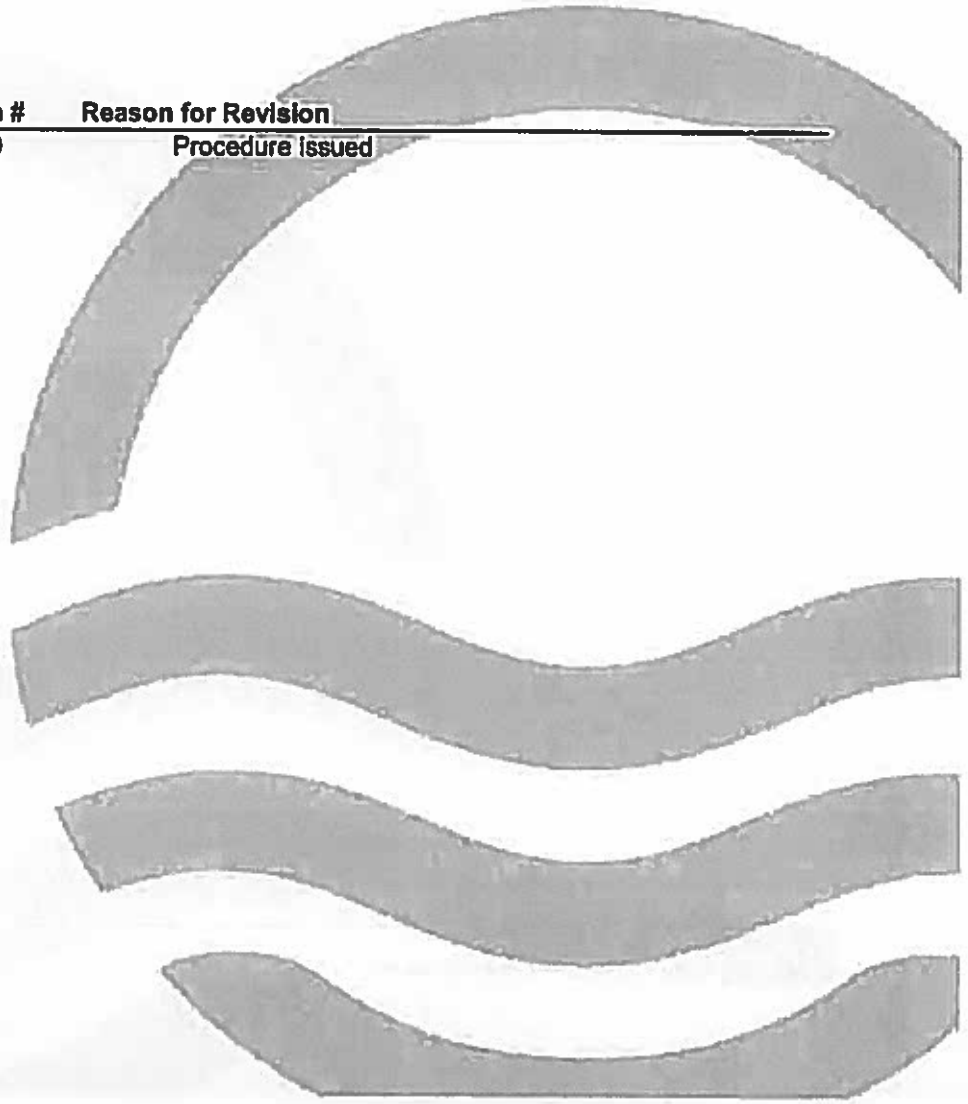
5.7 The QEMS Representative ensures that results of the audit are included as input to the management review process.

6.0 Related Documents

Internal Audit Protocol
Audit Reports
Action Plans
QP-01 Document and Records Control

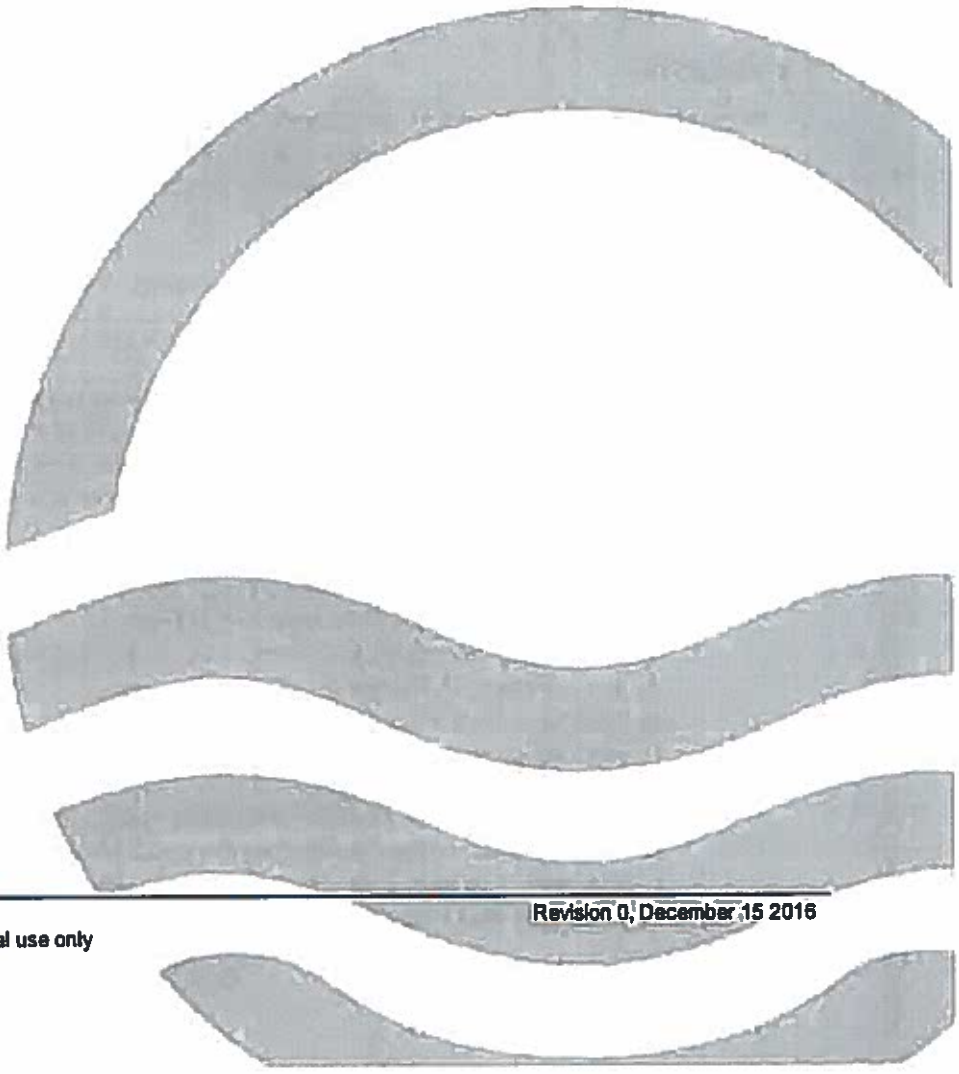
7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure issued



Appendix L

QP-11 Management Review



MANAGEMENT REVIEW

1.0 Purpose

to describe the procedure for conducting a Management Review of the Quality & Environmental Management System (QEMS) at the facility level.

2.0 Scope

Applies to the review of the QEMS implemented at the *Manitouwadge Drinking Water System.*

3.0 Responsibility

Top Management (facility level):

- Operations Manager

Other Management Review Participants:

- Process & Compliance Technician (PCT)
- Senior Operator
- Safety, Process and Compliance Manager (as required)

4.0 Definitions

Management Review – a formal (documented) meeting conducted at least once every 12 months by Top Management to evaluate the continuing suitability, adequacy and effectiveness of OCWA's Quality & Environmental Management System (QEMS)

5.0 Procedure

5.1 The Operations Manager determines a suitable frequency for Management Review meetings for the drinking water system. As a minimum, reviews must be conducted at least once every 12 months.

Management Reviews for more than one drinking water system may be conducted at the same meeting provided the systems belong to the same owner and the considerations listed in section 5.2 below are taken into account for each individual system and documented in the Management Review meeting minutes.

5.2 The standing agenda for Management Review meetings is as follows:

a) Incidents of regulatory non-compliance,
b) Incidents of adverse drinking water tests,
c) Deviations from critical control limits and response actions,
d) The efficacy of the risk assessment process,
e) Internal and third-party audit results,
f) Results of emergency response testing,
g) Operational performance,
h) Raw water supply and drinking water quality trends,
i) Follow-up on action items from previous Management Reviews,
j) The status of management action items identified between reviews,
k) Changes that could affect the QEMS,

l) Consumer feedback,
m) The resources needed to maintain the QEMS,
n) The results of the infrastructure review,
o) Operational Plan currency, content and updates, and
p) Staff suggestions.

The QEMS Representative coordinates the Management Review and distributes the agenda with identified responsibilities to participants in advance of the Management Review meeting along with any related reference materials.

5.3 The Management Review participants review the data presented and make recommendations and/or initiate action plans to address identified deficiencies as appropriate.

5.4 The QEMS Representative ensures that minutes of and action plans resulting from the Management Review meeting are prepared and distributed to the appropriate OCWA management (including the Regional Manager) and personnel and the township.

5.5 The Operations Manager or designate monitors the progress and documents the completion of action plans resulting from the Management Review.

6.0 Related Documents

Minutes and action plans resulting from the Management Review

7.0 Revision History

Date	Revision #	Reason for Revision
15-Dec-16	0	Procedure issued