ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

The City of Temiskaming Shores

MULTI-FACILITY OPERATIONAL PLAN

for the *Haileybury and New Liskeard Drinking Water Systems*

Updated: June 24, 2024

This Operational Plan is designed for the exclusive use of the system(s) specified in this Operational Plan.

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.

QEMS

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Reviewed by: I. Bruneau, QEMS Representative | Approved by: B. Logan, Sr. Operations Manager

1. Purpose

To document OCWA's Quality & Environmental Management System (QEMS). This Operational Plan defines and documents the QEMS for the Temiskaming Shores Drinking Water Systems 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).

2. Definitions

Drinking Water Quality Management Standard (DWQMS) – has the same meaning as Quality Management Standard for Drinking Water Systems approved under section 21 of the Safe Drinking Water Act (SDWA).

Operational Plan – means the operational plan required by the Director's Direction.

Quality & Environmental Management System (QEMS) – a system to:
a) Establish policy and objectives, and to achieve those objectives; and
b) Direct and control an organization with regard to quality.

Ministry - means the Ontario government ministry responsible for the administration of the SDWA.

3. Procedure

3.1 The Temiskaming Shores Drinking Water Systems are owned by the City of Temiskaming Shores.

OCWA is the contracted Operating Authority for the Temiskaming Shores Drinking Water Systems which includes the following facilities:

Haileybury Drinking Water System
- Haileybury water treatment plant and reservoir;
- Haileybury distribution system.

New Liskeard Drinking Water System
- New Liskeard water treatment plant;
- New Liskeard distribution system including the Shepherdson Road reservoir and the Dymond reservoir.

3.2 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.

3.3 The Operational Plan for the facilities listed above fulfils the requirements of the Ministry's DWQMS. The 21 QEMS Procedures within this Operational Plan align with the 21 elements of the DWQMS.

4. Related Documents

Ontario's Drinking Water Quality Management Standard, as amended from time to time
All QEMS Procedures and Documents referenced in this Operational Plan

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-01 was originally set out in the main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Addition of new wording (s. 3.3) to clarify that the Operational Plan now aligns with the 21 elements of the DWQMS.
Sep. 30, 2019	1	Updated MOECC to MECP.
Jun. 24, 2024	2	Procedure updated definition of DWQMS, added definition of Ministry as the Ontario government ministry responsible for drinking water and environmental legislation to alleviate need for future revisions if/when the Ministry experiences name changes, added "as amended from time to time directly following reference to Ontario's DWQMS to point to the most current version of the document. Removed watermark.

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) POLICY

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

1. Purpose

To document a QEMS Policy that provides the foundation for OCWA's Quality & Environmental Management System.

2. Definitions

Quality Management System Policy – means the policy described in Element 2 developed for the Subject System or Subject Systems

3. Procedure

3.1 The Ontario Clean Water Agency, its Board of Directors, Officers and entire staff are committed to the principles and objectives set out in our QEMS Policy.

OCWA's Policy is to:

- Deliver safe water and wastewater services that protect public health, the environment, and the sustainability of communities.
- 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.

Originally issued as Environmental Policy on June 8, 1995
Last revised, approved by OCWA's Board of Directors on April 4, 2024
(This policy is annually reviewed)

3.2 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).

3.3 OCWA's QEMS Policy is readily communicated and available to all OCWA personnel, through OCWA's intranet. The Owner and the members of the public can access the policy through OCWA's public website (www.ocwa.com). A hardcopy of the QEMS Policy is posted as specified in the OP-05 Document and Records Control procedure.

3.4 Essential suppliers and service providers are advised of OCWA's QEMS Policy as per the OP-13 Essential Supplies and Services procedure.

3.5 Corporate Compliance coordinates the annual review and approval of the QEMS Policy by the Board of Directors and communicates the approval to all OCWA employees via an electronic communication.

3.6 The current version of the policy indicates the date of the last revision and that the policy is annually reviewed. Electronic and hard-copy documents that include the QEMS Policy will only be required to be updated in years when the Policy has been revised. A complete review/revision history of the QEMS Policy (documenting the annual policy review and/or revision approval date)) is accessible to all staff on OCWA's intranet and is available upon request for external stakeholders.

4. Related Documents

Current QEMS Policy (Posted on OCWA's intranet and internet)
QEMS Policy Revision History (Posted on OCWA's intranet)
OP-05 Document and Records Control
OP-13 Essential Supplies and Services

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Section 3.4, 3.5 and 3.6 were added to the information originally set out in the main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). New sections: Purpose, Definitions, Procedure, Related Documents and a separate Revision History. Minor revisions to wording in s. 3.3 to reference location of posted copy of the policy. Added sections on how annual policy review is conducted (s. 3.5 and s. 3.6) and reference to OP-13 ESS (s. 3.4). The full revision history for the QEMS policy is available on OCWA's intranet.
May 30, 2023	1	Revised Step 3.1 to remove the word "approved" from the statement "Last revised, approved by OCWA's Board of Directors on April 6, 2016". Reviews and approvals of the policy are conducted by the board every year.
Jun. 24, 2024	2	The first bullet of the QEMS Policy (approved in 2016) was revised to align with OCWA's updated Mission statement. Sections 3.3 and 3.6 were modified to add information/clarify how to access the QEMS Policy and the Policy revision history document. Removed watermark.

COMMITMENT AND ENDORSEMENT

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

1. Purpose

To document the endorsement of the Operational Plan for the Temiskaming Shores Drinking Water Systems by OCWA Top Management and the City of Temiskaming Shores (Owner) and to set out when re-endorsement would be required.

2. Definitions

Top Management – a person, persons or a group of people at the highest management level within an Operating Authority that makes decisions respecting the QMS and recommendations to the Owner respecting the Subject System or Subject Systems

3. Procedure

3.1 The Operational Plan is provided to OCWA Top Management and to the Owner for endorsement. The signed written endorsement is presented in Appendix OP-03A. At a minimum, two members of Top Management must endorse the Operational Plan; however, the Operational Plan is made available to all members of Top Management in the specified document control location (refer to OP-05 Document and Records Control). Endorsement by OCWA's Top Management is represented by the Senior Operations Manager and the Safety Process and Compliance Manager or the Regional Hub Manager.

Endorsement by the Owner is represented by the Mayor and the Municipal Clerk.

3.2 Any major revision of the operational plan will be re-endorsed by OCWA Top Management and the Owner. Major revisions include:

1. A revision to OCWA's QEMS Policy;
2. A change to both representatives of the facility's Top Management and/or both of the Owner's representatives that endorsed the Operational Plan;
3. A modification to the drinking water system processes/components that would require a major change to the description in OP-06 Drinking Water System;
4. The addition of a drinking water subsystem owned by the same Owner to this operational plan.

Any other changes would be considered a minor change and would not require the Operational Plan to be re-endorsed.

4. Related Documents

OP-03A Signed Commitment and Endorsement
OP-05 Document and Records Control

OP-06 Drinking Water System

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-03 was originally set out in the main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). Procedure provides information on who from Top Management endorses the Operational Plan (s. 3.1); when owner re-endorsement is sought and 'criteria' as to what is considered a major revision to the Plan (s. 3.2). Appendix OP-03A includes the Owner and Top Management sign-off section.
Jan. 24, 2019	1	Updated step 3.1 to include representatives of the Owner who are responsible for re-endorsement of the Operational Plan and changed step 3.2.3 by adding "major" changes in the system description will require re-endorsement of the Plan.
Jun. 24, 2024	2	Updated step 3.1 to include the Safety Process and Compliance Manager as a member of Top Management that can endorse the plan. Removed watermark.

QEMS Ontario Clean Water Agency	**OPERATIONAL PLAN** Temiskaming Shores Drinking Water Systems	QEMS Doc: OP-03A Rev Date: 2024-06-24 Rev No: 2 Pages: 1 of 1

SIGNED COMMITMENT AND ENDORSEMENT

This Operational Plan sets out the framework for OCWA' Quality & Environmental Management System (QEMS) that is specific and relevant to your drinking water system(s) and supports the overall goal of OCWA and the City of Temiskaming Shores (Owner) 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 Temiskaming Shores Drinking Water Systems (DWSs) - Haileybury DWS and New Liskeard DWS - and will do so in a manner that ensures compliance with applicable legislative and regulatory requirements.

Through the endorsement of this Operational Plan, the Owner commits to work with OCWA to facilitate this goal.

OCWA Top Management Endorsement

Bryce Logan
Senior Operations Manager,
Temiskaming Shores Cluster

July 11/24
Date

Eric Nielson
Regional Hub Manager,
Northeastern Ontario Regional Hub

July 15/24
Date

Owner Endorsement

Logan Belanger
Municipal Clerk, City of Temiskaming Shores

July 10/24
Date

Jeff Laferriere
Mayor, City of Temiskaming Shores

July 10/24
Date

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) REPRESENTATIVE

Reviewed by: I. Bruneau, QEMS Representative	Approved by: Y. Rondeau, SPC Manager

1. Purpose

To identify and describe the specific roles and responsibilities of the QEMS Representative(s) for the Temiskaming Shores Drinking Water Systems.

2. Definitions

None

3. Procedure

3.1 The role of QEMS Representative for the Temiskaming Shores Drinking Water Systems is the Process and Compliance Technician (PCT). The Safety, Process and Compliance Manager (or alternate PCT) will act as an alternate QEMS Representative when required.

3.2 The QEMS Representative is responsible for:

- Administering the QEMS for the Temiskaming Shores Drinking Water Systems by ensuring that processes and procedures needed for the facility's QEMS are established and maintained;
- Reporting to Top Management on the facility's QEMS performance and identifying opportunities for improvement;
- Ensuring that current versions of documents related to the QEMS are in use;
- Promoting awareness of the QEMS to all operations personnel; and
- In conjunction with Top Management, ensuring that operations personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the system.

4. Related Documents

None

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-04 was originally set out in the main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Change to responsibilities: Operations Manager no longer considered QEMS Representative and SPC Manager to act as alternate as required (s. 3.1); added wording to clarify shared responsibilities for Top Management and QEMS Representative to ensure operations personnel are aware of applicable legislative and regulatory requirements (s. 3.2).

DOCUMENT AND RECORDS CONTROL

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

1. 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. This procedure applies to QEMS Documents and QEMS records pertaining to the Temiskaming Shores Drinking Water Systems as identified in this procedure.

2. 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

3. Procedure

3.1 Documents and records required by OCWA's QEMS and their locations are listed in Appendix OP-05A Document and Records Control Locations.

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

3.3 Controls for the Operational Plan include the use of an authorized approval and a header on every page that includes a title, alpha-numeric procedure code, revision date, revision number and page numbers. A revision history is also included at the end of each procedure.

Authorized personnel responsible for the review and approval of this Operational Plan are:

Review: QEMS Representative, Operations Supervisor or ORO
Approval: Safety Process and Compliance Manager or Senior Operations Manager

The QEMS Representative ensures that updated documents are provided to the above authorized personnel for review or approval prior to issuance. Authorized personnel authenticate their review/approval of this Operational Plan via email.

3.4 The QEMS Representative is responsible for ensuring that current versions of QEMS documents are being used at all times. Current QEMS documents and records are readily accessible to operations personnel and to internal and external auditors/inspectors at established document control locations. The currency of internal documents is ensured by comparing the date on the document to that of the master hardcopy and/or electronic copy residing in the designated document control location(s) specified in Appendix OP-05A.

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.

3.5 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 through a number of established mechanisms and practices such as daily back-up of files stored on servers, password expiry, limitations on login attempts, multi-factor authentication and policies outlining specific conditions of use.

Access to facility QEMS records contained within internal electronic databases and applications (e.g., Wonderware, OPEX, PDM, WMS) is administered by designated application managers/trustees, requires the permission of Operations Management and is restricted through use of usernames and passwords. Records are protected by means of regular network back-ups of electronic files stored on servers and/or within databases.

Plant SCADA records are maintained as per Appendix OP-05A and are accessible when required. SCADA records are stored on a quadruple redundant hard drive. Data can be retrieved from reports generated by the SCADA computer which is password protected or hard copy reports which are printed daily by operators and kept at the Haileybury water treatment plant. Data can also be retrieved from E&H data loggers.

The SCADA system is located in secured, locked buildings with limited authorized access. The buildings are equipped with alarm systems and security cameras.

3.6 Any employee of the drinking water system may make a verbal or written request for a revision to improve an existing internal QEMS document or request the preparation of a new document. These requests are to be made to the QEMS Representative and should indicate the reason for the 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 operations 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, memos and/or provincial, regional hub/cluster or facility-level training sessions.

3.7 When a QEMS document is superseded, the hardcopy and/or electronic copy of the document is promptly removed from the applicable designated document control location specified in OP-5A for disposal or retention (as appropriate).

3.8 The authorized method for disposal of hardcopy documents and records after the specified retention requirements have been met is shredding. The QEMS Representative or delegate is authorized to shred the old version of the hardcopy document.

The authorized method for electronic documents and records are to re-locate them to an obsolete folder and mark them "superseded". They may be deleted after specified retention requirements have been met. The QEMS Representative is authorized to supersede the electronic document and locate it in the obsolete folder.

3.9 QEMS documents and records are retained in accordance with applicable regulations and legal instruments. Relevant regulatory and corporate minimum retention periods are as follows:

Type of Document/Record	Minimum Retention Time	Requirement Reference
Operational Plan (OP-01 to OP-21 and appendices, including Schedule "C" – Subject System Description Form) Facility Emergency Plan (FEP) Long term forecast of major infrastructure maintenance, rehabilitation and renewal activities Sampling schedule	10 years	Director's Direction under SDWA
Internal QEMS Audit Results	10 years	OCWA Requirement
External QEMS Audit Results	10 years	OCWA Requirement
Management Review Documentation	10 years	OCWA Requirement
Documents/records required to demonstrate conformance with the DWQMS (specifically documents/records listed in OP-05A)	3 years* if no specified legislative requirement identified in this table or in the facility's legal instruments	OCWA Requirement
Log Books or other record-keeping mechanisms	5 years	O. Reg. 128/04

Type of Document/Record	Minimum Retention Time	Requirement Reference
Training Records for water operators and water quality analysts	5 years	O. Reg. 128/04
Operational checks, sampling and testing (e.g., chlorine residuals, turbidity, fluoride, sampling records), microbiological sampling and testing and chain of custodies	2 years	O. Reg. 170/03
Schedule 23 & 24 sampling, chain of custodies and test results	6 years LMR 15 years SMR	O. Reg. 170/03
THM, HAA, nitrates, nitrites and lead program (including pH and alkalinity) sampling, chain of custodies, and test results, Section 11 Annual Reports and Schedule 22 Summary Reports	6 years	O. Reg. 170/03
Sodium sampling, chain of custody and test results and related corrective action records/reports, 60 month fluoride sampling, chain of custody and test results (if the system doesn't fluoridate), Engineering Reports, GUDI/Non-GUDI Reports	15 years	O. Reg. 170/03
Corrective action records/reports for E. Coli, Total Coliforms and bacterial species	2 years	O. Reg. 170/03
Corrective action records/reports for chemical and radiological parameters under SDWA O. Reg. 169/03, pesticides not listed under O. Reg. 169/03 and health-related parameters in an order or approval	6 years (LMR) 15 years (SMR)	O. Reg. 170/03
Flow Meter Calibration Records, Analyzer Calibration Reports Maintenance Records/Work Orders	2 years	O. Reg. 170/03
Records by or created in accordance with the Municipal Drinking Water Licence (MDWL) or Drinking Water Works Permit (DWWP). Except records specifically referenced in O. Reg. 170/03 or otherwise specified in the MDWL or DWWP.	5 years	MDWL
Ministry forms referenced in the DWWP, including Form 1, Form 2, Form 3 and Director Notifications (applies to forms that have been completed by OCWA as the authorized by the owner)	10 years	DWWP

3.10 The Operational Plan is reviewed for currency by the QEMS Representative during internal/external audit and Management Review processes. Other QEMS-related

documents are reviewed as per the frequencies set out in this Operational Plan or as significant changes (e.g., changes in regulatory requirements, corporate policy or operational processes and/or equipment, etc.) occur. QEMS documents and records are reviewed for evidence of control during each internal system audit as per OP-19 Internal QEMS Audits.

4. Related Documents

OP-05A Document and Records Control Locations
OP-19 Internal QEMS Audits
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Sep. 17, 2010	1	Procedure for keeping documents current.
Apr. 14, 2011	2	Update to follow Corporate template.
Jun. 26, 2012	3	Correction of Process Compliance Manager's title; clarification of responsibility and method of maintaining currency of documents (5.4); description of how network security is maintained (5.5); clarification of retention times (5.9); inclusion of the operation plan review (5.10);updated Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Mar. 11, 2013	4	Removed reference to Process Compliance Manager, as this position has been discontinued, updated location of some documents.
Apr. 12, 2013	5	Updated Table 1 to include a second location to which the public can access the Operational Plan.
Sep. 08, 2017	6	Changed Water Treatment Systems to Drinking Water Systems. Replaced Operations Manager with Senior Operations Manager. Added new position for Safety, Process and Compliance Manager. Removed Team Lead. Changed PDC to PDM/WISKI 7 and Hansen to Maximo. Added "verbally" to documents revision requests (step 5.6). Updated Table 1 to include OCWA's Safety Manual, Action Analysis form, Contingency Plan Review/Test Summary Form, QEMS – Summary of Findings Form, Operator certificates (City), MOECC Forms (Form 1,2,3 and Director Notification) Distribution Repair and Maintenance forms, Tailgate forms and Quarterly Operation Reports, removed City website as a controlled location or the Town.
Aug. 28, 2018	7	QP-01 procedure renamed OP-05. Removed Scope and Responsibilities sections. Moved the former Table 1 (Designated location for documents and records required by OCWA's QEMS) to its own appendix (OP-05A). Assigned responsibility for ensuring current versions of QEMS documents are being used to the QEMS Representative (s. 3.4). Clarified that requests for revisions/new

Date	Revision #	Reason for Revision
		QEMS documents are made to the QEMS Representative (s. 3.6). Moved the former Table 2 (Relevant regulatory and corporate minimum retention periods) to be part of s. 3.9 and expanded on the minimum retention times for documents and records required to demonstrate compliance with legislation. Other minor wording changes.
Sep. 30, 2019	8	Added Step 3.8 to describe how superseded electronic documents are managed.
Sep. 1, 2022	9	Procedure updated Added: clarity to version control requirements to align with the Director's Directions dated May 2021, detail to the approval process for Operational Plan. Updated: the table in section 3.9 (clarified minimum retention time requirements for documents/records required to demonstrate conformance with the DWQMS, added forms required by the MDWL and DWWP, including their minimum retention times and requirement reference). Updated step 3.7 to clarify who has the authority to supersede electronic copies of documents and who can shred hardcopies of documents.
May 30, 2023	10	Procedure updated to change position of Team Lead to Operations Supervisor and to update the review and approval process for the Operational Plan in Step 3.3.
Jun. 24, 2024	11	Procedure updated to add multi factor authentication to Step 3.5. Table in Step 3.9 revised to include Schedule 23 & 24 records retention times for Large Municipal Residential (LMR) and Small Municipal Resident (SMR) systems, added chain of custody as record for retention for various sampling requirements, lead program clarified to include pH and alkalinity; added GUDI/Non-GUDI Reports. Removed watermark.

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

Designated locations for documents and records required by OCWA's QEMS

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Internal QEMS Documents	
Confined Space Programs	HC - Haileybury Water Treatment Plant
Corporate Emergency Response Plan (CERP)	EC - OCWA's Sharepoint site https://ocwa365.sharepoint.com
Facility Emergency Plan (FEP) Binder (includes Emergency Contact List, Essential Supplies and Services List, OCWA's Emergency Communications Protocol, Contingency Plans, Site Specific Emergency Procedures and OCWA's Emergency Management Program)	HC - Haileybury & New Liskeard Water Treatment Plants
OCWA's Health & Safety Management System	EC - OCWA's Sharepoint Site https://ocwa365.sharepoint.com
On-call Schedule	EC - Microsoft Outlook Shared Calendar
Operational Plan (OP-01 to OP-21 and appendices, including Schedule "C" – Subject System Description Form)	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems EC - Municipal Office (City Hall) HC - Haileybury Water Treatment Plant
ORO Letter	EC - \\ocwfilereg\NEO Collab\NEO DWQMS
QEMS Policy	EC - OCWA's public website www.ocwa.com & OCWA's Sharepoint Site (https://ocwa365.sharepoint.com) HC - Haileybury Water Treatment Plant
Sample Schedule	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems HC - Haileybury & New Liskeard Water Treatment Plants
Vacation Calendar	EC - Microsoft Outlook Shared Calendar
Internal QEMS Forms (blank)	
Analysis and Action Plan (AAP) Form	EC - \\ocwfilereg\NEO Collab\NEO DWQMS
Community Complaint Form	
Contingency Plan Review/Test Summary Form	
Distribution Maintenance and Repair Form	
Environmental Incident Report Form	
Facility Rounds Sheets	
Incidents of Non-Compliance Form	
Instrumentation Calibration/Maintenance Report Form	
Laboratory Chain of Custody Forms	
Loss of Pressure Incident Form	
QEMS – Summary of Findings Spreadsheet	

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Tailgate Meeting Form	
Watermain Commissioning Form	
External QEMS Documents	
American Water Works Association (AWWA) Standards (as referenced in the DWWP) & Ontario's Watermain Disinfection Procedure	EC - \\ocwfilereg\NEO Collab\NEO DWQMS
ANSI/NSF product registration documentation for Chemicals/Materials Used	EC - https://info.nsf.org/Certified/PwsChemicals/
Applicable Federal and Provincial Legislation	Provincial Online at www.e-laws.gov.on.ca Federal online at www.laws.justice.gc.ca
DWQMS Standard	EC - https://www.ontario.ca
Engineering schematics/plans/drawings	HC - Haileybury & New Liskeard Water Treatment Plants
Equipment Operation /Maintenance Manuals	HC - Haileybury & New Liskeard Water Treatment Plants EC - Internet
Legal Instruments: Municipal Drinking Water Licence (MDWL) / Drinking Water Works Permit (DWWP) / Permit to Take Water (PTTW)	HC - Haileybury & New Liskeard Water Treatment Plants EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Ministry Inspection Reports	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Municipal By-laws	Municipal Office
Operations Manual (including standard operating procedures)	HC - Haileybury & New Liskeard Water Treatment Plants
Operations Manual for Distribution System (including procedures and forms)	HC - Temiskaming Shores Public Works Department
Operator Certificates (OCWA)	HC - Haileybury Water Treatment Plant
Operator Certificates (City)	HC - City of Temiskaming Shores Public Works
External QEMS Forms (blank)	
Adverse Water Quality Incident (AWQI) Form	EC - \\ocwfilereg\NEO Collab\NEO DWQMS
Ministry forms referenced in the Drinking Water Works Permit, including Form 1, Form 2, Form 3 and Director Notifications	EC - \\ocwfilereg\NEO Collab\NEO DWQMS
QEMS Records	
Adverse Water Quality Incident (AWQI) Reports	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Analysis and Action Plan (AAP) Report	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Annual Compliance / Summary Reports for Municipalities	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Audit Reports - External	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Audit Reports - Internal	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Call Back Reports	EC - Workplace Management System (Maximo)
Confined Space Records (Entry Permits/Co-ordination Documents)	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\NEO - Health and Safety
Community Complaint Records	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Contingency Plan Review/Test Results	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Cluster - Common
Distribution Maintenance and Repair Records	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Environmental Incident Reports	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Facility Logbooks	HC - Haileybury & New Liskeard Water Treatment Plants and Reservoirs (old versions) HC - Temiskaming Shores Public Works Department
Facility E-Logbooks	EC - https://ocwa.eriscloud.com/ EC - eRIS Application (mobile or tablet device)
Facility Visitor Logbook	HC - Haileybury & New Liskeard Water Treatment Plants
Facility Rounds Sheets	HC - Haileybury Water Treatment Plant HC - Temiskaming Shores Public Works Department (distribution records)
Generator Maintenance Sheets	HC - Haileybury Water Treatment Plant – Facility Binders
Incidents of Non-Compliance Records	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Infrastructure Review (Capital Letter & Capital/Major Maintenance Recommendations)	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Laboratory Analytical Reports and completed Chain of Custody Forms	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Loss of Pressure Incident Report	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Maintenance & Calibration Records (completed WMS work orders)	EC - Workplace Management System (WMS)
Management Review Documentation	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Ministry Forms (Form 1, Form 2, Form 3 and Director Notifications)	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Operator Training Records (OCWA)	EC - OCWA's Training Summary Database

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Operator Training Records (City)	HC - City Hall
QEMS Communications - External	EC - Microsoft Outlook E-mail
QEMS Communications - Internal	EC - Microsoft Outlook E-mail
QEMS – Summary of Findings Record	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
Quarterly Operations Reports (to the Owner)	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems
SCADA Records (Wonderware, OCWA)	EC - maintained through Wonderware
SCADA Records (Plant SCADA, Client Owned)	EC - maintained through SCADA network
Tailgate Records	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\NEO - Health and Safety
Watermain Commissioning Records	EC - \\ocwfilereg\NEO Collab\NEO DWQMS\DWQMS - Temiskaming Shores Water Treatment Systems

Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	7	Appendix issued; Table was originally included within the Document and Records Control Procedure (QP-01) (revision 6, dated September 9, 2017). Added section for blank external QEMS forms, changed location for Confined Space Program and Operational Plan and changed name of OCWA's Safety Manual to OCWA's Health and Safety Management System and its location, added Distribution Manual, distribution records and Water Report.
Jan. 24, 2019	8	Table updated to include operator certificates and training records for City staff and to add reservoir as a designated location for logbooks.
Sep. 30, 2019	9	Added OCWA's Emergency Communication Protocol to documents identified with the FEP binder, removed OCWA's Reference Manual, added Loss of Pressure Incident Report under document/records and updated MOECC to MECP.
Oct. 2, 2020	10	Updated location of SCADA records from Outpost5/Wonderware to SCADA computer and back-up hard drives
Aug. 24, 2021	11	Updated designated location for Confined Space Records and Tailgate Reports. Added controlled locations for a Visitor's Logbook and OCWA's new e-logbook. Changed link to the NEO DWQMS public drive.
Sep. 1, 2022	12	Clarified which documents are included under the Operational Plan, clarified locations for maintenance and calibration records, added locations for plant schematics/plans/drawings, ANSI/NSF chemical

Date	Revision #	Reason for Revision
		registration and plant SCADA records. Changed location of the Operational Plan from the Municipal Office to the Municipal website. Changed OCWA's intranet with OCWA's Sharepoint site. Changed Water Report to Distribution and Maintenance Form. Added row to header to show who reviewed and approved the document.
May 30, 2023	13	Updated table to include generator maintenance sheets which are located in facility binders at the Haileybury WTP.
Jun. 24, 2024	14	Updated Corporate Emergency Plan (CERP) name and change MECP to Ministry. Added an electronic location for the systems MDWL, DWWP and PTTW and corrected the controlled location for the Contingency Plan Review/Test results. Updated location for applicable Provincial and Federal regulations. Updated Call-in Reports to Call Back Reports to reflect reports in Maximo. Added Watermain Commissioning form and records to the table. Removed watermark.

1. Purpose

To document the following for the Temiskaming Shores Drinking Water Systems:

- The name of the Owner and Operating Authority; and
- Provide a description of the system, including all applicable water sources, treatment system processes and distribution system components.

2. Definitions

Distribution System - means the part of a drinking water system that is used in the distribution, storage or supply of water and that is not part of a treatment system.

Primary Disinfection - means a process or series of processes intended to remove or inactivate human pathogens such as viruses, bacteria and protozoa in water.

Secondary Disinfection - means a process or series of processes intended to provide and maintain a disinfectant residual in a drinking water system's distribution system, and in plumbing connected to the distribution system, for the purposes of:

(a) protecting water from microbiological re-contamination;
(b) reducing bacterial regrowth;
(c) controlling biofilm formation;
(d) serving as an indicator of distribution system integrity; and

includes the use of disinfectant residuals from primary disinfection to provide and maintain a disinfectant residual in a drinking water system's distribution system for the purposes described in clauses (a) to (d).

Treatment System - means any part of a drinking water system that is used in relation to the treatment of water and includes,

(a) any thing that conveys or stores water and is part of a treatment process, including any treatment equipment installed in plumbing,
(b) any thing related to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the system, and
(c) a well or intake that serves as the source or entry point of raw water supply for the system;

3. Procedure

Refer to Appendix OP-6A for a description of the facilities included in the Haileybury Drinking Water System.

Refer to Appendix OP-6B for a description of the facilities included in the New Liskeard Drinking Water System.

4. Related Documents

None

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-06 (s. 3) was originally set out in main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 08, 2017). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections.

1.0 Haileybury Drinking Water System Overview

1.1 Owner / Operating Authority

The Haileybury Drinking Water System is owned by the Corporation of the City of Temiskaming Shores and consists of a Class 3 water treatment subsystem and a Class 2 water distribution subsystem. The system is a surface water supply that services the communities of Haileybury and North Cobalt. OCWA is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities.

1.2 Source Water

Raw Water Supply

The water treatment plant is located at 322 Browning Street in Haileybury. It obtains its raw water from Lake Temiskaming through a 197 m long, 450 mm diameter raw water intake pipe that extends168 m into the lake. The intake structure is an upturned bell inside a cribbed structure. The intake is approximately 12.5 m below the low recorded water level and 2 m above the lake bottom.

Water flows into the intake structure by gravity, through two removable inlet screens and is stored in the raw water wet well. The wet well contains a heated superstructure and has a storage volume of 37.2 m3. The low lift pumping station is equipped with three low lift vertical turbine pumps; which operate on an alternating basis. A magnetic flow meter with flow control is located in the water treatment plant to monitor raw water flows. The raw water is also continuously monitored for pH, turbidity and temperature.

General Characteristics

The raw water source for the Haileybury Drinking Water System is Lake Temiskaming. The water from Lake Temiskaming is typically high in turbidity, low in alkalinity and slightly basic having an average pH just above 7.00. Temperature fluctuates significantly through the seasons ranging from approximately 0.5 ºC in the winter to as high as 27 ºC during the summer. Bacteriological analysis of the raw water indicates a source of relatively good quality. Weekly sampling and testing the raw water for microcystins began in 2021 as part of the system's Harmful Algal Bloom Monitoring, Reporting and Sampling Plan. This Plan was required under Condition of the Municipal Drinking Water License 218-102 (issue 3) issued in July 2021.

Lake Temiskaming: *Raw Water Characteristics*

Characteristics	2018		2019		2020		2021		2022	
	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean
E. coli (CFU/100 mL)	<2 - 22	79.7	< 2 - 84	5.75	0 - 105	7.6	<2 - 60	6.61	<2 - 20	5.2
Total Coliforms (CFU/100 mL)	4 - 645	87.9	<2 - >400	104	0 - >1000	165	<1 - >1000	203	<2 - >1000	127
Turbidity (NTU)	0.07 - 40	17	0 - 40	13	0 - 40	17	0 - 40	11	3.0 - 40	9.4
pH	4.0 - 10	7.20	4.0 - 10	7.00	3.92 - 10	7.10	3.92 - 10	7.16	3.92 - 10	7.15

Characteristics	2018		2019		2020		2021		2022	
	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean
Temperature (°C)	0 - 24	9.22	0.3 - 23	9.28	0.1 - 25	8.98	0 - 26	10.9	1.3 – 26.9	13.5
Alkalinity (mg/L)	9 - 72	19.8	6 - 35	17.4	9 - 28	18.9	7 - 214	22.6	7 - 31	15.4
Colour (TCU)	1 - 100	79	1 - 120	87	1 - 90	66	1 - >90	79	5 - 80	36
Microcystins (ug/L)	-	-	-	-	-	-	<0.15 - 0.29	0.157	<0.15 – 0.17	0.15

* Notes:
< = less than the laboratory's method detection limit
> = greater than the laboratory's method detection limit

Common Fluctuations

Raw water turbidity increases during spring runoff and significant rainfall events. As well, water temperature changes significantly from winter to summer. Warm summer temperatures may result in increase of taste and odour concerns. Warmer temperatures can also result in algae blooms and the presence of cyanobacteria. A sampling and monitoring program for microcystins is initiated from June to October each year (began in 2021). Aluminum sulphate and polymer are adjusted accordingly to assist with sedimentation and filtration. The disinfection process also requires timely adjustments to chlorine in response to temperature fluctuations.

Threats

Potential sources of raw water contamination include fuel spills from boats, snow machines or highway traffic. Harmful algae blooms have been identified in Lake Timiskaming and pose a potential threat to the drinking water quality. Other biological contamination from wildlife (eg. beavers) may also be a potential risk.

Operational Challenges

Spring and fall turnover is the greatest operational challenge for the Haileybury water treatment plant. The turnover creates higher demands on process operations. It can affect the source waters alkalinity, pH, temperature, colour and turbidity. Proper operation and adjustment of the treatment process continues to meet the challenges of lake fluctuations.

1.3 Treatment System Description

Water Treatment

Raw water is pumped to the water treatment building where it is injected with sodium carbonate (soda ash) for pH and alkalinity adjustment and aluminum sulphate for the coagulation/ flocculation process. The process water undergoes rapid mixing then flows into two flocculation basins where polymer and pH is continuously monitored. It is then directed to a settling tank for clarification. The process water is directed through three dual media filters consisting of anthracite and silica sand. The filter system is equipped with an automated backwash

sequence, filter-to-waste capabilities, air blower and an underdrain system. The backwash wastewater and the settled solids from the settling tank are discharged to the municipal sewage system. On-line turbidity analyzers are used to monitor the turbidity off each filter.

After filtration, the process water is chlorinated and pH adjusted with soda ash before entering the dual celled clearwell. Three high lift pumps equipped with variable frequency drives (VFDs) are located at the end of the clearwell, where a magnetic flow meter is used to measure flow on the discharge main. In a separate room, with outside access only, a gas chlorine system equipped with automatic switchover is used for post-filtration chlorination in the clearwell. The water leaving the clearwell is continuously monitored for flow, pH, turbidity and free chlorine residual as it is directed to an off-site reservoir.

Water Storage and Pumping Capabilities

The Niven Street reservoir is a baffled contact tank consisting of two reservoirs and one pump chamber that provides sufficient chlorine contact time (CT). The water in the reservoir is monitored for free chlorine residual and level to ensure primary disinfection is achieved. An ammonium sulphate dosing system is used to chloraminate the treated water before being gravity fed or pumped to the distribution system by four high lift pumps equipped with VFDs. The water directed to the pressure zones are continuously monitored for pH, turbidity, pressure and total chorine residual. The gravity fed zone is continuously monitored for flow.

Control System

The Haileybury Water Treatment System is controlled by a dedicated Programmable Logic Controller (PLC) and monitored through a Control System Supervisory Control and Data Acquisition (SCADA) system. All analyzing, monitoring and control module equipment information is routed through the SCADA system for operator monitoring and control. Control of equipment can be accomplished locally using the SCADA computer located at the Haileybury water treatment plant or remotely using operator computers and cell phones. Alarm capability and set point adjustment along with trend monitoring are also available through SCADA system controls.

Emergency Power

A 250 kW diesel generator with a 2000 L fuel tank is available outside of the main water treatment plant and is capable of supplying power to the facility during power failures.

A 200 kW diesel engine generator with a 1000 L fuel tanks is located outside of the Niven Street Reservoir to provide emergency power during emergencies.

Treatment System Process Flow and Instrumentation Diagrams

Refer to Figure 1 and 2 on pages 7 and 8.

1.4 Description of the Distribution System Components

The Haileybury Drinking Water System is classified as a Large Municipal Residential Drinking Water System that provides water to a population of approximately 4,200 residents in the communities of Haileybury and North Cobalt. It is a standalone system not connected to another drinking water system.

The distribution system has approximately 1940 service connections and is comprised of various pipe materials including 4" - 12" cast iron with lead joints or ductile iron, 10" and 12" asbestos cement, and PVC with mechanical joints. There are several isolation valves to allow for the repair and maintenance of selected sections of the distribution system, one air relief valve and four pressure reducing valves. Approximately 174 fire hydrants are connected to the system to aid in fire protection.

The system consists of four pressure zones. Zone 1 is a gravity fed area in downtown Haileybury, Zone 2 is an intermediate pressure region located at higher elevations along the west side of Haileybury, Zone 3 is an controlled pressure system which is fed off of the high pressure system and is located in the central part of Haileybury and North Cobalt and Zone 4 is a high pressure zone in North Cobalt. The water distribution piping system is continuous between the four identified pressure zones; however the various zones are isolated from each other via closed valves.

To maintain disinfection residuals in the distribution system, the following processes are in place:

- The Haileybury distribution system will be, at all times; operated by a person(s) holding a valid operator's certificate.
- All maintenance or repairs conducted in the distribution system will be communicated, in advance to the ORO to ensure disinfection is maintained and that all maintenance and repairs are supervised by a certified operator.
- Regular flushing of the distribution system will be performed.
- The system will be monitored and sampled as required by legislative requirements and any adverse results will be resampled and reported in accordance with the Safe Drinking Water Act and its regulations.
- OCWA, as the operating authority for the distribution system will ensure that treatment equipment that provides secondary disinfection is operated such that, at all times and at all locations in the receiving distribution system, the chlorine residuals are never less than 0.25 mg/L (combined) or 0.05 mg/L (free).

Distribution System Map

Refer to Figure 3 on page 9.

2.0 Related Documents

None

3.0 Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Appendix issued; the drinking water description was originally included within the main body of Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). Updates based on revisions to DWQMS (e.g. removal of critical upstream or downstream processes, separation of systems that provide primary and/or secondary disinfection and systems that do not, for systems that are connected to another system with different owners, must now include which system is relied upon to ensure the provision of safe drinking water). Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Updated the Raw Water Characteristics table with more current data and added temperature and pH results. Made minor updates to the raw water and water treatment descriptions. Revised the distribution description to include the components and the new pressure zone. Updated the Haileybury Reservoir diagram to reflect recent upgrades.
Jan. 24, 2019	1	Raw Water Supply - changed the number and operation of the low lift pumps. Water Treatment - explained the purpose of the raw water chemicals and corrected how the water is directed through he filters.
Sep. 30, 2019	2	Added a flow control valve (FCV) after the raw water flow meter to the Haileybury water treatment plant process flow and instrumentation diagram and extended the waste line from the two sedimentation tanks. Added a pressure transmitter to the Zone 4 discharge line on the reservoir diagram.
Oct. 2, 2020	3	Updated Step 1.1 and 1.5 to include the community of North Cobalt. Revised Step 1.2 to indicate that the raw water is continuously monitored for selected parameters, to include the threat of harmful algae blooms and updated the raw water characteristics in table to include average data from 2014 to 2019. Revised Step 1.3 to indicate that the treated water is continuously monitored for selected parameters and added a new section – Control Systems. Updated Step 1.5 to include valve and hydrant information for the distribution system. Updated the water plant process flow diagram to show the bar screens.

Date	Revision #	Reason for Revision
Aug. 24, 2021	4	Changed the word *riv*er to *lake* in Section 1.2 – Operational Challenges And added fuel tank volumes to the description of the generators to Section 1.3 – Emergency Power.
Sep. 1, 2022	5	Updated section 1.2 to include flow control for the raw water flow meter. Updated the Raw Water Characteristics table in section 1.2 to include data from 2016 and 2021 and removed data from 2014 and 2015. Added microcystins to the table. Updated section 1.3 to indicate that the 3 high lift pumps are equipped with variable frequency drives (VFDs).
May 30, 2023	6	Updated the Raw Water Characteristics table in section 1.2 to include data from 2018 and 2022 and added minimum and maximum data. Updated general characteristics in section 1.2 to discuss pH and microcystins. Removed total chlorine residual monitoring for the gravity zone (Zone 1) from the description and the process flow diagram; operational analyzer, not used for compliance. Included a description of how disinfection residuals are maintained throughout the distribution system in Step 1.4.
Jun. 24, 2024	7	Updated process flow diagrams for the water treatment plant and the reservoir; plant diagram changes include adding temperature to flocculation tank 1 & 2, adding compressor for filter valves and generator and clearly labelling the clearwell. Changes to the reservoir diagram include adding the generator and correcting reservoir numbering (No. 3 to No. 1). Included an updated distribution map.

Figure 1: Haileybury Water Treatment Plant - Process Flow & Instrumentation Diagram

Revision No. 5, Revision Date: June 5, 2024

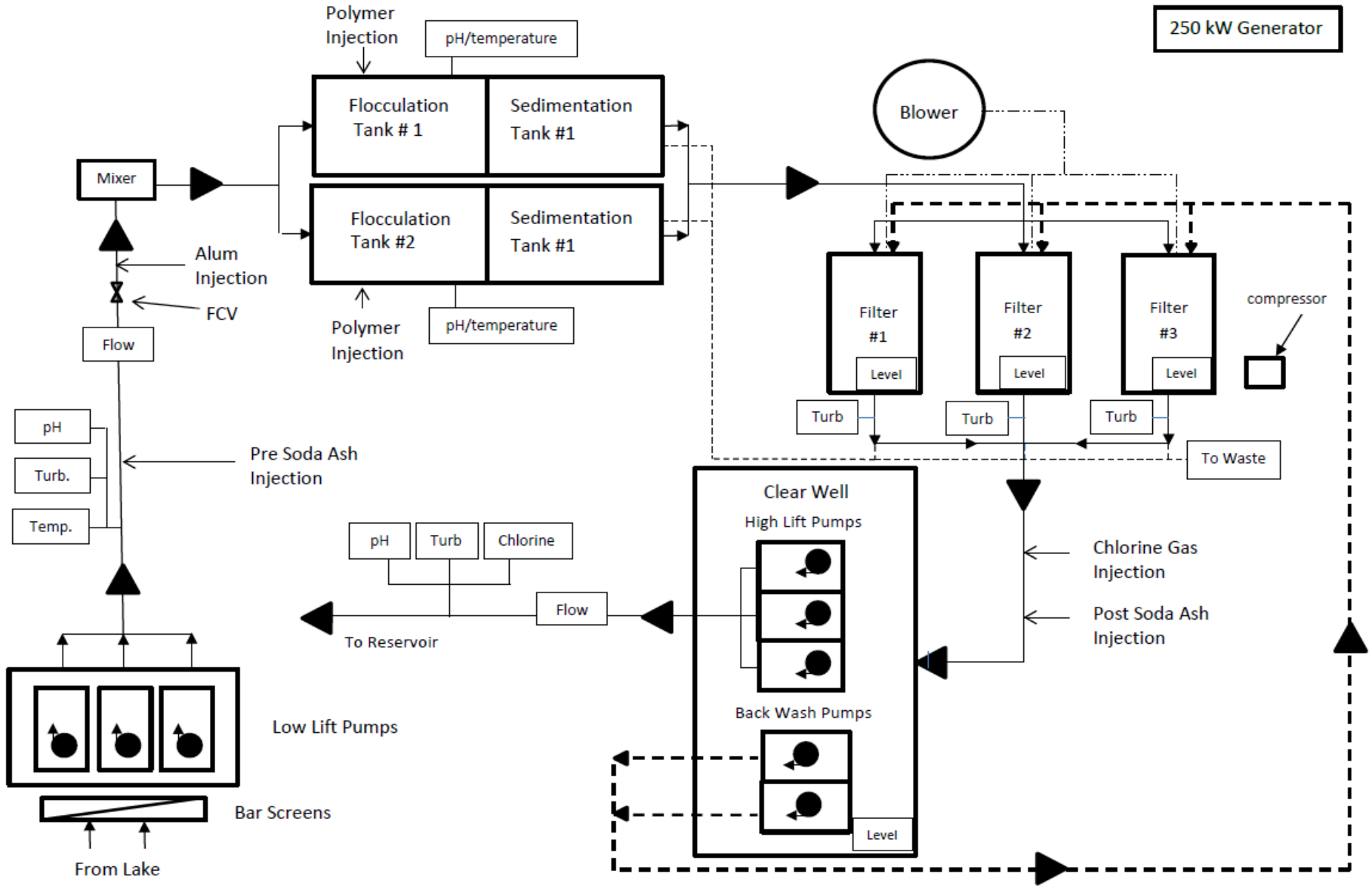


Figure 2: Haileybury (Niven Street) Reservoir - Process Flow & Instrumentation Diagram

Revision No. 5, Revision Date: June 5, 2024

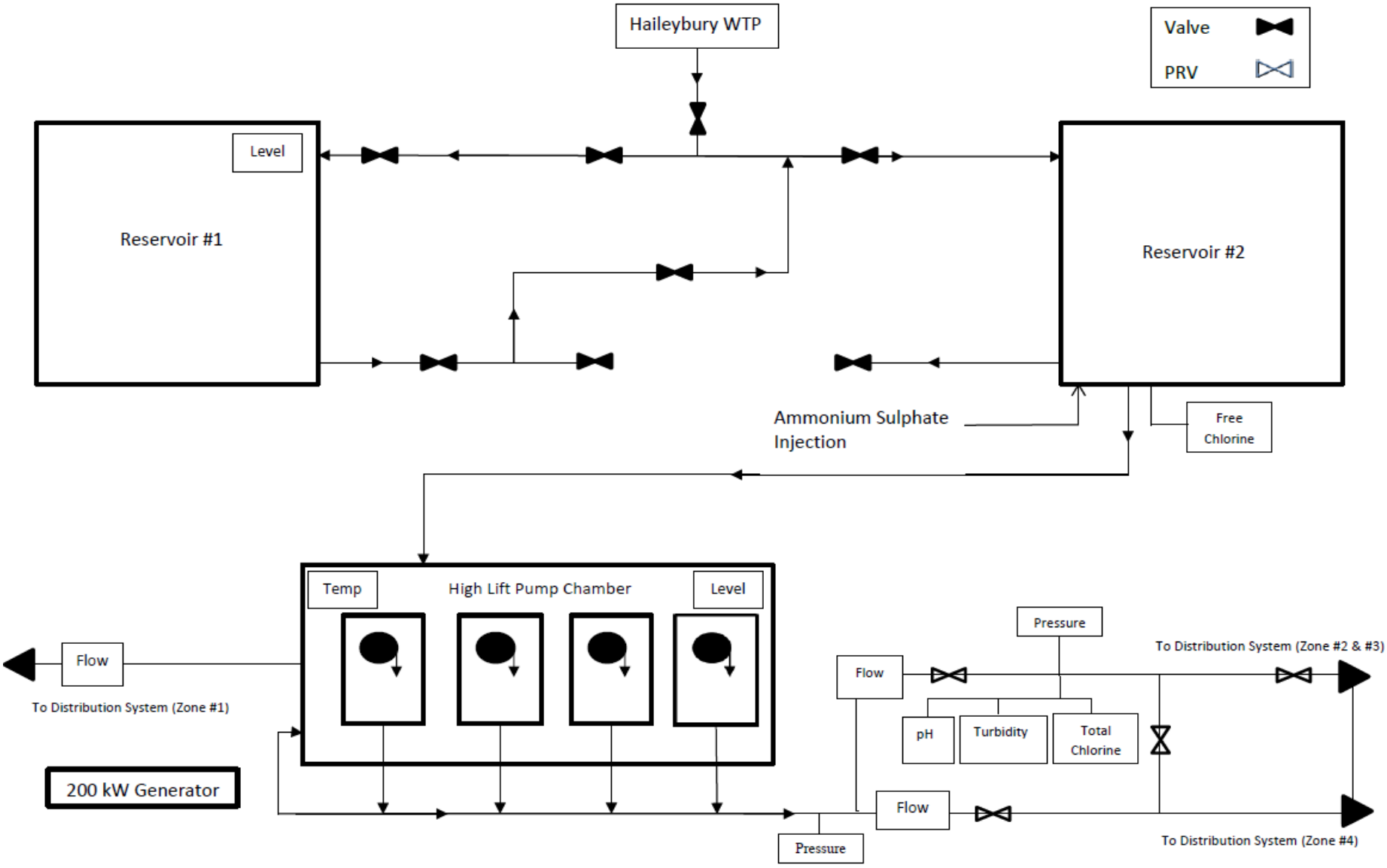
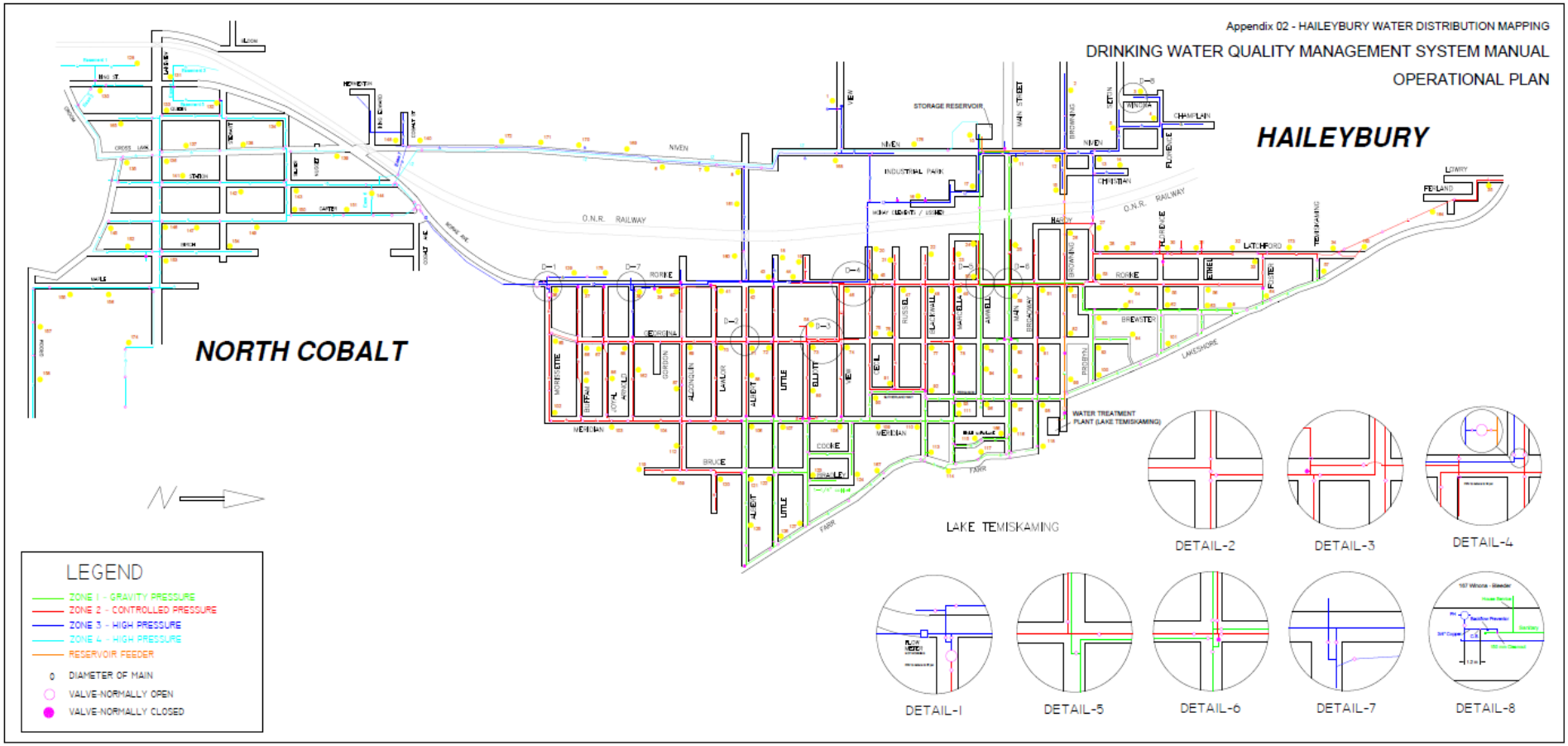


Figure 3: Haileybury Drinking Water System – Distribution Map



Revised: Feb 2023 Revision No. 16

1.0 New Liskeard Drinking Water System Overview

1.1 Owner / Operating Authority

The New Liskeard Drinking Water System is owned by the Corporation of the City of Temiskaming Shores and consists of a Class 1 water treatment subsystem and a Class 3 water distribution subsystem. The system is a communal ground water well supply that services the communities of New Liskeard and Dymond. OCWA is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities.

1.2 Source Water

Raw Water Supply

The New Liskeard water treatment plant is located at 301 McCamus Avenue in New Liskeard. It is supplied by two main production wells; Well No. 3 and Well No. 4.

Well No. 3 was originally constructed on December 2, 1950. It is a 54.9 m deep drilled well equipped with a vertical turbine pump rated at 2700 L/minute and a magnetic flow meter. It consists of a 660 mm diameter outer casing and 406 mm inner steel casing with a 7.6 m long stainless steel (shutter style) screen. The well is housed in a secure building located directly across from the water plant.

Well No. 4 was originally constructed on August 13, 1977. It is a 54.9 m deep drilled well also equipped with a vertical turbine pump rated at 2700 L/minute and a magnetic flow meter. It consists of a 762 mm diameter outer steel casing, to a depth of 27.4 m and 356 mm inner steel casing, to a depth of 46.3 m with a 7.6 m long stainless steel screen, 30.5 cm in diameter. This well is located inside the water treatment plant building.

There is approximately 23 m of low permeability clay between the ground surface and the aquifer protecting the groundwater from surface spills.

General Characteristics

The chemistry of the groundwater indicates a highly suitable source for drinking water. The water temperature and pH is considered normal for ground water systems and is relatively constant. The colour is very stable and the turbidity is low and shows very little variation. Bacteriological analysis of the raw water also indicates a source of good quality.

The source water has high levels of iron and manganese which is not a health issue for the public however it does pose an aesthetic concern. The system is equipped with two pressure filters which were replaced in 2018 to aid in the removal of these metals.

Well 3: *Raw Water Characteristics*

	2018		2019		2020		2021		2022	
Characteristics	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean
E. coli (CFU/100 mL)	0 - >80	4.7	0 - 0	0	0 - 0	0	0 - 0	0	0 - 0	0
Total Coliforms (CFU/100 mL)	0 - >80	4.71	0 - 4	0.15	0 -1	0.06	0 - 2	0.08	0 - 2	0.08
Turbidity (NTU)	0.11-275	11.8*	0.1 – 0.98	0.52	0.13 – 1.2	0.51	0.1 – 1.8	0.58	0.13 – 3.8	0,95
Colour (TCU)	5 - 5	5	5 -5	5	5 - 5	5	5 -5	5	5 - 5	5
Iron (ug/L)	800 - 5160	1643	940 - 1510	1226	800 - 1140	1036	<200 - 1250	<936	840 - 1280	1120
Manganese (ug/L)	30 -130	49	30 - 40	37	30 - 50	40	10 - 40	33	30 - 40	37
Hardness (mg/L)	267 - 332	298	266 - 343	312	305 - 370	340	295 - 370	329	314 - 407	343

Well 4: *Raw Water Characteristics*

	2018		2019		2020		2021		2022	
Characteristics	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean	Min - Max	Mean
E. coli (CFU/100 mL)	0 - 1	0.02	0 - 0	0	0 - 0	0	0 - 0	0	0 - 0	0
Total Coliforms (CFU/100 mL)	0 - 1	0.02	0 - 0	0	0 - 0	0	0 - 0	0	0 - 0	0
Turbidity (NTU)	0.21 – 2.8	0.64	0.15 – 1.1	0.61	0.09 – 2.8	0.73	0.11 – 2.7	0,69	0.22 – 4.9	1.2
Colour (TCU)	5 - 5	5	5 - 5	5	5 - 5	5	5 - 5	5	5 - 5	5
Iron (ug/L)	740 - 1110	951	940 - 3380	1369	810 - 1160	974	780 - 1630	1079	760 - 2110	1151
Manganese (ug/L)	20 – 30	29	20 - 30	29	30 - 30	30	20 - 30	28	20 - 30	29
Hardness (mg/L)	242 - 304	284	253 - 319	295	294 - 330	312	274 - 333	306	292 - 369	316

* Notes:
< = less than the laboratory's method detection limit
> = greater than the laboratory's method detection limit

April 2018 - Well No. 3 taken off-line during plant upgrade. High turbidity results caused when the well was started up in April to collect regulatory bacteriological and turbidity samples.

Common Fluctuations

Data available for the past several years indicates that the water source is relatively stable and consistent in terms of both quality and quantity. There are no major event-driven fluctuations or threats in the characteristics of the raw water supply.

Threats

The most likely threat to the raw water source is the proximity of the wells to the railway and municipal roads. A fuel or chemical spill from a train derailment or vehicles could contaminate the aquifer.

Operational Challenges

No major challenges have been encountered.

1.3 Treatment System Description

Water Treatment

The production wells feed the main water treatment plant that has a maximum rated capacity of 7865 cubic meters per day (m^3/d).

The treatment process consists of two iron and manganese removal/pressure filtration system rated at 94.6 L/s that are filled with Filtronic's Electromedia®, a proprietary media. The configuration allows either filter to be supplied with raw water from either of the two wells with the filter effluent monitored continuously for turbidity and free chlorine residual. The two pressurized filters are automatically backwashed, based on high filter turbidity or maximum filter runtime. Manual backwashes can also be initiated when required. The backwash wastewater is discharged into the municipal sanitary sewage system which flows into the New Liskeard Lagoon.

Prior to filtration, chlorine gas is injected into the water to aid the oxidation process and precipitate the iron and manganese. After filtration, the treated water is re-chlorinated and directed into a contact tank comprised of two clearwells

Water Storage and Pumping Capabilities

The clearwells are located directly below the water treatment plant and have a total storage capacity of 271 m^3 (clearwell No. 1: 126 m^3; clearwell No. 2: 145 m^3). The baffles in the clearwell help to ensure sufficient chlorine contact time (CT). The free chlorine residual, pH, temperature, level and flow are continuously monitored to ensure adequate primary disinfection before the water enters the distribution system. The two clearwells are connected via an isolation valve to enable either clearwell to be drained for maintenance without compromising a continuous supply of water to users.

Two vertical turbine high lift pumps, equipped with variable frequency drives (VFDs) are each rated at 3272 L/minute. They direct treated water from the clearwells to the Shepherdson Road and the Dymond reservoirs. If the high lifts are off then the Dymond Reservoir is fed by the Shepherdson Road reservoir.

The Shepherdson Road Reservoir is located at 150 Shepherdson Road in New Liskeard and has a storage capacity of 1818 m^3. Three vertical turbine pumps each rated at 2090 L/minute are all equipped with variable frequency drives (VFDs), supply water to pressure zones 2 and 3 in the system. A secondary disinfection system is in place at the reservoir using sodium hypochlorite to boost the chlorine levels leaving the reservoir if required.

The Dymond Reservoir is located at 286 Raymond Street and has a capacity of 1395 m^3. The reservoir is a single story building with an underground clearwell consisting of four interconnected baffled cells and four vertical turbine pumps (equipped with VFDs), two rated at 70 L/s and two rated at 28.1 L/s. A second building houses a sodium hypochlorite feed system, if boosting is required to maintain secondary disinfection.

Control System

The New Liskeard Water Treatment System is controlled by a dedicated Programmable Logic Controller (PLC) and monitored through a Control System Supervisory Control and Data Acquisition (SCADA) system. All analyzing, monitoring and control module equipment information is routed through the SCADA system for operator monitoring and control. Control of equipment can be accomplished locally using the Human Machine Interface (HMI) touch screen at the New Liskeard water treatment plant or remotely via the SCADA computer located at the Haileybury water treatment plant. Operators can also access the system using their computers and cell phones. Alarm capability and set point adjustment along with trend monitoring are also available through SCADA system controls.

Emergency Power

An emergency stand-by 300 kW diesel powered generator with a 1000L fuel tank is available at the Well No. 3 pump house to ensure continued operation of the water treatment facility during a power outage.

A 230 kW diesel generator with a 2000 L fuel tank is on-site at the Shepherdson Street Reservoir

A 260 kW standby diesel generator with two (2) 1000 L fuel tanks are available at the Dymond Reservoir in case of power failures.

Treatment System and Reservoir Process Flow and Instrumentation Diagrams

Refer to Figures 1, 2 and 3 on pages 8, 9 and 10.

1.4 Description of the Distribution System Components

The New Liskeard Drinking Water System is classified as a Large Municipal Residential Drinking Water System that provides water to the communities of New Liskeard and Dymond. It is a standalone system not connected to another drinking water system.

The distribution system consists of approximately 5750 residents and 2300 service connections and is comprised of various pipe materials including cast iron, ductile iron and PVC ranging from 4 to 16 “ in New Liskeard and 6 to 12 “ in Dymond. Approximately 535 m of 150 mm diameter HDPE feeder main to the Dymond Reservoir was installed in May 2020. There are several isolation valves to allow for the repair and maintenance of selected sections of the distribution

system, three air relief valves and five pressure reducing valves. Approximately 313 fire hydrants are connected to the system to aid in fire protection.

This distribution system is broken down into three (3) service zones. It should be noted that the feeder main from the McCamus water treatment plant to the storage reservoir on Shepherdson Road also acts as a distribution line within Zone I. The three zones are supplied with potable water in the following manner:

Zone I – Gravity Zone is supplied with water through a distribution line (also the feeder main to the reservoir from the WTP) from the Shepherdson Road reservoir. Zone I is also isolated from Zones II and III via natural topography and closed valves. Zone I also supplies water from Shepherdson Road to the Dymond Reservoir which feeds the Dymond Distribution System.

Zone II – Intermediate Zone is fed through a separate distribution line from the Shepherdson Road reservoir through pumping. The area is generally comprised of residential units as well as the recently developed (2011) Dymond Industrial Park. The interconnected distribution piping between this zone and Zone I (gravity) is isolated via closed gate valves.

Zone III – High Zone is fed through a separate distribution line from the Shepherdson Road reservoir through pumping. The area is generally comprised of limited industrial users and is the main feed for Temiskaming Hospital.

To maintain disinfection residuals in the distribution system, the following processes are in place:

- The New Liskeard and Dymond distribution systems will be, at all times; operated by a person(s) holding a valid operator's certificate.
- All maintenance or repairs conducted in the distribution system will be communicated, in advance to the ORO to ensure disinfection is maintained and that all maintenance and repairs are supervised by a certified operator.
- Regular flushing of the distribution system will be performed.
- The system will be monitored and sampled as required by legislative requirements and any adverse results will be resampled and reported in accordance with the Safe Drinking Water Act and its regulations.
- OCWA, as the operating authority for the distribution system will ensure that treatment equipment that provides secondary disinfection is operated such that, at all times and at all locations in the receiving distribution system, the free chlorine residuals are never less than 0.05 mg/L.
- A free chlorine residual below 0.2 mg/L in the distribution will initiate corrective actions to prevent an adverse water quality incident.

Distribution System Map

Refer to Figures 4 and 5 on pages 11 and 12.

2.0 Related Documents

None

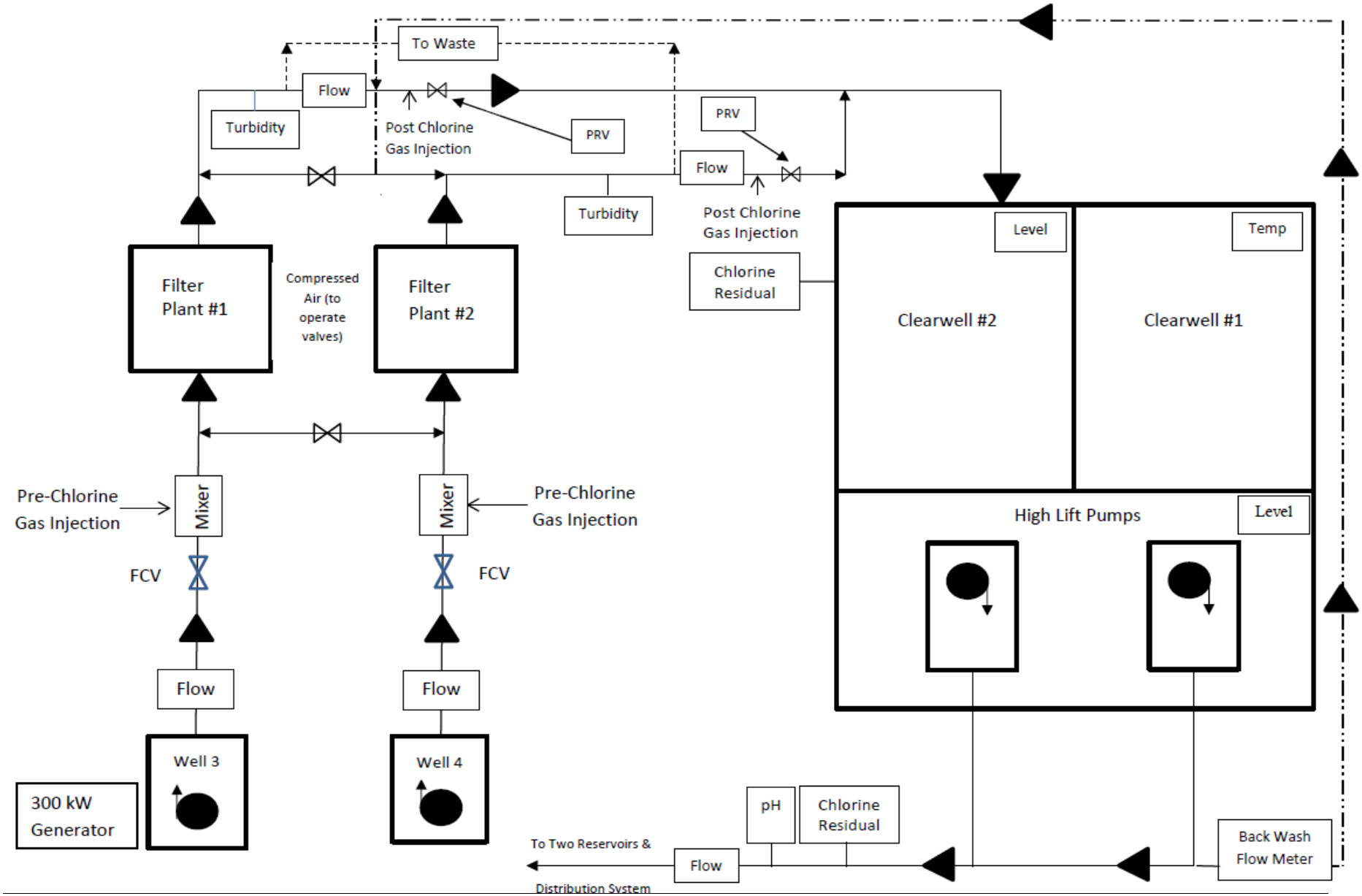
3.0 Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Appendix issued; the drinking water description was originally included within the main body of Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). Updates based on revisions to DWQMS (e.g. removal of critical upstream or downstream processes, separation of systems that provide primary and/or secondary disinfection and systems that do not, for systems that are connected to another system with different owners, must now include which system is relied upon to ensure the provision of safe drinking water). Moved order of system description to follow the process (e.g., source water first, then treatment, then distribution). Updated the Raw Water Characteristics table with more current data and added iron and manganese results for 2017. Made minor updates to the raw water and distribution water descriptions. Revised the water treatment description to include the new pressure filtration system. Updated the New Liskeard Water Plant diagram to reflect the new filtration system.
Jan. 24, 2019	1	Corrected procedure number and the rated capacity of the diesel generator at the Dymond Reservoir.
Sep. 30, 2019	2	Added variable frequency drives (VFDs) to the description of the pumps at the water treatment plant and the Dymond Reservoir and added a pressure release valve after the filters to the New Liskeard water plant process flow and instrumentation diagram. Shepherdson Reservoir PFID - added a flow meter and pressure transmitter to the Zone 2 discharge line. Dymond Reservoir PFID – indicated flow to the school.
Oct. 2, 2020	3	Revised Step 1.2 to provide more information on the wells, and to update the raw water characteristics in table to include average data from 2014 to 2019. Revised Step 1.3 to indicate that the treated water is continuously monitored for selected parameters, to provide the volume of each clearwell and added a new section – Control Systems. Updated Step 1.5 to include pipe, valve and hydrant information for the distribution system. Updated the water plant process flow diagram to change the pressure reducing valves after the raw water pumps to flow control valves and include an updated distribution map for the community of Dymond which shows the new feeder main to the reservoir.

Date	Revision #	Reason for Revision
Aug. 24, 2021	4	Included a magnetic flow meter to the description of Well No. 3 and No. 4 in Section 1.2 – Source Water, Changed the following addresses: - Shepherdson Road Reservoir is located at 150 Shepherdson Road. - Dymond Reservoir is located at 286 Raymond Street - New Liskeard WTP is located at 301 McCamus Ave. , Included fuel tank volumes in the description for the generators.
Sep. 1, 2022	5	Updated the Raw Water Characteristics table in section 1.2 to include data from 2020 and 2021 and removed data from 2014 and 2015. Added hardness to the table.
May 30, 2023	6	Updated the Raw Water Characteristics table in section 1.2 to include data from 2018 and 2022 and added minimum and maximum data. Updated general characteristics in section 1.2 to include colour. Replaced the New Liskeard and Dymond distribution maps with updated versions. Included a description of how disinfection residuals are maintained throughout the distribution system in Step 1.4.
Jun. 24, 2024	7	Updated process flow diagrams for the water treatment plant and the reservoirs; plant diagram changes include adding pressure relief valves (PRVs), generator and compressor. Changes to the Shepherdson Reservoir diagram include adding the chlorine booster injection at the beginning of the clearwell and adding the generator. Dymond Reservoir diagram revised to include generator.

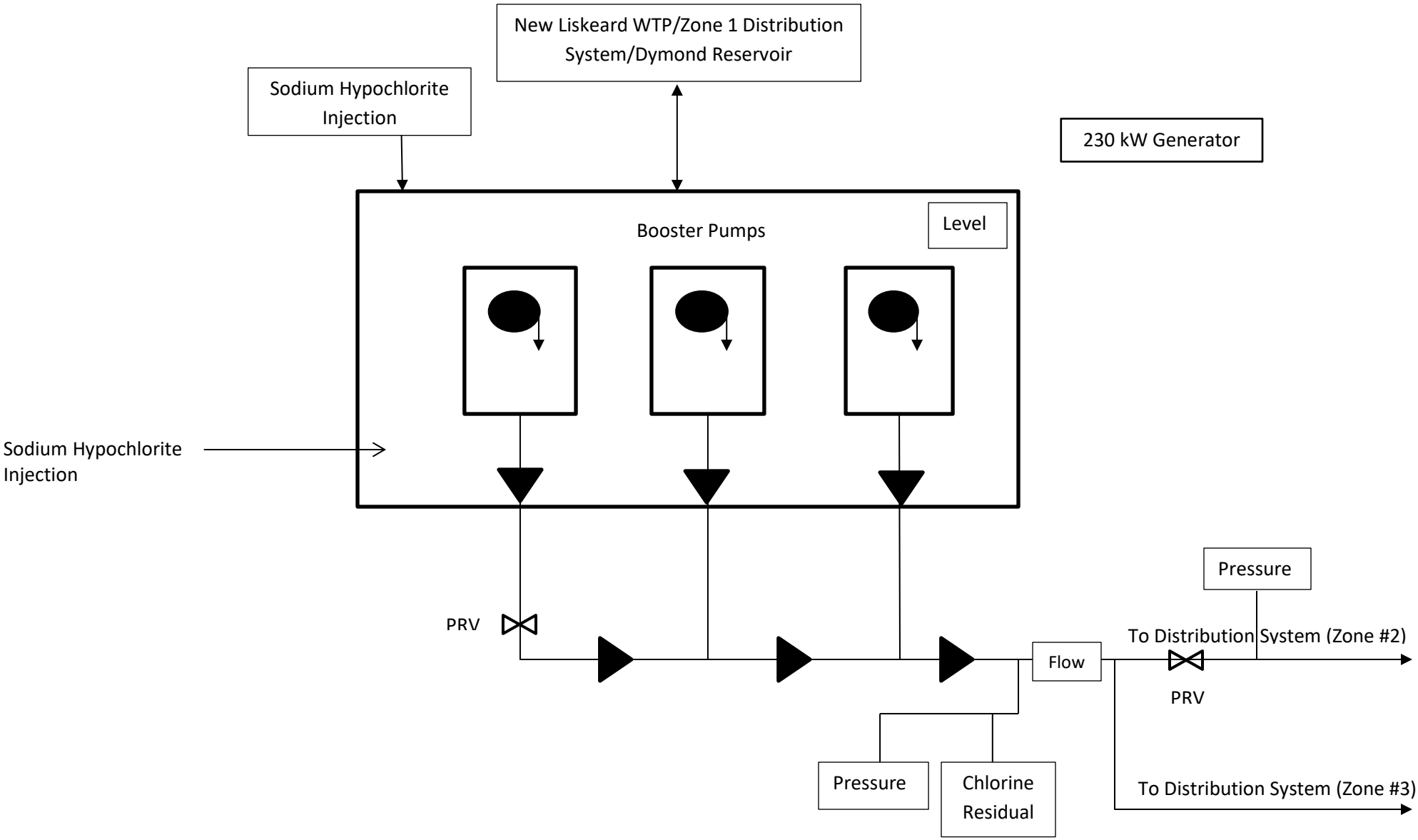
Figure 1: New Liskeard Water Treatment Plant - Process Flow & Instrumentation Diagram

Revision No. 4, Revision Date: June 5, 2024



New Liskeard (Shepherdson Road) Reservoir

Revision No. 4, Revision Date: June 5, 2024



Dymond Reservoir Schematics

Revision No. 4, Revision Date: June 5, 2024

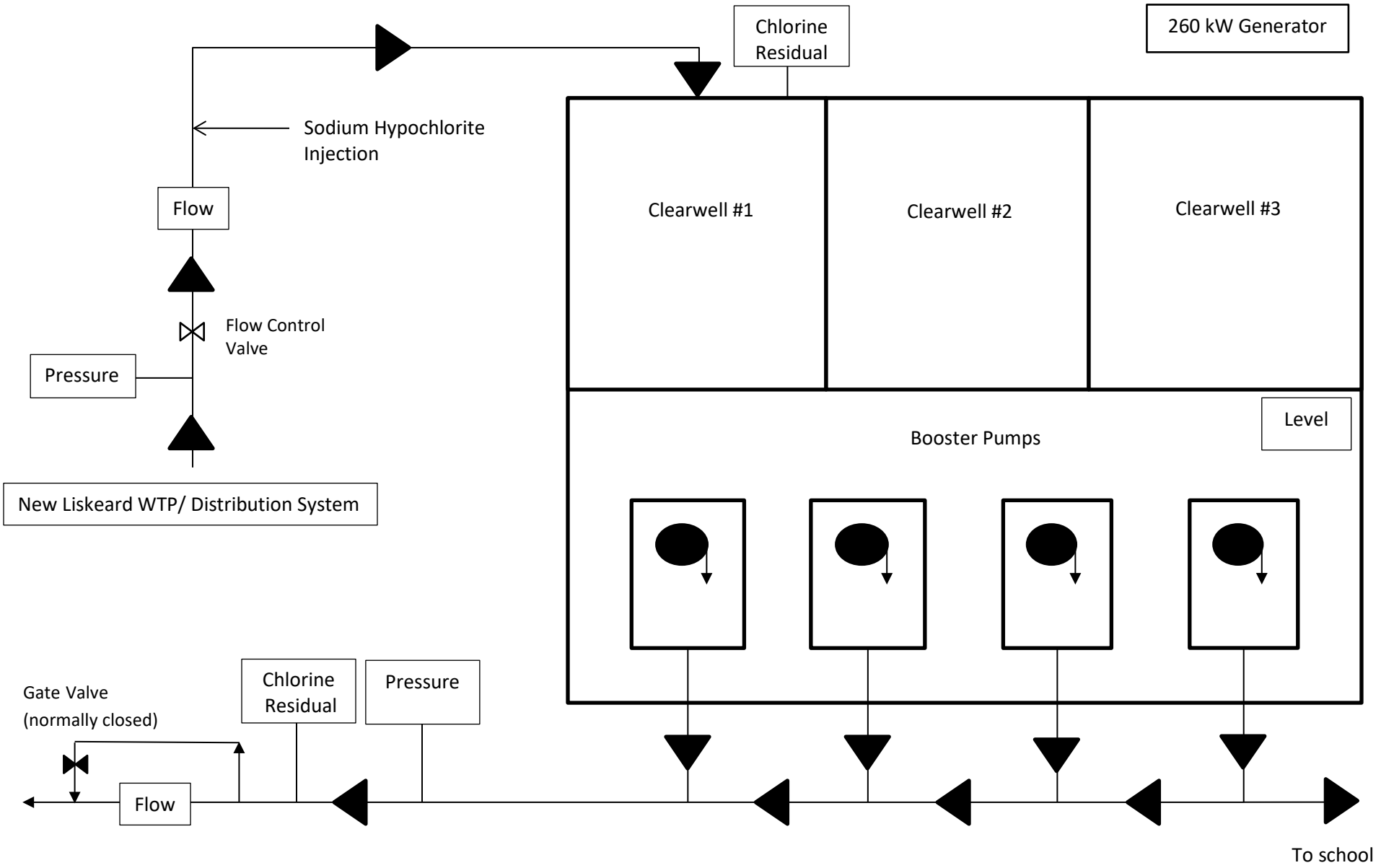
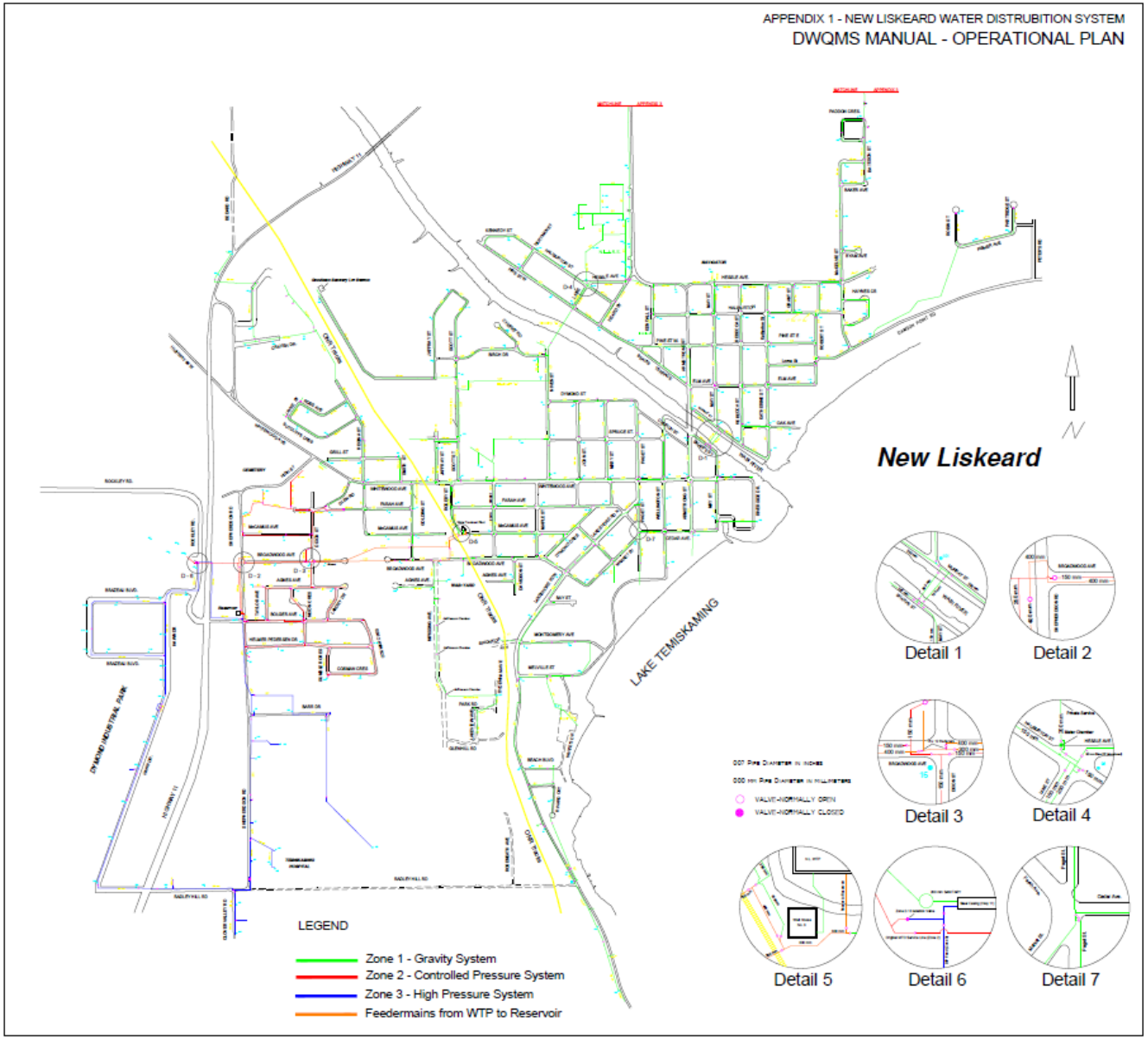
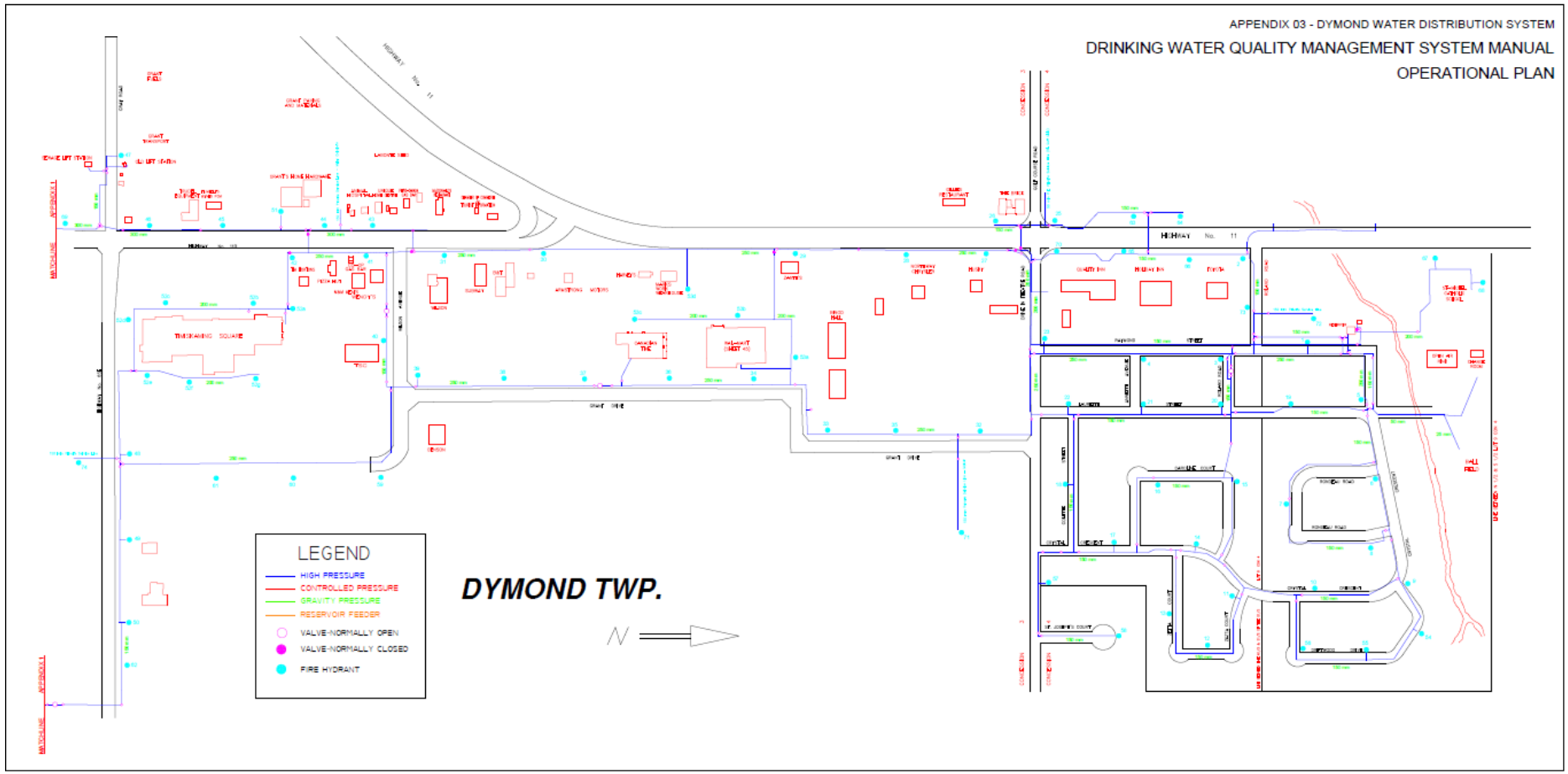


Figure 4: New Liskeard Drinking Water System – New Liskeard Distribution Map



Revised: Jan 2023 Revision No. 14

Figure 5: New Liskeard Drinking Water System – Dymond Distribution Map



1. Purpose

To document the process for conducting a risk assessment to identify and assess potential hazardous events and associated hazards that could affect drinking water safety.

2. Definitions

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

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

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

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

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

Likelihood – the probability of a hazard or hazardous event occurring

3. Procedure

3.1 Operations Management ensures that operations personnel are assigned to conduct a risk assessment at least once every thirty-six months. At a minimum, the Risk Assessment Team must include the QEMS Representative, at least one member of the Operational staff for the system and at least one member of Operations Management.

3.2 The QEMS Representative is responsible for coordinating the risk assessment and ensuring that documents and records related to the risk assessment activities are maintained.

3.3 The Risk Assessment Team performs the risk assessment as follows:

3.3.1 OP-07 Risk Assessment and OP-08 Risk Assessment Outcomes are reviewed.

3.3.2 For each of the system's activities/process steps, potential hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water are identified. At a minimum, potential hazardous events and associated hazard as identified in the most current version of the Ministry's document titled "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as applicable to the system type) must be considered.

3.3.3 For each of the hazardous events, control measures currently in place at the system to eliminate the hazard or prevent it from becoming a threat to public health are specified. Control measures may include alarms, monitoring procedures, standard operating procedures/emergency procedures/contingency plans, preventive maintenance activities, backup equipment, engineering controls, etc.

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

<u>As a minimum, the following must be included as CCPs (as applicable):</u>

- Equipment or processes required to achieve primary disinfection (e.g., chemical and/or UV disinfection system, coagulant dosing system, filters, etc.)
- Equipment or processes necessary for maintaining secondary disinfection in the distribution system
- Fluoridation system

3.3.5 Additional CCPs for the system are determined by evaluating and ranking the hazardous events for the remaining activities/process steps (i.e., those <u>not</u> included as OCWA's minimum CCPs).

3.3.6 Taking into consideration existing control measures (including the reliability and redundancy of equipment), each hazardous event is assigned 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

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

The likelihood and consequence values are multiplied to determine the risk value (ranking) of each hazardous event. Hazardous events with a ranking of 12 or greater are considered high risk.

3.3.7 Hazardous events and rankings are reviewed and any activity/process step is identified 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 can be controlled 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); and
- ✓ Failure of the control measures would lead to immediate notification of Medical Officer of Health (MOH) or Ministry or both.

3.4 The outcomes of the risk assessment are documented as per OP-08 Risk Assessment Outcomes.

3.5 At least once every calendar year, the QEMS Representative facilitates the verification of the currency of the information and the validity of the assumptions used in the risk assessment in preparation for the Management Review (OP-20). When performing this review, the following may be considered:

- Process/equipment changes
- Reliability and redundancy of equipment
- Emergency situations/service interruptions
- CCP deviations
- Audit/inspection results
- Changes to the Ministry document "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended)

4. Related Documents

Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended)
Ministry's "Procedure for Disinfection of Drinking Water in Ontario" (as amended)
OP-08 Risk Assessment Outcomes
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-07 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (revision 3, dated September 08, 2017). Revised Purpose to reflect element 7 requirements only. Included minimum requirements for the Risk Assessment Team (QEMS Representative, at least one operator for the system and at least one member of Operation Management. Clarified role of QEMS Representative in coordinating the risk assessment and maintaining documents and records. Re-worded procedure for performing the risk assessment (process itself remains essentially unchanged). Included reference to MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems". Removed requirements for documenting the outcomes of the risk assessment (now covered in OP-08). Changed annual review to at least once every calendar year and included potential considerations when performing the review.
Sep. 30, 2019	1	Updated MOECC to MECP.
Sep. 1, 2022	2	Replaced MECP with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Added "(as amended)" directly following any references to Ministry documents to point to the most current version of the document and added the Ministry document "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended) to the list of items that may be considered when performing the annual verification of the

Date	Revision #	Reason for Revision
		currency of the information in the risk assessment.

1. Purpose

To document the outcomes of the risk assessment conducted as per OP-07 Risk Assessment.

2. Definitions

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

Critical Control Limit (CCL) – The point at which a Critical Control Point response procedure is initiated

3. Procedure

3.1 The QEMS Representative is responsible for updating the information in OP-08A Summary of Risk Assessment Outcomes for the Haileybury DWS and OP-08B for the New Liskeard DWS as required.

3.2 The results of the risk assessment conducted as per OP-07 are documented in Table 1 of OP-08A and OP-08B. This includes:

- Identified potential hazardous events and associated hazards (possible outcomes) for each of the system's activities/process steps;
  Note: Hazards listed in the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended) are indicated in the appropriate column using the reference numbers in Table 4 of OP-08A.
- Identified control measures to address the potential hazards and hazardous events; and
- Assigned rankings for the hazardous events (likelihood x consequence = risk value) and whether the hazardous event is a Critical Control Point (CCP) (mandatory or additional).
  Note: If the hazardous event is ranked as 12 or higher and it is <u>not</u> being identified as a CCP, provide rationale as to why it does not meet the criteria set out in section 3.3.7 of OP-07).

3.3 Operations Management is responsible for ensuring that for each CCP:

- Critical Control Limits (CCLs) are set;
- Procedures and processes to monitor the CCLs are established; and
- Procedures to respond to, report and record deviations from the CCLs are implemented.

The identified CCPs, their respective CCLs and associated procedures are documented in Table 2 of OP-08A and OP-08B.

3.4 A summary of the results of the annual review/36-month risk assessment is recorded in Table 3 of OP-08A and OP-08B.

3.5 Operations Management considers the risk assessment outcomes during the review of the adequacy of the infrastructure (Refer to OP-14 Review and Provision of Infrastructure).

4. Related Documents

Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended)
OP-07 Risk Assessment
OP-08A Summary of Risk Assessment Outcomes
OP-14 Review and Provision of Infrastructure

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-08 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (revision 3, dated September 08, 2017). Clarified role of QEMS Representative in updating the information in OP-08A Summary of Risk Assessment Outcomes. Included requirements for how to document the risk assessment outcomes using the tables in OP-08A. Clarified responsibility of Operations Management to ensure Critical Control Limits are set and related procedures are developed. Included reference to OP-14 Review and Provision of Infrastructure to emphasize the need for Operations Management to review the risk assessment outcomes during the infrastructure review.
Sep. 30, 2019	1	Updated MOECC to MECP.
Sep. 1, 2022	2	Replaced MECP with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Added "(as amended)" directly following references to the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" to point to the most current version of the document.
Jun. 24, 2024	3	Included OP-08B for the New Liskeard DWS in Steps 3.1, 3.2, 3.3 and 3.4. Removed watermark.

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Table 1: Risk Assessment Outcome Table

Note: Processes referred to in section 5.5 of QP-02 Risk Assessment must be identified as mandatory Critical Control Points (CCPs) as applicable. Mandatory CCPs are not required to be ranked.

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Source/Intake	2, 5, 6, 9	Spill of biological or chemical material into Lake Temiskaming - accidentally or intentionally (eg. snowmobiles or water crafts, traffic, including transports, train derailment, vandalism)	Contamination of source water	No method of control until contaminant has been identified – response may include: - shutting down intake, - 1 day supply from reservoir, - City ordered water conservation or ban (supply alternate source of drinking water), Monitor and sample, online raw water pH, turbidity and temperature monitoring, EEP for Off-site Chemical/Fuel Spill, EEP for Contaminated Raw Water, EEP for Water Supply Shortage, CP for Spill Response, CP for Unsafe Water.	3	3	9	**NO**
Source/Intake	1, 2, 3, 4, 6	Breakage/blockage of single intake pipe, due to natural disaster, freezing, accident or vandalism/terrorism	Loss of water supply	Use alternate pump which can be located in the lake to supply water to the plant, One (1) day supply from the reservoir, City ordered water conservation or ban, EEP for Water Supply Shortage.	1	3	3	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Source/Intake	9	Spring/fall turnover	Public complaints	Appropriate operational adjustments, chemical optimization for changes in colour, odour, alkalinity, pH, temperature and turbidity, Raw water turbidity monitoring, Filter water turbidity monitoring with alarms.	4	2	8	**NO**
	1, 2 ,3, 12	Algal Blooms	Biological contamination of raw water source	Weekly visual checks and sampling during the HAB season (raw & treated water), SOP/Plan for Monitoring, Sampling and Reporting a Harmful Blue-Green Algae Bloom, Notifications from MOH, MECP and public	4	3	12	**NO** – does not meet all criteria in step 3.3.7 of OP-07. No control of the hazard
Low Lift Pumps	2	Low lift pump failure	Loss of water supply	Redundancy (3 pumps), Scheduled maintenance activities, Back-up generator for loss of power situations, Alarms for power loss and low clearwell level, EEP for Low Lift Pump Failure.	2	2	4	**NO**
Filtration Process (includes flocculation, coagulation, dual media gravity filters)	10	Aluminum Sulphate (alum) feed pump failure	Ineffective removal of pathogens (minimum treatment requirements not met), Potential AWQI	Redundancy - 1 back-up pump with automatic switchover, Spare pumps available, Operator checks (tank levels, dosage calculations),				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Scheduled maintenance activities, Continuous monitoring of filter effluent turbidity; High turbidity alarm with automatic backwash and filter-to-waste features, Chemical pump failure alarm, If both pumps fail an alarm is initiated and plant shuts down, EEP for Chemical Pump Failure, EEP for Reporting Adverse Water Quality, CP for Unsafe Water				
Filtration Process	10	Soda ash feed pump failure (pre and post treatment)	Lowered pH and alkalinity, Ineffective coagulation process, Potential for increased turbidity and/or AWQI.	Redundancy - 1 back-up pump per system with automatic switchover, 2 systems available (2 pre-treatment pumps and 2 post-treatment pumps), Spare pumps available, Operator inspections (tank levels, calculate dosage), Scheduled maintenance activities, Chemical pump failure alarm, If both pumps fail an alarm is initiated and plant shuts down, Continuous monitoring of filter effluent turbidity; with alarms, EEP for Chemical Pump Failure,				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Filtration Process	10	Polymer pump failure	Ineffective coagulation, Increased turbidity, Ineffective removal of pathogens Potential for AWQI	Redundancy - 1 back-up pump per system with automatic switchover (4 pumps), Operator checks (tank levels, dosage calculations), Scheduled maintenance activities, Chemical pump failure alarm, If both pumps fail an alarm is initiated and plant shuts down, Continuous monitoring of filter effluent turbidity; with alarms, Increased backwash scheduled if poly dose too high, EEP for Chemical Pump Failure, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				**YES – Mandatory CCP**
Filtration Process	10	Filter breakthrough	Increased turbidity, Ineffective removal of pathogens, Potential for AWQI	Continuous monitoring of filter effluent turbidity, High turbidity alarms, Filter to waste at turbidity of 0.99 NTU, Redundancy (3 filters), Regular automated backwash schedule,				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Visual inspection of media, Scheduled maintenance activities, Filter 1 refurbished in 2023, Filter 3 refurbished in 2024, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Filtration Process	10	Backwash system failure	Increased turbidity, Ineffective removal of pathogens, Potential for loss of treated water supply	Backwash pump failure alarms, Redundancy (2 pumps available), Continuous monitoring of turbidity with alarms, Filter to waste at turbidity of 0.99 NTU, Scheduled maintenance activities, Alternate system for backwashing (manual), EEP for Backwash Failure (Filters), EEP for Reporting Adverse Water Quality, EEP for Water Supply Shortage, CP for Unsafe Water.				**YES – Mandatory CCP**
Filtration Process	10	Blower Failure	Backwash System Failure, Increased turbidity	Back up blower available Maintenance, Plant shuts down on blower failure (loss of power)				**YES – Mandatory CCP**
Filtration Process	10	Turbidity analyzer failure	Unknown turbidity levels,	Filter redundancy (3 filters – 1 analyzer per filter),				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
			Potential for AWQI	Take filter out of service until analyzer replaced/repaired, Analyzer fault alarm, Scheduled maintenance activities, Regular operator checks, Manual readings every 15 minutes if analyzer fails, Back-up analyzer available within hub, OCWA Instrumentation Technician available to repair analyzer in case of failure, EEP for Turbidity Analyzer Failure, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Filtration Process	10	De-sludge valve failure	Plugged filter and potentially high turbidity	Filter redundancy (3 filters), Manually open valve, Turbidity monitoring, High turbidity alarm, Regular maintenance checks Manual backwash available				**YES – Mandatory CCP**
Filtration Process	10	Backwash, effluent and filter to waste valve failures	Backwash failure, Loss of water, Inability to filter to waste	Filter redundancy (3 filters), Regular maintenance, Turbidity monitoring, Alarms				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Chlorine Gas System (primary disinfection)	10	Vacuum chlorinator failure	Loss of disinfection, Ineffective inactivation of pathogens (minimum disinfection requirements not met), Potential for AWQI	Redundancy (1 standby and back-up chlorinator), On-line monitoring with alarms, In-house residual testing and dosage calculations, Scheduled maintenance activities, SOP for CT (Chlorine Concentration x Time), Site specific spreadsheet to calculate CT, EEP for Vacuum Chlorinator Failure, EEP for Low or High Chlorine Residual in Treated Water, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				**YES – Mandatory CCP**
Chlorine Gas System (primary disinfection)	10	Cylinder failure	Loss of disinfection, Low chlorine residual Inadequate inactivation of pathogens, Potential for AWQI	Redundancy (1 standby cylinder), On-line monitoring with alarms, In-house residual testing and dosage calculations, Scheduled maintenance activities, Leak detection alarm, EEP for Chlorine Gas Leak EEP for Self-Contained Breathing Apparatus (SCBA) Check, EEP for Chlorine Cylinder Emergency Kit, CP for Unsafe Water.				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Chlorine Gas System (primary disinfection)	10	Free chlorine analyzer failure	Unknown chlorine residual levels, Potential for AWQI	Analyzer fault alarm, In-house residual testing every 5 minutes, Scheduled maintenance activities, Back-up analyzers available in the hub, Plant shutdown on low residual, SOP for CT, Site specific spreadsheet to calculate CT, EEP for Chlorine Analyzer Failure, EEP for Low or High Chlorine Residual in Treated Water, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				**YES – Mandatory CCP**
Chlorine Gas System (primary disinfection)	2, 3, 10	Low supply of chlorine gas	Inadequate disinfection, Potential for AWQI	Low chlorine residual alarm, Operator checks, Chlorine gas available on-site and within the Region, SOP for CT, Site specific spreadsheet to calculate CT, EEP for Low or High Chlorine Residual in Treated Water, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Clearwells	2, 7	Low level	Inadequate treated water supply to reservoir	Low level clearwell alarm, Low free chlorine alarm with plant shutdown, Supply water from reservoir only (1 day supply), City order water conservation or ban, EEP for Reporting Adverse Water Quality, EEP for Water Supply Shortage, CP for Unsafe Water.	3	1	3	**NO**
Clearwells	2, 7, 10	Out of service for repair or maintenance	Inadequate treated water supply to reservoir	Duel-celled clearwell with isolation valves, Reservoir has 1 day supply to allow for repairs or maintenance on clearwell, Scheduled and controlled maintenance plan and monitoring, Increase chlorine dosage to maintain primary disinfection (CT), Site specific spreadsheet to calculate CT, EEP for Water Supply Shortage	3	1	3	**NO**
Clearwells	2, 7, 10	Compromised structural integrity	Loss of water supply to reservoir	Reservoir has 1 day supply to allow for repairs or maintenance on clearwell, Maintenance and inspection activities, Low clearwell level alarm,	3	1	3	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Low free chlorine alarm with plant shutdown, City ordered water conservation or ban (supply an alternate source of water), EEP for Water Supply Shortage. CP for Loss of Service				
High Lift Pumps (at plant and reservoir)	2, 7	High lift pump failure	Loss of pressure in distribution system, Low supply of water	Redundancy (3 pumps at WTP, 4 pumps at reservoir), Scheduled maintenance activities, Low clearwell level alarm, Low reservoir level alarm, On-line monitoring of discharge pressure with alarms, Back-up generators for loss of power situations, EEP for High Lift Pump Failure, EEP for Low Pressure Events in the Distribution System, EEP for Water Supply Shortage.	3	2	6	**NO**
Reservoir (primary disinfection)	2, 7, 10	Low level	Inadequate chlorine contact time (CT) for primary disinfection, Inadequate treated water supply, Inadequate fire protection	Able to isolate reservoir 3, not reservoir 2, Low level alarm, Maintenance and inspection activities, City order water conservation or ban, SOP for CT (Concentration x Time),				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Site specific spreadsheet to calculate CT, EEP – Low Reservoir Level, EEP for Reporting Adverse Water Quality, EEP for Water Supply Shortage, CP for Unsafe Water.				
Reservoir (primary disinfection)	2, 7, 10, 11	Reservoir out of service for repair, maintenance	Inadequate chlorine contact time (CT) for primary disinfection, Inadequate treated water supply, Inadequate fire protection	Able to isolate reservoir 3, not reservoir 2, Scheduled controlled maintenance plan and monitoring, Re-calculate CT and increase chlorine dosage to maintain primary disinfection, City ordered water conservation or ban, SOP for CT, Site specific spreadsheet to calculate CT, EEP for Reporting Adverse Water Quality, EEP for Water Supply Shortage, CP for Unsafe Water.				**YES – Mandatory CCP**
Reservoir (primary disinfection)	2, 7, 10, 11	Compromised structural integrity	Loss of volume, Inadequate CT for primary disinfection, Inadequate fire protection.	Able to isolate reservoir 3, not reservoir 2, Low level alarm Residual monitoring, Operator checks,				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
			Infiltration, Potential AWQI	City ordered water conservation or ban, EEP for Low Reservoir Level, EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality				
Ammonium Sulphate System - Chloramination (secondary disinfection)	11	Ammonium Sulphate feed pump failure	Loss of total chlorine residual at reservoir	Continuous on-line monitoring for total chlorine residual with alarm, Chemical pump failure alarm, Back-up pump, Routine operator checks, EEP – Chemical Pump Failure				**YES – Mandatory CCP**
Ammonium Sulphate System - Chloramination (secondary disinfection)	11	Total chlorine analyzer failure	Unknown total chlorine residual levels	Routine operator checks, In-house residual testing, EEP – Chlorine Analyzer Failure				**YES – Mandatory CCP**
Ammonium Sulphate System - Chloramination (secondary disinfection)	11	Low or loss of supply of chemical	Loss of total chlorine residual	Continuous on-line monitoring for total chlorine residual, Routine operator checks, Chemical available within the Region.				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Water Treatment System	1, 2, 3, 4, 6, 7	Power failure due to weather, or vandalism/terrorism	Loss of pressure/ supply, Loss of equipment, Power surges	Back-up diesel generators at WTP and reservoir, Scheduled maintenance for back-up generator, Routine operator checks, Low fuel level alarm (gen-set), EEP for Hydro Interruption, Surge or Failure, EEP for Power Failure of Long Duration.	4	1	4	**NO**
Water Treatment System	2, 6, 7	Generator Failure (accidentally or vandalism/terrorism)	Loss of pressure/supply, Potential loss of equipment	Power (generator) failure alarm, Various plant alarms (eg. chlorine, pressure, flow, pumps), Scheduled maintenance activities for back-up generator, Portable generator available within the Region, EEP for Standby Power Failure, CP for Loss of Service.	3	3	9	**NO**
Water Treatment System	2, 6, 7, 10, 11	Fire in Plant or Reservoir (accidentally or intentionally)	Partial or full system shutdown, Damage to critical equipment, Potential loss of supply.	Regular operator visits, System alarms, Fire extinguishers, EEP for Fire in Plant.	2	3	6	**NO**
Water Treatment System	2, 6, 10, 11	SCADA failure (accident or vandalism/terrorism)	Loss of automatic process control, Interruption or loss of data and trending,	Loss of communication alarm, Back-up controller, Spare I/O cards, Spare power supplies,	2	3	6	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
			Loss of process visibility for operators	SCADA system password protected, Multi-level protection, Data is backed-up on an external storage devices, Data also backed-up on BTP/ Wonderware, Facility locked when no personnel on site, Qualified personnel (Instrumentation Technician) available.				
Water Treatment System	2, 5, 6	Vandalism/terrorism at Water Treatment Plant and Reservoir	Contamination of the water supply, Damage to critical equipment	Locked (water plant, reservoir), Security/intrusion alarms, Appropriate signage and lighting, Fencing (reservoir), Regular visits by operators, Regular sampling and monitoring, City ordered ban, supply an alternate source of drinking water, EEP for Vandalism or Suspected Unauthorized Entry, EEP for Contamination of Treated Water, EEP for Water Supply Shortage, CP for Spill, Response, CP for Loss of Service, CP for Security Breach.	2	4	8	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Water Treatment System	13	Cybersecurity Threats (PDM, WMS, SCADA – Wonderware)	Loss of system process visibility for operators (e.g., unable to monitor treatment processes), Interruption of data recording leading to a loss of critical/ compliance data, Inability to remotely control processes and/or loss of automatic control, Installation of malicious programs (eg. ransomware) which can disable business enterprise until money is paid, Loss of data (stolen or maliciously deleted)	Embedded system security include: Identity and Access Management throughout the account management lifecycle, Privileges are granted to users with two principles – need to know and least privileges. Users are assigned only the privileges they need to perform their job, Default to fail secure. The application or system failure will cause little or no harm to other systems. Data will not fall into the wrong hands, Multiple layers of defense including: o Intrusion detection systems constantly monitoring traffic flow (borders), o Multi factor authentication o Firewalls that provide real-time filtering and blocking (walls), o Cryptography and layered authentication (zones), o Certified professionals ensuring system integrity (gatekeepers), Constant monitoring and tracking for quick and effective response to attacks,	2	4	8	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Performance of routine vulnerability scans and threat assessments, Periodic cyber security audits and risk compliance checks Databases backed-up on a remote, secured network location, CP – Security Breach.				
Water Treatment System	1	Pandemic	Shortage of staff Supply shortages Loss of sample locations	CP for Critical Shortage of Staff Staff training and PPE, OCWA's Emergency Operations Center/Action Group (EOC), Staff isolation, staff rescheduling, modifications to work rounds, remote work done where possible, Alternate suppliers available, refer to Essential Services & Suppliers list	1	4	4	**NO**
Water Treatment System	1, 2, 3, 4, , 9, 10, 11	Natural Disasters (ice storm, wind storm, flooding, forest fire)	Loss of supply, Contamination, Loss of communication, Loss of power	Contingency Plans, Emergency Procedures, OCWA's Emergency Response Plan, City's Emergency Response Plan, Staff training.	3	4	12	**NO** – does not meet all criteria in step 3.3.7 of OP-07. No control of the hazard
Distribution System (secondary disinfection)	11	Loss of chlorine residual in distribution	Failure to control biofilm and pathogens (long-term), Potential for AWQI	Continuous on-line monitoring of total chlorine residual into the distribution system, Alarms for low/high chlorine residuals in water entering distribution system,				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Distribution chlorine residual testing as per O. Reg. 170/03, Regularly scheduled maintenance of disinfection system, EEP for Adverse Water Quality, CP for Unsafe Water.				
Distribution System	1, 11	Adverse water quality as described in O. Reg. 170/03 (eg. Bacteriological, THMs, HAA, NDMA)	Potential for unsafe drinking water	Site specific Sampling Schedule, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	3	4	12	**NO** – does not meet all criteria in step 3.3.7 of OP-07. No control of the hazard
Distribution System	6, 7	Fire (accidentally or intentionally)	Contamination Low pressure,	Communication with fire department, Monitoring of flows, pressure, and reservoir levels, 4 high lift pumps, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	3	2	6	**NO**
Distribution System (watermains)	1, 2, 3, 4, 7, 8	Structural failure/ breaks due to weather or age.	Contamination, Loss of pressure/supply	Notification/complaints from customers, Routine monitoring of flows, pressure and reservoir levels via SCADA, Alarms (low pressure, low reservoir, high flows),	4	3	12	**NO** – does not meet all criteria in step 3.3.7 of OP-07. No control of the hazard

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				AWWA Standards and Ministry's Watermain Disinfection Procedure, Maintenance program, EEP for Low or Loss of Pressure, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Distribution System (service connections)	8	Cross-connection, backflow, siphonage	Contamination	Plumbing code, Municipal by-law EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	2	4	8	**NO**
Distribution System (service connections)	1, 2, 3, 4, 7, 8	Structural failure/breaks due to accident, weather, age	Contamination, Loss of pressure/supply to affected users	Customer notification/complaints, Routine monitoring of flows, clearwell levels, and pressure via SCADA, Alarms (high flows, low pressure, low reservoir), EEP for Low or Loss of Pressure, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	3	2	6	**NO**
Distribution System (valves)	1, 2, 3, 4, 7, 8	Structural failure due to accident, weather or age	Loss of control, Contamination, Loss of pressure	Routine monitoring of flows, clearwell level and pressure via SCADA, Alarms (high flows, low pressure, low reservoir), Maintenance program,	3	2	6	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				AWWA Standards and Ministry's Watermain Disinfection Procedure, EEP for Low or Loss of Pressure, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Distribution System (hydrants)	1, 2, 3, 4, 7, 8	Structural failure/ component failure due to accident, weather, age	Contamination, Loss of pressure, Loss of supply, Loss of fire control	Customer notification/complaints, Routine monitoring of flows, pressure and clearwell levels via SCADA, Alarms (high flows, low pressure, low clearwell), Maintenance program, AWWA Standards and Ministry's Watermain Disinfection Procedure, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	2	3	6	**NO**
Distribution System All - watermains, connections, valves, construction, etc.	2, 6, 7, 8	Accident, Vandalism/terrorism	Contamination, Loss of water supply, Loss of pressure	Notifications/complaints from customers, Routine monitoring of flows, pressure and clearwell levels via SCADA, Alarms (low pressure, low clearwell), EEP for Low or Loss of Pressure,	2	3	6	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Distribution System (capital construction)	7, 8	Sub-standard construction and commissioning	Contamination, Loss of pressure	AWWA guidelines, Provincial standards, Staff training, Sampling and testing.	2	3	6	**NO**

Table 2: Identified Critical Control Points (CCPs)

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Filtration Process	**Filter Effluent Turbidity Alarms (Filters 1, 2 & 3)** High high set point = 0.99 NTU (alarm and filter-to-waste) - CCL High set point = 0.7 NTU (automatic backwash after 100 seconds) **Alum, Soda Ash and Polymer Feed Systems** If both pumps fail an alarm is initiated and plant shuts down	SCADA (continuous online analyzers), Routine operator checks via SCADA, Trend review and sign-off as per O. Reg. 170/03, Routine on-site checks conducted by OCWA staff, Alarms, Sampling, Dosage calculations.	Refer to: • EEP for High Turbidity in Filtered Water, • EEP for Turbidity Analyzer Failure • EEP for Chemical Pump Failure • EEP for Backwash Failure (Filters) • EEP for Reporting Adverse Water Quality, • CP for Unsafe Water
Primary Disinfection (Chlorination – Chlorine Gas System)	**Free Chlorine Residual Alarms** Low set point = no less than 0.30 mg/L	SCADA (continuous online analyzers), Routine operator checks via SCADA, Trend review and sign-off as per O. Reg. 170/03, Routine on-site checks conducted by OCWA staff, Alarms, Sampling, Dosage calculations.	Refer to: • SOP for CT (Chlorine Concentration x Time), • Site specific spreadsheet to calculate CT • EEP for Low or High Chlorine Residual in Treated Water • EEP for Chlorine Gas Leak • EEP for SCBA • EEP for Chlorine Cylinder Repair Kit • EEP for Vacuum Chlorinator Failure • EEP for Reporting Adverse Water Quality, • CP for Unsafe Water

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Reservoir	**Reservoir Low Level Alarm – Niven St.** Set point = no less than 2.3 meters **Pump Chamber Low Level – Niven St.** Set point = no less than 2.13 meters	SCADA (continuous online analyzers), Routine operator checks SCADA, Trend review and sign-off as per O. Reg. 170/03, Regular on-site checks conducted by certified municipal operators, Routine on-site checks conducted by OCWA staff	Refer to: • SOP for CT (Chlorine Concentration x Time) • SOP for When to Use CT Calculation • EEP for Water Supply Shortage • EEP for Reservoir - Low Level • EEP for Reporting Adverse Water Quality, • CP for Unsafe Water
Secondary Disinfection (Ammonia Sulphate System)	**Total Chlorine Residual Leaving the Reservoir and Entering the Distribution System** Low set point = 0.5 mg/L High set point = 3.0 mg/L	SCADA (continuous online analyzers), Routine operator checks via SCADA, Routine on-site checks conducted by OCWA staff, Alarms, Sampling, Dosage calculations.	Refer to: • EEP for Chemical Pump Failure • EEP for Chlorine Analyzer Failure.
Secondary Disinfection	**Combined Chlorine Residual - Distribution** Regulatory Low = 0.25 mg/L (low free chlorine residual = 0.05 mg/L) Regulatory High = 3.0 mg/L	Distribution chlorine residuals monitored as per O. Reg. 170/03	Refer to: • EEP for Reporting Adverse Water Quality, • CP for Unsafe Water

Note: Standard Operating Procedures (SOPs) referenced in Tables 1 and 2 are controlled as per QP-01 Document and Records Control.

Table 3: Record of Annual Review/36-Month Risk Assessment

The Drinking Water Quality Management Standard (DWQMS) requires that the currency of the information and the validity of the assumptions used in the risk assessment be verified at least once every calendar year. In addition, the risk assessment must be conducted at least once every thirty-six months.

Date of Activity	Type of Activity	Participants	Summary of Results
October 24, 2009	Risk Assessment	Amanda Dubuc (PCT), Michael Del Monte (Operations Manager), Eddie Hillman (ORO)	Conducted initial risk assessment.
October 30, 2009	Review	Amanda Dubuc (PCT)	Desktop review prior to submission of Partial Accreditation application. No changes.
September 17, 2010	Review	Amanda Dubuc (PCT), Eric Nielson (PCM), Michael Del Monte (Operations Manager), Tony Janssen (Senior Operations Manager)	Review during Internal Audit. No changes.
October 15, 2010	Review	Amanda Dubuc (PCT), Tony Janssen (Senior Operations Manager), Eric Nielson (PCM), Michael Del Monte (Operations Manager)	Review during management review meeting. No changes.
November 9, 2011	Review	Amanda Dubuc (PCT), Eric Nielson (PCM), Pat Dinel (Operator), Tony Janssen (Senior Operations Manager)	Review during Internal Audit. No changes.
November 9, 2012	Risk Assessment	Amanda Dubuc (PCT) and Eddie Hillman (ORO)	Conducted 36 month risk assessment. All changes are summarized in the revision history.
November 27, 2014	Review	Ilona Bruneau (PCT), Rebecca Marshall (PCT) and Eddie Hillman (ORO)	Review of Risk Assessment completed during the Internal Audit. No Changes.
November 19, 2015	Risk Assessment	Rebecca Marshall (PCT) and Eddie Hillman (ORO)	Conducted 36 month risk assessment. Changes are summarized in the revision history.
October 26, 2016	Review	Rebecca Marshall (PCT), Eddie Hillman (ORO), Claude Mongrain (Operator) and Bryce Logan (Operator)	Review of Risk Assessment completed. No Changes.
May 31, 2017	Review	Rebecca Marshall (PCT)	Changes are listed in the revision history.
February 13, 2018	Reviewed during internal audit	Ilona Bruneau (PCT), Eddie Hillman (ORO)	Review of Risk Assessment completed. No Changes.

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Date of Activity	Type of Activity	Participants	Summary of Results
September 5, 2018	36 month Risk Assessment	Claude Mongrain (ORO), Bryce Logan (Electronic Tech.), Ilona Bruneau (PCT), Victor Legault (Sr. Operations Manager)	All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 6 of this Summary of Risk Assessment Outcomes.
October 30, 2018	Review during the annual internal audit	Claude Mongrain (Team Lead/ORO), Bryce Logan (Team Lead/Electronic Tech.), Ilona Bruneau (PCT)	Table 2 – added critical control limits for the ammonia sulphate system and removed the 5 second delay from the high high turbidity set point.
January 24, 2019	Review outcomes during Plan update	Ilona Bruneau (PCT)	Table 1 - Updated or changed the MOECC Potential Hazardous Event/Hazard Reference numbers for high lift pumps and water treatment system. Added public complaints as a hazard to spring and fall turnover and removed increased demand on operations. Removed continuous on-line monitoring for total chlorine analyzer failure.
August 28, 2019	Review during the annual internal audit	Mark Ziller (Operator), Ilona Bruneau (PCT)	Table 1 – Source/Intake; corrected location of an alternate pump from river to lake under existing control measures.
September 30, 2019	Review outcomes during Plan update	Ilona Bruneau (PCT)	Table 1 - Added MECP's Potential Hazard No. 7 – sustained pressure loss to a low level in the clearwell and when clearwell removed from service for repair or maintenance.
September 8, 2020	Annual Review	Ilona Bruneau (PCT)	Table 1 – For a potential blue green algae bloom in the source water; removed Responding Procedure for Blue-Green Algae and added SOP for Monitoring, Sampling and Reporting Harmful Blue-Green Algae. Added Pandemic as risk to the water treatment systems in light of the COVID-19 Pandemic and added emergency procedure for Gas Leak to cylinder failure under chlorine gas system. Table 2 – Under Primary Disinfection (Chlorine Gas System) - Added emergency procedure for Gas Leak and Vacuum Chlorinator Failure Changed MOECC to MECP or Ministry.
September 23, 2020	Review during the annual internal audit	Claude Mongrain (Team Lead/ORO)	No changes identified.

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Date of Activity	Type of Activity	Participants	Summary of Results
August 17, 2021	36 month Risk Assessment	Claude Mongrain (Team Lead/ORO), Ilona Bruneau (PCT), Victor Legault (Senior Operations Manager)	Table 1 – Changed the likelihood rating for raw water biological or chemical contamination from a 3 to a 4 in light of yearly observations of blue green algae in Lake Temiskaming (Risk value = 12). Changed the likelihood rating for a standby generator failure from a 2 to a 3 and the consequence rating form a 4 to a 3 (risk value = 9). Added Ministry Hazard Reference Numbers 2 and 6 to PLC/SCADA failure; also added potential accident or vandalism/terrorism to the description of the hazard. Included facility locked when no personnel on-site as an additional control measure. Changed the consequence rating from a 4 to a 3 (risk value = 6). Added HAA and NDMA to the description for adverse water quality incidents in the distribution system. Table 2 – Added critical control limits for the low level pump chamber at the Niven St. Reservoir.
April 19, 2022	Annual Review	Ilona Bruneau (PCT)	Table 1 – Updated possible outcomes and existing control measures for SCADA failure. Updated to include MECP's new hazardous event, cybersecurity threats. Added possible outcomes and existing control measures. Table 3 – Updated August 17, 2021 review to include the Senior Operations Manager. Table 4 – Updated to include MECP's new hazardous event, cybersecurity threats (Reference No. 13).
May 29, 2023	Annual Review	Ilona Bruneau (PCT)	No changes identified.
September 29, 2023	Review during the annual internal audit	Ilona Bruneau (PCT)	Table 1 - Added blower failure, de-sludge valve failure and backwash, effluent and filter-to-waste valve failures as a hazardous event. Replaced multiple EEPs for Reporting and Responding to various AWQIs to one EEP that covers all incidents.
June 19 & 24, 2024	36 month Risk Assessment	Claude Mongrain (Operations Supervisor/ORO), Ilona Bruneau (PCT), Andrew Gervais (UPIT/Operator), Hetanshi Dalwadi (PCT Coop Student), Bryce Logan (Senior Operations Manager)	Table 1 - Removed Algae Bloom from the raw water Spill hazard and listed it as its own risk. Assessed and included the Reservoir Out of Service for Repair or Maintenance as a risk for the Reservoir. Added additional control measures for selected risks/hazards. Changed risk value for raw water spill, low lift pump failure and natural disasters. Minor working changes, Reviewed the Ministry's Potential Hazardous Event/Hazard

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: B. Logan, Senior Operations Manager

Date of Activity	Type of Activity	Participants	Summary of Results
			Reference Numbers and updated for selected hazards as per the re-assessment. Table 2 - Added emergency procedure (EEP) for High Turbidity Off the Filters for the filtration process critical control limit. Removed watermark

Table 4: Potential Hazardous Event/Hazard Reference Numbers (based on MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated April, 2022)

If the hazardous event/hazard is not applicable to this drinking water system (DWS), it will be noted in the first column of this table.

System Type (indicate all that apply to this DWS)		Reference Number	Description of Hazardous Event/Hazard
X	All Systems	1	Long Term Impacts of Climate Change
X	All Systems	2	Water supply shortfall
X	All Systems	3	Extreme weather events (e.g., tornado, ice storm)
X	All Systems	4	Sustained extreme temperatures (e.g., heat wave, deep freeze)
X	All Systems	5	Chemical spill impacting source water
X	All Systems	6	Terrorist and vandalism actions
X	Distribution Systems	7	Sustained pressure loss
X	Distribution Systems	8	Backflow
X	Treatment Systems	9	Sudden changes to raw water characteristics (e.g., turbidity, pH)
X	Treatment Systems	10	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system)
X	Treatment Systems and Distribution Systems providing secondary disinfection	11	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)
X	Treatment Systems using Surface Water	12	Algal blooms
X	All Systems	13	Cybersecurity threats

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT

Approved by: B. Logan, Senior Operations Manager

Revision History

Date	Revision #	Reason for Revision
Oct. 24, 2009	0	Initial risk assessment conducted
Jun. 26, 2012	1	Template revised to include 'Record of Annual Review/36-Month Risk Assessment' (Table 3) and updated Critical Control Limit set points; updated Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager
Nov. 23, 2012	2	Added 'monitor and sample raw water quality' control measure for spill of biological or chemical material, removed the word 'none' and added 'install an alternate intake pipe', changed 'treated to 'filter' water turbidity alarms' control measure for spring/fall turnover, added 'pump failure' control measure to low lift pump failures, re-ranked likelihood and consequence of excavation near low lift building, added 'ineffective coagulation process to remove turbidity' to aluminum sulphate feed pump failure, removed 'caustic soda' from the filtration process hazardous event, changed soda ash feed pump control measure to '2 systems available (2 pre-treatment pumps and 2 post treatment pumps)', added 'ineffective coagulation process' to polymer feed pump failure, added 'backwash pump failure alarms' as a control measure to backwash system failure, added 'filter redundancy (3) and alarm for turbidity analyzer at 0 NTU' control measures to turbidity meter failure, changed 'back-up pump to 'chlorinator'' control measure to vacuum chlorinator failure, removed 'redundancy (duel-celled clearwell) and added 'reservoir also used for contact time' control measure under clearwell out of service, added 'sample schedule for microbiological bacteria' control measure under reservoir compromised integrity, added 'pump failure alarm' to ammonium sulphate pump failure, removed 'duplexed analyzers' and added 'free chlorine analyzer as backup' control measure and added 'total' chlorine residual possible outcome of secondary disinfection analyzer failure, removed 'switch from combined to free residual in the system if required' control measure under non-typical distribution system flows, removed 'on-line monitoring of discharge' control measure and re-ranked likelihood and consequence for distribution pump failure, re-ranked likelihood and consequence for distribution system AWQI's, re-ranked likelihood and consequence of water treatment system power failure, added 'back-up power failure' hazardous event, removed 'fencing around entire reservoir' control measure from vandalism/terrorism, removed 'caustic soda' control limits from Table 2 as part of the filtration process CCP, changed high chlorine set point in Table 2, and added low pressure set point alarm in Table 2.
Apr. 19, 2016	3	Risk assessment completed – omitted "Pressure in Distribution System" as a CCP
Jun. 12, 2016	4	Added procedures from "Existing Control Measures" in Table 1 to "Response, Reporting and Recording Procedures" in Table 2. Changed Filter High set point from 0.7 to <1, changed Primary Disinfection Low Chlorine set point from 0.7 to >0.2 and the high set point from 3.0 to <5.0 in Table 2.
May 31, 2017	5	Updated Table 3. Changed Water Treatment System to Drinking Water System.
Sep. 06, 2018	6	Summary of Risk Assessment Outcomes assigned document number (OP-08A); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Hazardous Events for Municipal Residential Drinking Water Systems"; and updated Table 1 to include results of the 36-month risk assessment that took place on September 05, 2018.
Jan. 24, 2019	7	Revised summary based on results of October 30, 2018 and January 24, 2019 reviews.

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT	Approved by: B. Logan, Senior Operations Manager

Date	Revision #	Reason for Revision
Sep. 30, 2019	8	Revised summary based on results of August 28, 2019 and September 30, 2019 reviews.
Oct. 2, 2020	9	Revised summary based on results of September 8 and 23, 2020 reviews.
Aug. 24, 2021	10	Revised summary based on results of 36 month re-assessment performed on August 17, 2021.
Sep. 1, 2022	11	Revised summary based on results of April 19, 2022 review.
Jun. 24, 2024	12	Revised summary based on results of September 29, 2023 review and the 36 month risk assessment performed on June 19 & 24, 2024.

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Table 1: Risk Assessment Outcome Table

Note: Processes referred to in section 5.5 of QP-02 Risk Assessment must be identified as mandatory Critical Control Points (CCPs) as applicable. Mandatory CCPs are not required to be ranked.

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Raw Water/Wells	1, 2, 3, 4, 6	Well casing collapse due to natural disaster or vandalism/terrorism	Loss of raw water	Back-up well and pump, Well 4 - Pressure transmitter (PT) to monitor aquifer level Low clearwell alarm, City ordered water conservation or ban, Routine monitoring of well water flows via SCADA, Routine operational checks, Site specific Environmental Emergency Procedure (EEP) for Water Supply Shortage	2	2	4	**NO**
Raw Water/Wells	2	Well pump failure	Loss of raw water	Second well and pump, Pump fail alarm on both pumps, Low clearwell alarm, City ordered water conservation or ban, Routine monitoring of well water flows via SCADA), Routine operational checks, EEP for Well Pump Failure, EEP - Water Supply Shortage	3	2	6	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Raw Water/Wells	2, 5, 6, 9	Fuel/chemical or biological spill to the well, accidently or intentionally. Proximity to Railway and municipal roads	Contamination of aquifer	No method of control until contaminant has been identified - response may include; - shutting down the well, - distance may allow for corrective actions to be carried out before contamination of groundwater occurs, - City ordered water conservation or ban (supply alternate source of water), - monitor and sample, EEP for Off-site Fuel/Chemical Spill, EEP for Contaminated Raw Water Supply, Contingency Plan (CP) for Spill Response CP for Unsafe Water,	2	5	10	**NO**
Chlorine Gas System (primary disinfection)	10	Vacuum chlorinator pump failure	Loss of disinfection, Ineffective removal of pathogens (minimum treatment requirements not met), Potential for AWQI	Continuous on-line monitoring with alarms, Low pre-chlorine alarm, Spare parts within the cluster, Scheduled maintenance activities, EEP for Vacuum Chlorinator Failure, EEP for Low or High Chlorine Residual in Treated Water, Standard Operating Procedure (SOP) for Chlorine CT,				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Site specific spreadsheet to calculate CT, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Chlorine Gas System (primary disinfection)	10	Cylinder failure	Loss of disinfection, Low chlorine residual Inadequate inactivation of pathogens, Potential for AWQI	Redundancy (1 standby cylinder), On-line monitoring with alarms, In-house residual testing and dosage calculations, Scheduled maintenance activities, Leak detection alarm, EEP for Chlorine Gas Leak EEP for Self-Contained Breathing Apparatus (SCBA), EEP for Chlorine Cylinder Emergency Kit				**YES – Mandatory CCP**
Chlorine Gas System (primary disinfection)	10	Free chlorine analyzer failure	Unknown chlorine residual levels, Potential for AWQI	Analyzer fault alarm, In-house residual testing every 5 minutes, Scheduled maintenance activities, Back-up analyzer (in cluster), Plant shutdown on low residual, SOP for CT, Site specific spreadsheet to calculate CT, EEP for Chlorine Analyzer Failure, EEP for Low or High Chlorine Residual in Treated Water,				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Chlorine Gas System (primary disinfection)	10	Low supply of chlorine gas	Inadequate disinfection, Potential for AWQI	Low chlorine residual alarm, Operator checks, Chemical available within the Region, SOP for CT Results, Site specific spreadsheet to calculate CT, EEP for Low or High Chlorine Residual in Treated Water, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				**YES – Mandatory CCP**
Filtration System (iron and manganese removal/pressure filter)	N/A	Filter Breakthrough	Increased iron and manganese levels, Increased turbidity levels	Redundancy (2 filters), Continuous on-line turbidity monitoring with alarms, Regular backwashes, Scheduled maintenance activities.	2	2	4	**NO**
Filtration System (iron and manganese removal/pressure filter)	N/A	Backwash system failure	Increased iron and manganese levels, Increased turbidity levels	Continuous on-line turbidity monitoring with alarms, Maintenance activities, Manual operation of the system.	2	2	4	**NO**
Clearwells	2, 7	Low level	Inadequate treated water supply,	Low clearwell level alarm with high lift pump lockout, City ordered water conservation or ban,				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
			Inadequate contact time for primary disinfection, Inadequate fire protection	EEP for Water Supply Shortage, EEP for Clearwell-Low Level.				
Clearwells	2, 7, 10	Clearwell out of service for repair, maintenance	Inadequate treated water supply, Inadequate chlorine contact time (CT) for primary disinfection, Inadequate fire protection.	Two clearwells with isolation valve between clearwells, Scheduled controlled maintenance plan and monitoring, Re-calculate CT and increase chlorine dosage to maintain primary disinfection, City ordered water conservation or ban, SOP for CT, Site specific spreadsheet to calculate CT, EEP for Reporting Adverse Water Quality, EEP for Water Supply Shortage, CP for Unsafe Water.				**YES – Mandatory CCP**
Clearwells	2, 7, 10, 11	Compromised structural integrity	Inadequate treated water supply, Inadequate fire protection, Inadequate CT for primary disinfection,	Two clearwells with isolation valve between clearwells, Maintenance and inspection activities, Emergency repair, City ordered water conservation or ban (alternate source of water), EEP for Water Supply Shortage,				**YES – Mandatory CCP**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				EEP for Reporting Adverse Water Quality, CP Loss of Service.				
High Lift Pumps	*2, 7*	High lift pump failure,	Low pressure in distribution system, Low supply of water	Redundancy - 2 high lift pumps, Low clearwell level alarm and pump lockout, Scheduled maintenance activities, EEP for High Lift Pump Failure, EEP for Low or Loss Pressure in the Distribution System, EEP for Water Supply Shortage.	3	3	9	**NO**
Water Treatment System	1, 2, 3, 4, 6, 7, 10	Power failure due to weather, or vandalism/terrorism	Loss of pressure/ supply, Power surges	Back-up generators at WTP and reservoirs, Scheduled maintenance activities for back-up generator, Routine operator checks, Low fuel level alarm (Gen-Set), EEP for Hydro Interruption, Surge or Failure, EEP for Power Failure of Long Duration	4	2	8	**NO**
Water Treatment System	2, 6, 7, 10	Generator Failure (accident or vandalism/terrorism)	Loss of pressure/supply, contamination	Power (generator) failure alarms, Various plant alarms (eg. chlorine, pumps, pressure - at reservoir), Scheduled maintenance activities for back-up generator, Portable generator available within the Region,	3	3	9	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				EEP for Standby Power Failure, CP for Loss of Service.				
Water Treatment System	2, 6, 7, 10, 11	Fire in Plant, Well House or Reservoirs (accidentally or intentionally)	Partial or full system shutdown, Damage to critical equipment, Potential loss of supply.	Regular operator visits, System alarms, Fire extinguishers, EEP for Fire in Plant.	2	4	8	**NO**
Water Treatment System	2, 6, 10, 11	SCADA failure (accident or vandalism/terrorism)	Loss of automatic process control, Interruption or loss of data and trending, Loss of process visibility for operators	Loss of communication alarm, Back-up controller, Spare I/O cards, Spare power supplies, SCADA system password protected, Multi factor protection, Data is backed-up on an external storage devices, Data also backed-up on BTP /Wonderware, Facility locked when no personnel on-site, Qualified personnel (Instrumentation Technician) available, Operate plant manually.	2	3	6	**NO**
Water Treatment System	2, 5, 6	Vandalism/terrorism at Water Treatment Plant, Well House and Reservoirs	Contamination of the water supply, Damage to critical equipment	Locked (WTP, well house, reservoirs), Appropriate signage, Intrusion alarms and surveillance cameras (reservoirs),	2	4	8	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Fencing at reservoirs, Regular visits by operators, Regular sampling and monitoring, City ordered ban, supply an alternate source of drinking water, EEP for Vandalism or Suspected Unauthorized Entry, EEP for Contamination of Treated Water, EEP for Water Supply Shortage, CP for Spill, Response, CP for Loss of Service, CP for Security Breach.				
Water Treatment System	13	Cybersecurity Threats (PDM, WMS, SCADA – Wonderware)	Loss of system process visibility for operators (e.g., unable to monitor treatment processes), Interruption of data recording leading to a loss of critical/ compliance data, Inability to remotely control processes and/or loss of automatic control, Installation of malicious programs (eg. ransomware) which can disable business	Embedded system security include: Identity and Access Management throughout the account management lifecycle, Privileges are granted to users with two principles – need to know and least privileges. Users are assigned only the privileges they need to perform their job, Default to fail secure. The application or system failure will cause little or no harm to other systems. Data will not fall into the wrong hands, Multiple layers of defense including:	2	4	8	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
			enterprise until money is paid, Loss of data (stolen or maliciously deleted)	o Intrusion detection systems constantly monitoring traffic flow (borders), o Multi factor authentication o Firewalls that provide real-time filtering and blocking (walls), o Cryptography and layered authentication (zones), o Certified professionals ensuring system integrity (gatekeepers), Constant monitoring and tracking for quick and effective response to attacks, Performance of routine vulnerability scans and threat assessments, Periodic cyber security audits and risk compliance checks Databases backed-up on a remote, secured network location, Operate plant manually CP – Security Breach.				
Water Treatment System	1	Pandemic	Shortage of staff Supply shortages Loss of sample locations	CP for Critical Shortage of Staff Staff training and PPE, OCWA's Emergency Operations Center/Action Group (EOC), Staff isolation, staff rescheduling, modifications to work rounds, remote work done where possible,	2	4	8	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Alternate suppliers available, refer to Essential Services & Suppliers list				
Water Treatment System	1, 2, 3, 4, 9, 10, 11	Natural Disasters (ice storm, wind storm, flooding, forest fire)	Loss of supply, Contamination, Loss of communication, Loss of power	Contingency Plans, Emergency Procedures, OCWA's Emergency Response Plan, City's Emergency Response Plan, Staff training.	3	4	12	**NO** – does not meet all criteria in step 3.3.7 of OP-07. No control of the hazard
Distribution System Reservoirs (Shepherson Road & Dymond)	7, 8, 11	Pump failure	Low pressure in the system Potential for infiltration and AWQI	Redundancy (3 pumps at Shepherdson and 4 pumps at Dymond), Scheduled maintenance activities, On-line monitoring of discharge pressure, Alarms for low pressure, EEP for Pump Failure, EEP for Low Pressure Events in the Distribution System, CP for Unsafe Water.	2	3	6	**NO**
Distribution System Reservoirs (Shepherson Road & Dymond)	2, 7	Low level	Inadequate water supply, Inadequate fire protection.	Low level alarms, Operator checks, City ordered water conservation or ban.	3	2	6	**NO**
Distribution System Reservoir Reservoirs (Shepherson Road & Dymond)	2, 7	Compromised integrity	Loss of volume, Inadequate fire protection. Infiltration, Potential AWQI,	Low level alarms, Residual monitoring, Operator checks City ordered water conservation or ban,	2	4	8	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality				
Distribution System (secondary disinfection)	11	Loss of chlorine residual in distribution	Failure to control biofilm and pathogens (long-term), Potential for AWQI	Continuous on-line monitoring of chlorine residual into the distribution system, Alarms for low free chlorine residuals in water entering distribution system, Two chlorine booster stations (Shepherson Rd. and Dymond reservoirs), Distribution chlorine residual testing as per O. Reg. 170/03, Regularly scheduled maintenance of disinfection systems, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				**YES – Mandatory CCP**
Distribution System	N/A	Adverse water quality as described in O. Reg. 170/03 (eg. Bacteriological, Total Trihalomethanes, HAAs)	Potential for unsafe drinking water	Site specific Sampling Schedule, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	3	4	12	**NO** – does not meet all criteria in step 3.3.7 of OP-07. No control of the hazard
Distribution System	6, 7	Fire (accidentally or intentionally)	Contamination Low pressure, Low clearwell level	Communication with fire department, Low pressure alarms at reservoirs, High flow alarms at reservoirs,	3	2	6	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Low reservoir level alarm, Low clearwell alarm at WTP, Monitoring of flows and pressure, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Distribution System (watermains)	1, 2, 3, 4, 7, 8	Structural failure/ breaks due to weather or age	Contamination, Loss of pressure/supply	Notification/complaints from customers, Routine monitoring of flows, pressure and clearwell levels via SCADA, Alarms (high flows, low pressure, low clearwell) Maintenance program, AWWA Standards and Ministry's Watermain Disinfection Procedure, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	4	3	12	**NO** – does not meet all criteria in step 3.3.7 of OP-07. No control of the hazard
Distribution System (service connections)	8	Cross-connection, backflow, siphonage	Contamination	Plumbing code, Municipal by-law EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	2	4	8	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Distribution System (service connections)	1, 2, 3, 4, 7, 8	Structural failure/breaks due to accident, weather, age	Contamination, Loss of pressure/supply to affected users	Customer notification/complaints, Routine monitoring of flows, clearwell levels, and pressure via SCADA, Alarms (high flows, low pressure, low clearwell), EEP for Low or Loss of Pressure, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	4	2	8	**NO**
Distribution System (valves)	1, 2, 3, 4, 7, 8	Structural failure due to accident, weather, age	Loss of control, Contamination, Loss of pressure	Routine monitoring of flows, clearwell level and pressure via SCADA, Alarms (high flows, low pressure, low clearwell), Maintenance program, AWWA Standards and Ministry's Watermain Disinfection Procedure, EEP for Low or Loss of Pressure, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	3	2	6	**NO**
Distribution System (hydrants)	1, 2, 3, 4, 7, 8	Structural failure/ component failure due to accident, weather, age	Contamination, Loss of pressure, Loss of supply, Loss of fire control	Customer notification/complaints, Routine monitoring of flows, pressure and clearwell levels via SCADA, Alarms (high flows, low pressure, low clearwell),	2	3	6	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Activity/ Process Step	Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
				Maintenance program, AWWA Standards and Ministry's Watermain Disinfection Procedure, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.				
Distribution System All - watermains, connections, valves, construction, etc.	2, 6, 7, 8	Accident, Vandalism/terrorism	Contamination, Loss of water supply, Loss of pressure	Notifications/complaints from customers, Routine monitoring of flows, pressure and clearwell levels via SCADA, Alarms (high flows, low pressure, low clearwell), Operator checks, EEP for Low or Loss of Pressure, EEP for Water Supply Shortage, EEP for Reporting Adverse Water Quality, CP for Unsafe Water.	2	3	6	**NO**
Distribution System (capital construction)	7, 8	Sub-standard construction and commissioning	Contamination, Loss of pressure	AWWA guidelines, Provincial standards, Staff training, Sampling and testing.	2	3	6	**NO**

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Table 2: Identified Critical Control Points (CCPs)

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Primary Disinfection (Chlorine Gas System)	**Free Chlorine Residual Alarm –** Low alarm set point = no less than 0.40 mg/L (with plant shutdown)	SCADA (continuous online analyzer), Routine operator checks via remote monitoring system, Trend review and sign-off as per O. Reg. 170/03, Routine on-site checks conducted by OCWA staff, Alarms, Sampling, Chemical Dosages	Refer to: • SOP for CT (Chlorine Concentration x Time), • Site specific spreadsheet to calculate CT • EEP for Vacuum Chlorinator Failure • EEP for Free Chlorine Analyzer Failure • EEP for Low or High Chlorine Residual in Treated Water • EEP for Chlorine Gas Leak • EEP for Chlorine Cylinder Repair Kit • EEP for SCBA, • EEP for Reporting Adverse Water Quality, • CP for Unsafe Water.
Primary Disinfection (Clearwells)	**Clearwell Low Level Alarm - Plant** Set point = no less than 0.8 meters (with high lift pump lock-out)	SCADA (continuous online analyzers), Routine operator checks via remote monitoring system (Wonderware) Trend review and sign-off as per O. Reg. 170/03, Regular on-site checks conducted by certified municipal operators, Routine on-site checks conducted by OCWA staff	Refer to: • SOP for CT (Chlorine Concentration x Time) • SOP for When to Use CT Calculation • EEP for Water Supply Shortage • EEP for Clearwell-Low Level • EEP for Reporting Adverse Water Quality, • CP for Unsafe Water
Secondary Disinfection	**Free Chlorine Residual - Distribution System** Regulatory Low – 0.05 mg/L High - 4.0 mg/L (high)	Distribution chlorine residuals monitored as per O. Reg. 170/03	Refer to: • EEP for Reporting Adverse Water Quality, • CP for Unsafe Water

Note: Standard Operating Procedures (SOPs) referenced in Tables 1 and 2 are controlled as per QP-01 Document and Records Control.

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Table 3: Record of Annual Review/36-Month Risk Assessment

The Drinking Water Quality Management Standard (DWQMS) requires that the currency of the information and the validity of the assumptions used in the risk assessment be verified at least once every calendar year. In addition, the risk assessment must be conducted at least once every thirty-six months.

Date of Activity	Type of Activity	Participants	Summary of Results
October 24, 2009	Initial Risk Assessment	Amanda Dubuc (PCT), Michael Del Monte (Operations Manager), Eddie Hillman (ORO)	Conducted initial risk assessment.
October 30, 2009	Review	Amanda Dubuc (PCT)	Desktop review prior to submission of Partial Accreditation application. No changes.
September 17, 2010	Review	Amanda Dubuc (PCT), Eric Nielson (PCM), Michael Del Monte (Operations Manager), Tony Janssen (Senior Operations Manager)	Review during Internal Audit. No changes.
October 15, 2010	Review	Amanda Dubuc (PCT), Tony Janssen (Senior Operations Manager), Eric Nielson (PCM), Michael Del Monte (Operations Manager)	Review during management review meeting. No changes.
November 9, 2011	Review	Amanda Dubuc (PCT), Eric Nielson (PCM), Pat Dinel (Operator), Tony Janssen (Senior Operations Manager)	Review during Internal Audit. No changes.
December 20, 2011	Review	Amanda Dubuc (PCT), Tony Janssen (Senior Operations Manager), Eric Nielson (PCM), Michael Del Monte (Operations Manager)	Review during management review meeting. No changes.
November 9, 2012	Risk Assessment	Amanda Dubuc (PCT) and Eddie Hillman (ORO)	Conducted 36 month risk assessment. Changes are summarized in the revision history.
November 27, 2014	Review	Ilona Bruneau (PCT), Rebecca Marshall (PCT) and Eddie Hillman (ORO)	Review of Risk Assessment completed during the Internal Audit. No Changes.
November 19, 2015	Risk Assessment	Rebecca Marshall (PCT) and Eddie Hillman (ORO)	Conducted 36 month risk assessment. Changes are summarized in the revision history.
October 26, 2016	Review	Rebecca Marshall (PCT), Eddie Hillman (ORO), Claude Mongrain (Operator) and Bryce Logan (Operator)	Review of Risk Assessment Completed. No Changes

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Date of Activity	Type of Activity	Participants	Summary of Results
May 31, 2017	Review	Rebecca Marshall (PCT)	Changes are summarized in the revision history.
February 13, 2018	Reviewed during internal audit	Ilona Bruneau (PCT), Eddie Hillman (ORO)	Include high lift pump lock out feature under Clearwell – low level and updated number of distribution pumps at the reservoirs.
September 5, 2018	36 month Risk Assessment	Claude Mongrain (ORO), Bryce Logan (Electronic Tech.), Ilona Bruneau (PCT), Victor Legault (Sr. Operations Manager)	All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems") and ranked according to OP-07 (revision 0). Results captured in Revision 6 of this Summary of Risk Assessment Outcomes.
October 30, 2018	Reviewed during the annual internal audit	Claude Mongrain (Team Lead/ORO), Bryce Logan (Team Lead/Electronic Tech.), Ilona Bruneau (PCT)	Table 2 – added critical control limit for the clearwell (primary disinfection). Corrected the QEMS doc. Number from OP-08A to OP-08B.
January 24, 2019	Reviewed outcomes during Plan update	Ilona Bruneau (PCT)	Table 1 - Updated or changed the MOECC Potential Hazardous Event/Hazard Reference numbers for water treatment system.
August 28, 2019	Reviewed during the annual internal audit	Josh Dubois (Operator), Ilona Bruneau (PCT)	Table – 2 -Changed high lift pump shut off to plant shutdown and added high lift pump lock-out to low clearwell level.
September 30, 2019	Reviewed outcomes during Plan update	Ilona Bruneau (PCT)	Table 1 - Added MECP's Potential Hazard No. 7 – sustained pressure loss when clearwell removed from service for repair or maintenance, to low reservoir levels and compromised integrity of the Shepherdson and Dymond reservoirs. Added No. 11 - failure of equipment or process associated with secondary disinfection to fire in the plant.
September 8, 2020	Annual Review	Ilona Bruneau (PCT)	Table 1 – Added Pandemic as risk to the water treatment systems in light of the COVID-19 Pandemic and added emergency procedure for Gas Leak to cylinder failure under chlorine gas system. Table 2 – Under Primary Disinfection (Chlorine Gas System) - Added emergency procedure for Gas Leak and Vacuum Chlorinator Failure Changed MOECC to MECP or Ministry.
September 16, 2020	Reviewed during the annual internal audit	Chris Barkhouse (Electronics Technician/Operator)	No changes identified
August 17, 2021	36 month Risk Assessment	Claude Mongrain (Team Lead/ORO),	Table 1 – Changed the likelihood rating for a standby generator failure from a 2 to a 3 and the consequence rating form a 4 to a 3 (risk value = 9).

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Date of Activity	Type of Activity	Participants	Summary of Results
		Ilona Bruneau (PCT), Victor Legault (Senior Operations Manager)	Added Ministry Hazard Reference Numbers 2 and 6 to PLC/SCADA failure; also added potential accident or vandalism/terrorism to the description of the hazard. Included facility locked when no personnel on-site as an additional control measure. Changed the consequence rating from a 4 to a 3 (risk value = 6). Added HAA to the description for adverse water quality incidents in the distribution system.
April 19, 2022	Annual Review	Ilona Bruneau (PCT)	Table 1 – Updated possible outcomes and existing control measures for SCADA failure. Updated to include MECP's new hazardous event, cybersecurity threats. Added possible outcomes and existing control measures. Table 3 – Updated August 17, 2021 review to include the Senior Operations Manager. Table 4 – Updated to include MECP's new hazardous event, cybersecurity threats (Reference No. 13).
May 29, 2023	Annual Review	Ilona Bruneau (PCT)	No changes identified
September 29, 2023	Review during the annual internal audit	Ilona Bruneau (PCT)	Replaced multiple EEPs for Reporting and Responding to various AWQIs to one EEP that covers all incidents.
June 19 & 24, 2024	36 month Risk Assessment	Claude Mongrain (Operations Supervisor/ORO), Marc Doyon (UPIT/Operator), Ilona Bruneau (PCT), Bryce Logan (Senior Operations Manager)	Table 1 - Added additional control measures for selected risks/hazards. Changed risk value for raw well pump failure, power failure, fire in the plant and natural disasters. Minor working changes, Reviewed the Ministry's Potential Hazardous Event/Hazard Reference Numbers and updated for selected hazards as per the re-assessment. Removed watermark.

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT | Approved by: Bryce Logan, Senior Operations Manager

Table 4: Potential Hazardous Event/Hazard Reference Numbers (based on MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated April 2022)

If the hazardous event/hazard is not applicable to this drinking water system (DWS), it will be noted in the first column of this table.

System Type (indicate all that apply to this DWS)		Reference Number	Description of Hazardous Event/Hazard
X	All Systems	1	Long Term Impacts of Climate Change
X	All Systems	2	Water supply shortfall
X	All Systems	3	Extreme weather events (e.g., tornado, ice storm)
X	All Systems	4	Sustained extreme temperatures (e.g., heat wave, deep freeze)
X	All Systems	5	Chemical spill impacting source water
X	All Systems	6	Terrorist and vandalism actions
X	Distribution Systems	7	Sustained pressure loss
X	Distribution Systems	8	Backflow
X	Treatment Systems	9	Sudden changes to raw water characteristics (e.g., turbidity, pH)
X	Treatment Systems	10	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system)
X	Treatment Systems and Distribution Systems providing secondary disinfection	11	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)
N/A	Treatment Systems using Surface Water	12	Algal blooms
X	All Systems	13	Cybersecurity threats

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: Ilona Bruneau, QEMS Representative/PCT

Approved by: Bryce Logan, Senior Operations Manager

Revision History

Date	Revision #	Reason for Revision
Oct. 24, 2009	0	Initial risk assessment conducted
Jun. 26, 2012	1	Template revised to include 'Record of Annual Review/36-Month Risk Assessment' (Table 3) and updated Critical Control Limit set points; updated Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager
Nov. 22, 2012	2	Added 'contained aquifer' control measure and re-ranked likelihood and consequence for fuel/chemical spill at the source, added 'presence of bacteria in well' hazardous event, changed 'Redundancy (1 standby and back-up ~~pumps~~ 'chlorinator')' control measure for vacuum chlorinator failure, added 'on-line turbidity 'with alarms'' control measure to filter breakthrough, changed 'Town' to 'City' and added 'CT SOP' control measure to low clearwell level, added 'CT SOP to be modified for reduced capacity' control measure and re-ranked likelihood and consequence for clearwell out of service, changed 'lockout' to 'plant shutdown' under high lift pump control measures, re-ranked likelihood and consequence for distribution AWQI and power failure, added 'back-up power failure' hazardous event, added 'fence around reservoir' control measure to vandalism/terrorism, and changed low chlorine set point from 0.55 mg/L to 0.35 mg/L in Table 2.
Apr. 19, 2016	3	Changed CCP for primary disinfection low level alarm from 0.35 mg/L to 0.40 mg/L and omitted Distribution Pumps as a CCP and rated the risk
Jul. 12, 2016	4	Added procedures from "Existing Control Measures" in Table 1 to "Response, Reporting and Recording Procedures" in Table 2. Changed low chlorine set point from 0.4 to >0.35.
May 11, 2017	5	Updated Table 3 and changed Water Treatment System to Drinking Water System.
Sep. 6, 2018	6	Summary of Risk Assessment Outcomes assigned document number (OP-08B); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Hazardous Events for Municipal Residential Drinking Water Systems"; and updated Table 1 to include results of the 36-month risk assessment that took place on September 5, 2018.
Jan. 24, 2019	7	Revised summary based on results of October 30, 2018 and January 24, 2019 reviews.
Sep. 30, 2019	8	Revised summary based on results of August 28, 2019 and September 30, 2019 reviews.
Oct. 2, 2020	9	Revised summary based on results of September 8 and 16, 2020 reviews.
Aug. 24, 2021	10	Revised summary based on results of 36 month re-assessment performed on August 17, 2021.
Sep. 1, 2022	11	Revised summary based on results of April 19, 2022 review.
Jun. 24, 2024	12	Revised summary based on results of September 29, 2023 review and the 36 month risk assessment performed on June 19 & 24, 2024.

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

1. Purpose

To document the following for the Temiskaming Shores Drinking Water Systems:

- Owner;
- Organizational structure of the Operating Authority;
- QEMS roles, responsibilities and authorities of staff, Top Management and individuals/groups that provide corporate oversight; and
- Responsibilities for conducting the Management Review

2. Definitions

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

Senior Leadership Team (SLT) – members include President and CEO, Executive Vice President and General Counsel, Vice Presidents of OCWA's business units and Regional Hub Managers

Top Management – a person, persons or a group of people at the highest management level within an operating authority that makes decisions respecting the QMS and recommendations to the owner respecting the subject system or subject systems

Operations Personnel – Employees of the drinking water system who perform various activities related to the compliance, operations and maintenance of the drinking water system that may directly affect drinking water quality

3. Procedure

3.1 Organizational Structure

The Temiskaming Shores Drinking Water System is owned by the Corporation of the City of Temiskaming Shores and is represented by the Mayor, Municipal Clerk and Council.

The organizational structure of OCWA, the Operating Authority, is outlined in appendix OP-09A: Organizational Structure.

3.2 Top Management

Top Management for the Temiskaming Shores Drinking Water Systems consists of:

- Operations Management – Temiskaming Shores Cluster
- Regional Hub Manager – Northeastern Ontario Regional Hub
- Operations Management, Capital Projects – Northeastern Ontario Regional Hub
- Safety, Process & Compliance Manager – Northeastern Ontario Regional Hub

Irrespective of other duties (see Table 9-2 below), Top Management's responsibilities and authorities include:

- Endorsing the Operational Plan as per the Commitment and Endorsement procedure (OP-03);
- Ensuring that the QEMS meets the requirements of the DWQMS;
- Ensuring staff are aware of the applicable legislative and regulatory requirements;
- Communicating the QEMS according to the Communications procedure (OP-12);
- Providing resources needed to maintain and continually improve the QEMS;
- Appointing and authorizing a QEMS Representative (OP-04); and
- Undertaking Management Reviews as per the Management Review procedure (OP-20).

Note: Specific responsibilities of the individual members of Top Management are identified in the referenced procedures.

3.3 Corporate Oversight

Roles, responsibilities and authorities for individuals/groups providing corporate oversight of OCWA's QEMS are summarized in Table 9-1 below.

Table 9-1: Corporate QEMS Roles, Responsibilities and Authorities

Role	Responsibilities and Authorities
Board of Directors	• Set the Agency's strategic direction, monitor overall performance and ensure appropriate systems and controls are in place in accordance with the Agency's governing documents • Review and approve the QEMS Policy
Senior Leadership Team (SLT)	• Establish the Agency's organizational structure and governing documents and ensure resources are in place to support strategic initiatives • Monitor and report on OCWA's operational and business performance to the Board of Directors • Review the QEMS Policy and recommend its approval to the Board • Approve corporate QEMS programs and procedures
Corporate Compliance	• Manage the QEMS Policy and corporate QEMS programs and procedures • Provide support for the local implementation of the QEMS • Monitor and report on QEMS performance and any need for improvement to SLT • Consult with the Ministry and other regulators and provide compliance support/guidance on applicable legislative, regulatory and policy requirements • Manage contract with OCWA's DWQMS accreditation body

3.4 Regional Hub Roles, Responsibilities and Authorities

QEMS roles, responsibilities and authorities of Northeastern Ontario Regional Hub personnel are summarized in Table 9-2 below. This information is kept current as per the Document and Records Control procedure (OP-05) and is communicated to staff as per the Communications procedure (OP-12).

Additional duties of employees are detailed in their job specifications and in the various QEMS programs and procedures that form, or are referenced in, this Operational Plan.

Table 9-2: QEMS Roles, Responsibilities and Authorities for the Regional Hub

Role/Position	Responsibilities and Authorities
All Operations Personnel	• Perform duties in compliance with applicable legislative and regulatory requirements • Be familiar with the QEMS Policy and work in accordance with QEMS programs and procedures • Maintain operator certification (as required) • Attend/participate in training relevant to their duties under the QEMS • Document all operational activities • Identify potential hazards at their facility that could affect the environmental and/or public health and report to Operations Management • Report and act on all operational incidents • Recommend changes to improve the QEMS
Regional Hub Manager (Top Management)	• Oversee the administration and delivery of contractual water/wastewater services on a Regional Hub level • Fulfill role of Top Management • Ensure corporate QEMS programs and procedures are implemented consistently throughout the Regional Hub • Manages the planning of training programs for Regional Hub • Report to VP of Operations/SLT on the regional performance of the QEMS and any need for Agency-wide improvement
Operations Management, Capital Projects (Top Management)	• Provide support to the regional operations teams related to planning and execution of capital projects. • Develop standard processes to provide efficiency when providing capital project related support to clients (internal/external) • Report to the Regional Hub Manager on regional capital project status' • Prepare and manage project budgets, ensuring cost-effectiveness • Develop detailed project plans, including timelines, budgets and resource allocation.

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Role/Position	Responsibilities and Authorities
Operations Management (Top Management)	• Manage the day-to-day operations and maintenance of their assigned facilities and supervise facility operational staff • Fulfill role of Top Management • Ensure corporate and site-specific QEMS programs and procedures are implemented at their assigned facilities • Determine necessary action and assign resources in response to operational issues • Report to the Regional Hub Manager on facility operational performance • Ensure operational training is provided for the cluster (in consultation with the SPC Manager as required) • May act as Overall Responsible Operator (ORO) when required if holds appropriate certification – same class or higher than the class of the water treatment or water distribution subsystem • May act as alternate ORO if the designated ORO is unable to act when required, if holds applicable certification or if the certification is not more than one class lower than the class of the subsystem and for not more than 150 days in any 12 month period. • Refer to ORO Letter
Safety, Process & Compliance (SPC) Manager (Top Management)	• Supervise facility compliance staff and provide technical and program support to the Regional Hub related to process control and compliant operations • Fulfill role of Top Management • Ensure corporate/regional QEMS programs and procedures are implemented consistently throughout the Regional Hub • Assist in the development of site-specific operational procedures as required • Ensure training on applicable legislative and regulatory requirements and the QEMS is provided for the Regional Hub (in consultation with Operations Management as required) • Monitor and report to the Regional Hub Manager and Operations Management on the compliance status and QEMS performance within his/her Regional Hub and any need for improvement • Act as alternate QEMS Representative (when required)
Process & Compliance Technician – PCT (QEMS Representative)	• Implement, monitor and support corporate programs relating to environmental compliance and support management by evaluating and implementing process control systems at their assigned facilities • Fulfill role of QEMS Representative (OP-04) • Monitor, evaluate and report on compliance/quality status of their assigned facilities • Implement facility-specific QEMS programs and procedures consistently at their assigned facilities

Role/Position	Responsibilities and Authorities
	• Participate in audits and inspections and assist in developing, implementing and monitoring action items to respond to findings • Report to the SPC Manager on QEMS implementation and identify the need for additional/improved processes and procedures at the Regional Hub/cluster/facility level (in consultation with the Operations Management as required) • Communicates to Owners on facility compliance and DWQMS accreditation as directed • Deliver/participate in/coordinate training including applicable legislative and regulatory requirements and the QEMS • May fulfil role of Certified Operator when required (based on certification)
Operations Supervisor Water & Wastewater	• Perform duties as assigned by Operations Management • Leads daily plant operations and maintenance activities by assigning and monitoring work and resolving issues • Directly supervises projects, provides direction and supervision to operations/mechanical staff, contractors and consultants • Participate as a technical advisor to staff and management and provide specialized training on technical issues • Oversee maintenance activities on equipment and process in order to maintain compliance with applicable legislation, regulations, approvals, and established procedures • Identifies asset management needs and assist management by providing recommendations for annual capital forecasts and • Gathers information for operational and regulatory reports as required • Monitors and reviews water quality test results • Assist in the preparation of facility manuals and documenting operating processes and procedures for staff • Assist in the procurement, RFQ and RFP process • Act for management during vacations or periodic absences • Perform duties of Operator/Mechanic as required • May act as Operator-in-Charge (OIC) if holds a Class I or higher certification for a water treatment or water distribution subsystem • May act as Overall Responsible Operator (ORO) if holds appropriate certification – same class or higher than the class of the water treatment or water distribution subsystem • May act as alternate ORO if the designated ORO is unable to act when required, if holds applicable certification or if the certification is not more than one class lower than the class of the subsystem and for not more than 150 days in any 12 month period. • Refer to ORO Letter

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: I. Bruneau, QEMS Representative | Approved by: B. Logan, Sr. Operations Manager

Role/Position	Responsibilities and Authorities
Certified Operator Includes the following positions: • Senior Water & Wastewater Operator • Water & Wastewater Operator • Water & Wastewater Operator-In-Training (OIT)	• Perform duties as assigned by Operations Management or Supervisor • Monitor, maintain and operate facilities in accordance with applicable regulations, approvals 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 • Assist management in providing recommendations for annual capital forecasts and gathering information for operational reports as required • Assist in the review and preparation of facility manuals and operating procedures • Ensure records of adjustments made to the process under their responsibility, equipment operating status during their shifts and any departures from normal operations observed and actions taken are maintained within facility logs/record keeping mechanisms (as per O. Reg. 128) • Participate in facility inspections and audits • May act as Operator-in-Charge (OIC) if holds a Class I or higher certification for a water treatment or water distribution subsystem • May act as Overall Responsible Operator (ORO) if holds appropriate certification – same class or higher than the class of the water treatment or water distribution subsystem • May act as alternate ORO if the designated ORO is unable to act when required, if holds applicable certification or if the certification is not more than one class lower than the class of the subsystem and for not more than 150 days in any 12 month period. • Refer to ORO Letter **NOTE:** OITs cannot act as OIC and/or ORO. OITs perform the above duties under the direction of the OIC/ORO and as assigned by Operations Management or designate.
Instrumentation Technician (UPIT)/SCADA Support/Operator	• Provide advice and technical expertise on the services required for process control and automation systems • Discuss and advise on detailed system and programming requirements, modify existing and new software in response to plant requests, analyze and resolve problems/error conditions, document changes/modifications and configure, install and support related software, hardware and network for such systems • Perform repairs, inspections, calibrations, preventive maintenance and/or scheduled maintenance on electrical

Role/Position	Responsibilities and Authorities
	systems, equipment, components and devices in accordance with established procedures and record the maintenance data • 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 legislation, regulations, approvals and established operating procedures • Install and commission new electrical/electronic equipment and automation systems • Performs duties as described under “Certified Operator” • May act as Operator-in-Charge (OIC) if holds a Class I or higher certification for a water treatment or water distribution subsystem • May act as Overall Responsible Operator (ORO) if holds appropriate certification – same class or higher than the class of the water treatment or water distribution subsystem • May act as alternate ORO if the designated ORO is unable to act when required if holds applicable certification or if the certification is not more than one class lower than the class of the subsystem and for not more than 150 days in any 12 month period. • Refer to ORO Letter
Electronics Technician/Operator	• Perform repairs, inspections, calibrations, preventive maintenance and/or scheduled maintenance on electrical systems, equipment, components and devices in accordance with established procedures and record the maintenance data • 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 legislation, regulations, approvals and established operating procedures • Performs duties as described under “Certified Operator” • May act as Operator-in-Charge (OIC) if holds a Class I or higher certification for a water treatment or water distribution subsystem • May act as Overall Responsible Operator (ORO) if holds appropriate certification – same class or higher than the class of the water treatment or water distribution subsystem • May act as alternate ORO if the designated ORO is unable to act when required if holds applicable certification or if the certification is not more than one class lower than the class of the subsystem and for not more than 150 days in any 12 month period. • Refer to ORO Letter

Role/Position	Responsibilities and Authorities
Administrative Support Includes the following: • Regional Hub Business Manager • Administrative Assistants	• Support the administrative functions of the Regional Hub/cluster/facility including coordinating delivery of training as required • Assist with entering operational training records into the appropriate database as directed
Municipal Operators working in the Temiskaming Shores Drinking Water Systems	• Fulfill duties assigned by their Supervisor • Regularly inspect the distribution system, perform routine maintenance and repairs and complete appropriate forms • Contact OCWA for all non-routine operational concerns or adjustments • Take control of emergency situations (eg. water main breaks) and complete repair according to applicable regulations, licences, permits and established operating procedures • Collect samples when required • Respond to water complaints and provide records to OCWA • Maintain the distribution log book according to regulatory requirements • Participate in facility inspections and audits • May act as Operator-in-Charge (OIC) if holds a Class I or higher certification for a water distribution subsystem

4. Related Documents

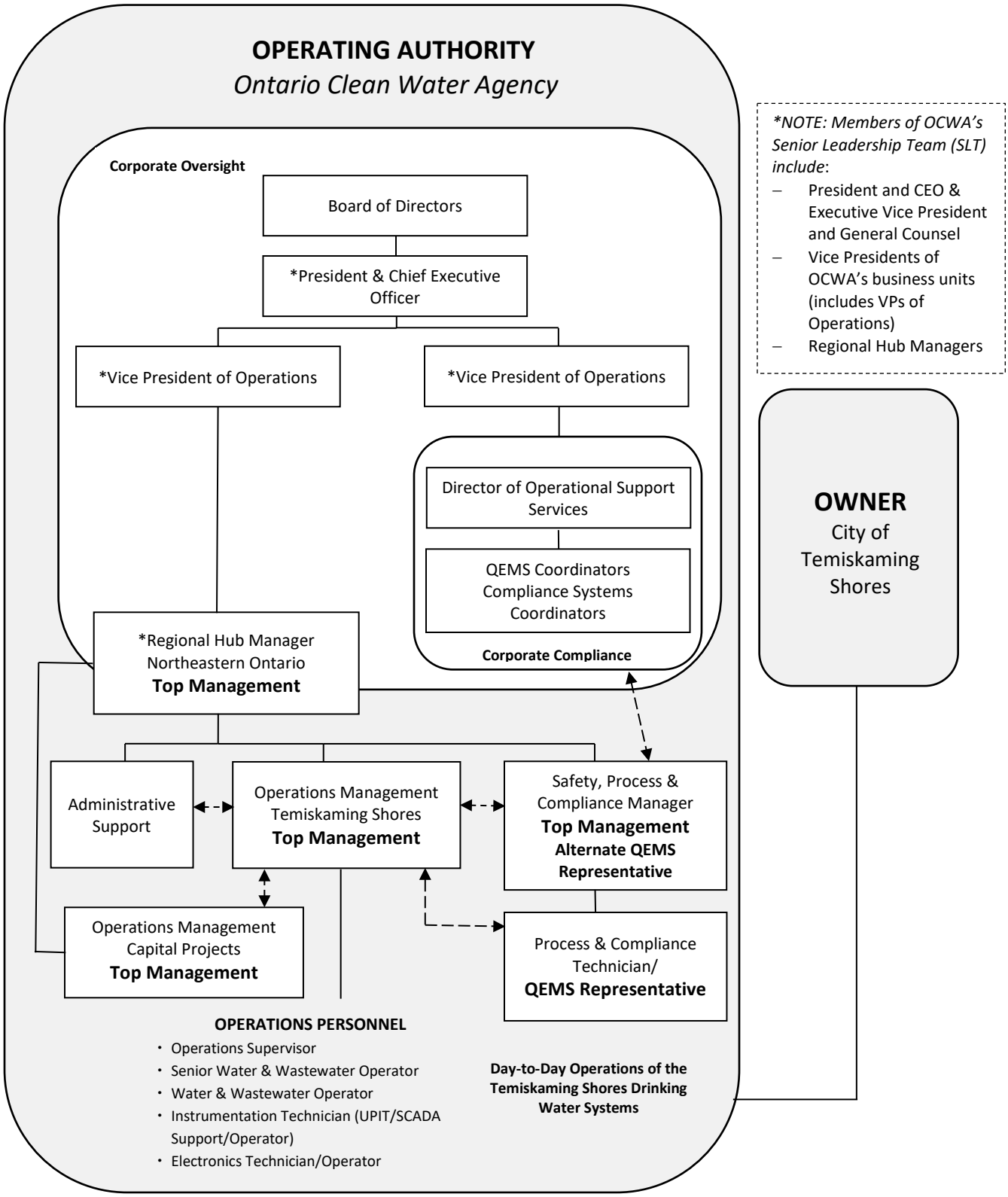
OP-03 Commitment and Endorsement
OP-04 QEMS Representative
OP-05 Document and Records Control
OP-09A Organizational Structure
OP-12 Communications
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-09 (s. 3) was originally set out in main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added definitions for Operations Management and Operations Personnel and throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Incorporated OCWA's new org structure, including SPC Manager. Removed two levels of Top Management (e.g. Facility Level and Corporate level), instead Top Management is only at the facility level and corporate has been moved to Corporate oversight. Re-worded QEMS Roles, Responsibilities and Authorities for each position. Added QEMS Roles, Responsibilities and Authorities for Team Lead and removed Instrumentation Foreman.
Sep. 30, 2019	1	Updated responsibilities and authorities for the Team Lead and the Electronics Technician. Removed positions of Instrumentation Technician and Maintenance Foreman.
Aug. 24, 2021	2	Changed Electronics Technician title to Instrumentation Technician (UPIT) / SCADA Support / Operator.
May 30, 2023	3	Added responsibilities and authorities for Operations Supervisor, Senior Operator and Mechanic Operator and removed position of Team Lead
Jun. 24, 2024	4	Procedure updated with revisions to Table 9-2 as follows: Role/Position updated to clarify roles are performed by multiple positions, position titles updated, note added regarding OITs operating limitations. Clarified certification requirements when selected personal can act has OIC, ORO or alternate ORO. Remove position of Mechanic Operator and added position for Electronics Technician/Operator. Removed watermark.

ORGANIZATIONAL STRUCTURE

Reviewed by: I. Bruneau, QEMS Representative | Approved by: B. Logan, Sr. Operations Manager



Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Organizational Chart issued.
Jun. 26, 2012	1	Added media spokesperson.
Mar. 11, 2013	2	Removed position of Process and Compliance Manager, changed Operations Manager to Senior Operations Manager, changed Cluster Manager to Operations Manager.
Sep. 9, 2017	3	Added Safety Process and Compliance Manager Position and changed media spokesperson from Senior Operations Manager to Regional Hub Manager. Added Maintenance Foreman, Instrumentation Foreman and Electronic Technician. Changed Director of Risk, Compliance & Training to Director of Operational Services.
Aug. 28, 2018	4	Appendix issued - Organizational Chart previously contained as Appendix C of the Operational Plan. Moved to a new Appendix. Removed position for Instrumentation Foreman.
Sep. 30, 2019	5	Removed the positions of Instrumentation Technician and Maintenance Foreman
Oct. 2, 2020	6	Revision to reflect change to reporting structure - Corporate Compliance now reports to VP of Operations.
Aug. 24, 2021	7	Changed Electronics Technician title to Instrumentation Technician (UPIT) / SCADA Support / Operator
May 30, 2023	8	Updated chart to include Supervisor, Senior Operator and Mechanic Operator. Removed position of Team Lead.
Jun. 24, 2024	9	Revised to include Senior Leadership Team (SLT) in reporting structure and identify members, added Compliance System Coordinators, added Operations Management, Capital Projects, and updated Operations Personnel position titles. Removed watermark.

1. Purpose

To document a procedure that describes:

- the competencies required for personnel performing duties directly affecting drinking water quality;
- the activities to develop and/or maintain those competencies; and
- the activities to ensure personnel are aware of the relevance of their duties and how they affect safe drinking water.

2. Definitions

Competence – the combination of observable and measurable knowledge, skills, and abilities which are required for a person to carry out assigned responsibilities

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

Operations Personnel – employees of the drinking water system who perform various activities related to the compliance, operations and maintenance of the drinking water system that may directly affect drinking water quality

Top Management – a person, persons or a group of people at the highest management level within an operating authority that makes decisions respecting the QMS and recommendations to the Owner respecting the subject system or subject systems

3. Procedure

3.1 The following table presents the minimum competencies required by operations personnel.

Role/Position	Required Minimum Competencies
Operations Management (Top Management)	• Valid operator certification required to fulfil certified operator duties (if assigned). • Experience and/or training in managing/supervising drinking water system operations, maintenance, financial planning and administration • Training and/or experience related to drinking water system processes, principles and technologies • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems

Role/Position	Required Minimum Competencies
Safety, Process & Compliance (SPC) Manager (Top Management) (May also fulfill the role of Alternate QEMS Representative)	• Valid operator certification; if required to act as Overall Responsible Operator (ORO), certification must be at the level of the facility or higher • Experience in providing technical support and leading/managing programs related to process control and compliant operations • Experience and/or training in conducting compliance audits, and management system audits • Experience and/or training in preparing and presenting informational and training material • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Process & Compliance Technician (PCT) (QEMS Representative)	• Valid operator certification required to fulfil certified operator duties (if assigned) • Experience and/or training in resolving/addressing compliance issues for drinking water systems • Experience and/or training in monitoring, assessing and reporting on facility performance against legal requirements and corporate goals • Experience and/or training in preparing and presenting informational and training material • Experience in conducting management system audits or internal auditor education/training • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Operations Supervisor Water & Wastewater	• Valid operator certification; if required to act as Overall Responsible Operator (ORO), certification must be at the level of the facility or higher Experience and/or training in managing and planning multiple projects, assessing priorities and effectively coordinating operation and maintenance programs • Experience leading/directing operations personnel, and providing technical guidance to resolve operational issues • Training and/or experience related to operations and maintenance of drinking water system processes, principles and technologies • Experience and/or training in financial planning and administration • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures

Role/Position	Required Minimum Competencies
	• Experience using computers and operational computerized systems
Certified Operator Includes the following: • Senior Water & Wastewater Operator • Water & Wastewater Operator • Water & Wastewater Operator-in-Training	• Valid operator certification • If required to act as ORO, certification must be at the level of the facility or higher • If required to act as Operator-in-Charge (OIC), certification must be level 1 or higher • Training and/or experience in inspecting and monitoring drinking water system processes and performing/planning maintenance activities, • Performs maintenance activities, including preventative, emergency and capital works • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Instrumentation Technician (UPIT)/SCADA Support/Operator or ElectronicsTechnician/Operator	• Valid operator certification required to fulfil certified operator duties (if assigned) • If required to act as ORO, certification must be at the level of the facility or higher • If required to act as Operator-in-Charge (OIC), certification must be level 1 or higher • Electrical Engineering diploma and/or Instrumentation Technology diploma • Experience and/or training in monitoring, programming, installing and troubleshooting network, hardware, software and instrumentation • Experience in performing maintenance and repair of electrical and electronic equipment • Experience and/or training in drinking water system processes design, instrumentation, process control and automation systems • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Administrative Support Includes the following: Regional Business Hub Manager, Administrative Assistants	• Experience and/or training related to procurement and business administration practices • Knowledge of OCWA's QEMS and the DWQMS • Knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers
Municipal Operators	• Valid operator certification (appropriate certification required if

Role/Position	Required Minimum Competencies
working in the Temiskaming Shores Distribution System	acting as OIC.) • Experience and/or training of the distribution system operations • Training in water treatment processes • Experience and training on the maintenance and repair of a variety of equipment and structures • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Knowledge of OCWA's QEMS and the DWQMS

3.2 OCWA's recruiting and hiring practices follow those of the Ontario Public Service (OPS). As part of the OPS, minimum 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. Based on this evaluation, the hiring manager selects and assigns personnel for specific duties.

3.3 OCWA's Operational Training Program aims to:

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

3.4 The Program consists of Director Approved, continuing education and on-the-job training and is delivered using a combination of methods (e.g., traditional classroom courses, e-learning/webinars 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.

3.5 Awareness of OCWA's QEMS is promoted during the orientation of new staff, at facility/cluster/regional hub level training sessions and meetings and through OCWA's Environmental Compliance 101 (EC 101) course. All new staff are required to complete the EC 101 course within their first year of joining OCWA. The purpose of the EC 101 course is to ensure staff are aware of applicable legislative and regulatory requirements, to promote awareness of OCWA's QEMS and to reinforce their roles and responsibilities under OCWA's QEMS.

3.6 Staff are also required to complete the training listed in OCWA's Mandatory Training Requirements procedure, based on their position and/or the duties they perform. This list includes mandatory environmental and health and safety compliance training, as well as the training deemed mandatory by OCWA corporate and Ontario Public Service (OPS) policies and is available on OCWA's intranet (sharepoint site).

3.7 Operations personnel also receive site-specific training/instruction 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.

3.8 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 as part of this process (and on an ongoing basis). In addition to this process, OCWA employees may at any time request training from either internal or external providers by obtaining approval from their Manager.

3.9 Certified drinking water operators are responsible for completing the required number of training hours in order to renew their certificates based on the highest class of drinking water subsystem they operate. They are also responsible for 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 Management takes reasonable steps to ensure that every operator has the opportunity to attend training to meet the requirements.

3.10 It is the responsibility of operations personnel to ensure Operations Management are aware of any change to the status/classification of their drinking water operator certificate(s), the validity of their driver's licence (required to hold at a minimum a Class G license which is initially verified upon hire) and/or the validity of any other required certificates/qualifications.

3.11 Individual OCWA employee training records are maintained and tracked using a computerized system, the Training Summary database, which is administrated by OCWA's Learning and Development Department.

4. Related Documents

OCWA's Learning and Development Resources (OCWA Intranet/sharepoint)
OCWA's Mandatory Training Requirements (OCWA intranet/sharepoint)
OCWA's Training Summary Database
Performance Planning and Review (PPR) Database
OP-5 Document and Records Control

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-10 (s. 3) was originally set out in main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). New Purpose, Definitions, Procedure, Related Documents and

Date	Revision #	Reason for Revision
		separate Revision History sections. Added definitions for Operations Management and Operations Personnel and throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Modified table in procedure (s. 3.1 and s. 3.2): removed/revised non-measurable competencies, added the word 'minimum' to competencies; removed 'Valid Class G Driver's License' listed under individual positions and referenced in s. 3.11; added competencies for SPC Manager and merged competencies for Senior Operations Manager and Operations Manager under Operations Management. Updated training sections (s. 3.4 to s. 3.7) to reference new Environmental 101 course, Mandatory Compliance Training list and removed specific references to Orientation Training Program. Added s. 3.11 related to ensuring operators make Operations Management aware of changes to operator certification and other certificates/licenses. Other minor changes to wording.
Jan. 24, 2019	1	In the Competency Table - clarified what diploma is required for an Electronic Technician.
Sep. 30, 2019	2	Updated required minimum competencies for the Electronics Technician and removed positions of Instrumentation Technician and Maintenance Foreman.
Aug. 24, 2021	3	Changed Electronics technician title to Instrumentation Technician (UPIT) / SCADA Support / Operator.
May 30, 2023	4	Added competencies for Operations Supervisor, Senior Operator and Mechanic Operator and removed position of Team Lead
Jun. 24, 2024	5	Procedure updated with revisions to table in 3.1 Role/Position updated to clarify roles are performed by multiple positions, included statements regarding certification requirements and updated position titles. Updated Procedure to reflect changes to title and content of OCWA's Mandatory Training Requirements Document and added sharepoint. Removed watermark.

PERSONNEL COVERAGE

Reviewed by: I. Bruneau, QEMS Representative | Approved by: B. Logan, Sr. Operations Manager

1. Purpose

To describe the procedure for ensuring that sufficient and competent personnel are available for duties that directly affect drinking water quality at the Temiskaming Shores Drinking Water Systems.

2. 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)

3. Procedure

3.1 Operations Management ensures that personnel meeting the competencies identified in OP-10 Competencies are available for duties that directly affect drinking water quality.

3.2 The Temiskaming Shores Drinking Water Systems are considered unmanned at the New Liskeard Drinking Water plant and manned at the Haileybury Drinking Water plant. The facilities are regularly checked between Monday and Friday within the hours of 0730 to 1600 by certified operator(s). The facilities are regularly monitored via the plant's SCADA system. OCWA operations personnel are remotely available 24 hours a day, 7 days a week by alarm systems.

Certified City employees perform the following duties;

- Regularly inspect the distribution system and perform routine maintenance and repairs.
- Contact OCWA for all non-routine operational concerns or adjustments
- Maintain a distribution log book

3.3 Operations 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.

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

Refer to the ORO Letter for current and alternate OROs and to the procedure for the Designation of OICs in the Temiskaming Shores Cluster for a list of OICs. The designated OIC for each shift is recorded in the facility logbook.

3.4 The Senior Operations Manager or designate assigns an on-call operator for the time that the facility is un-staffed (i.e., evenings, weekends and Statutory Holidays). The on-call shift rotates every Monday morning at 0730 hours, unless Monday is a statutory holiday in which case the change is on Tuesday morning at 0730 hours. The on-call schedule is maintained by the Operations Manager and is available to on-call operators in the Microsoft Outlook shared calendar.

3.5 The on-call operator conducts an inspection of the facility process at least once per day during the weekends and Statutory Holidays either on-site or via the plant's SCADA system. Details of the inspection are recorded in the facility logbook and/or round sheets.

3.6 The alarm system auto dialer is programmed to contact the operator on-call. The operator on-call is responsible for responding to the alarm within a reasonable timeframe. If the nature of the alarm requires additional staff, the on-call operator can request assistance from any of the other certified operators. The on-call operator ensures details of the call-in are documented in the facility logbook. OCWA operators also record details in OCWA's Workplace Management System (WMS/Maximo).

3.7 The Operations Management is responsible for approving vacation time for their staff in a manner which ensures sufficient personnel are available for the performance of normal operating duties.

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

1.1 A contingency plan for Critical Shortage of Staff is included in the Facility Emergency Plan. This plan provides direction in the event that there is a severe shortage of operations personnel due to sickness (e.g., pandemic flu) or other unusual situations where personnel might not be available.

4. Related Documents

Call-In Reports (WMS)
Critical Shortage of Staff Contingency Plan (Facility Emergency Plan)
Facility Logbook
Facility Round Sheets
On-Call Schedule
ORO Letter

Vacation Schedule
OP-10 Competencies

5. Revision History

Date	Revision #	Reason for Revision
Oct. 31, 2009	0	Procedure issued.
Jun. 26, 2012	1	Procedure 5.9 was added to reference contingency planning for Critical Shortage of Staff; changed Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Mar. 11, 2013	2	Removed reference to Process Compliance Manager, as the position has been discontinued.
May 31, 2017	3	Changed Operations Manager to new position title Senior Operations Manager. Changed Water Treatment System to Drinking Water System. Added duties of certified City employees to step 5.2.
Aug. 28, 2018	4	QP-03 procedure renamed OP-11. Removed Scope and Responsibilities sections. Changed Senior Operator to Team Lead. Other minor edits in wording.
Jan. 24, 2019	5	Changed Township employees to City employees in step 3.2 and corrected the system names in step 3.3. Changed times to the 24 hour clock.
Sep. 30, 2019	6	Updated wording in step 3.6 to clarify how call-ins are documented in the facility logbook and the Workplace Management System (Maximo).
May 30, 2023	7	Changed Step 3.3 to refer to the ORO letter for current ORO and alternate. Changed Team Lead to Operations Supervisor in Step 3.4.
Jun. 24, 2024	8	Revised Step 3.3 to reference the procedure for the Designation of OICs. Updated Operations Supervisor to Operations Manager. Removed watermark.

COMMUNICATIONS

1. Purpose

To describe the procedure for facility level internal and external QEMS-related communications between Top Management and:

- OCWA staff;
- the Owner;
- essential suppliers and service providers (as identified in OP-13); and
- the public.

2. Definitions

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

Operations Personnel – employees of the drinking water system who perform various activities related to the compliance, operations and maintenance of the drinking water system that may directly affect drinking water quality.

3. Procedure

3.1 Operations Management and the QEMS Representative are responsible for identifying and coordinating any site-specific communications in relation to the status/ development of the facility's QEMS.

3.2 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 Corporate Emergency Response Plan). Refer to OP-18 Emergency Management for more information.

3.3 Communication with OCWA staff:

3.3.1 Within the first year of hire, all staff are required to complete the Environmental Compliance 101 (EC101) course. The objective of the EC 101 course is to ensure that staff are aware of applicable legislative and regulatory requirements and of OCWA's QEMS and to reinforce their roles and responsibilities under OCWA's QEMS.

3.3.2 Operations Management are responsible for ensuring operations personnel receive site-specific training on the Operational Plan, the organizational structure for the facility including the roles and responsibilities and authorities (outlined in OP-09 Organizational Structure, Roles, Responsibilities and Authorities), QEMS Procedures and other related operating instructions and procedures as part of the orientation process and on an on-going basis as required.

3.3.3 The Safety, Process and Compliance (SPC) Manager is responsible for ensuring training is provided for the Regional Hub (in consultation with Operations Management as required) on applicable legislative and regulatory requirements and the QEMS.

3.3.4 The QEMS Representative assists Operations Management and/or the SPC Manager in the coordination/delivery of training as required.

3.3.5 Revisions to the QEMS and associated documentation are communicated as per OP-05 Document and Records Control.

3.3.6 The QEMS Policy is available to all OCWA personnel through OCWA's intranet and as outlined in 3.6.2 of this procedure.

3.3.7 Operations personnel are responsible for identifying potential hazards at the facility that could affect the environmental and/or public health, and communicating these to Operations Management. They may also recommend changes be made to improve the facility's QEMS by making a request to the QEMS Representative (as per OP-05).

3.3.8 The QEMS Representative is responsible for ensuring that the Operations Management and the SPC Manager are informed regarding the compliance/quality status of the facility and QEMS implementation and any need for improved processes/procedures at the cluster/facility level.

3.3.9 The SPC Manager reports to the Regional Hub Manager on the compliance status, the QEMS performance and effectiveness, any need for improvement and on issues that may have Agency-wide significance. Operations Management reports to the Regional Hub Manager on facility operational performance.

3.4 Communication with the Owner:

3.4.1 The Regional Hub Manager, Operations Management and SPC Manager ensures that the Owner is provided with QEMS updates and that they are kept informed of the status of the facility's operational and compliance performance during regularly scheduled meetings and/or through electronic and/or verbal communications. The QEMS Representative/PCT assists in the coordination of these meetings and with communicating the updates as directed.

3.4.2 The continuing suitability, adequacy and effectiveness of OCWA's QEMS are communicated to the Owner as part of the Management Review process (refer to OP-20 Management Review).

3.5 Communications with Essential Suppliers and Service Providers:

3.5.1 Communication requirements to ensure essential suppliers and service providers understand the relevant OCWA QEMS policies, procedures and expectations are described in OP-13 Essential Supplies and Services.

3.6 Communication with the Public:

3.6.1 Media enquiries must be directed to the facility's designated media spokesperson as identified in the Facility Emergency Plan. The media spokesperson coordinates with local and corporate personnel (as appropriate) and the Owner in responding to media enquiries.

3.6.2 OCWA's QEMS and QEMS Policy are communicated to the public through OCWA's public website (*www.ocwa.com*). The QEMS Policy is also posted at the Haileybury Water Treatment Plant.

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

3.6.4 All complaints, whether received from the consumer, the community or other interested parties, are documented on a Community Complaint form. As appropriate, the Operations Management or the ORO ensures that the Owner is informed of the complaint and/or an action is developed to address the issue in a timely manner. The QEMS Representative ensures that consumer feedback is included for discussion at the Management Review.

3.6.5 Any complaints received by the City of Temiskaming Shores are responded to by the City staff. The complaint; along with any actions taken are recorded on the City's computerized information tracking spreadsheet and a summary is provided to OCWA every month.

4. Related Documents

Community Complaint Form
Emergency Response Plan
Facility Emergency Plan
OP-05 Document and Records Control
OP-09 Organizational Structure, Roles, Responsibilities and Authorities
OP-13 Essential Supplies and Services
OP-18 Emergency Management
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Jun. 26, 2012	1	Correction of some employee titles and update to Procedure 5.2 to include information how revisions are communicated; changed Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Mar. 15, 2013	2	Removed references to Process Compliance Manager, as the position has been discontinued.
Apr. 12, 2013	3	Addressed non-conformance report 2013-01 to include a second publicly accessible location for the operational plan. This change was made in procedure 5.2.
Sep. 8, 2017	4	Changed Senior Operations Manager to Regional Hub Manager and Operations Manager to Senior Operations Manager. Replaced Regional Hub Manager with Safety Process and Compliance Manager in step 5.2. Added Quarterly Operations Report to step 5.3. Removed Senior Operations Manager as media spokesperson in step 5.5 and removed OPEX reporting from step 5.6. Added client reports to section 6.0.
Aug. 28, 2018	5	QP-04 procedure renamed OP-12. Removed Scope and Responsibilities sections. Added definitions for Operations Management and Operations Personnel. Reordered and created separate sections to clarify communications to each of the 4 parties. Clarified suppliers were those listed as essential as per Element 13 (as per DWQMS v. 2.0) and replaced references to Senior Operations Manager with 'Operations Management'. Updated training sections for OCWA personnel (s. 3.3.1 to s. 3.3.4) to reference new Environmental Compliance 101 course completed within first year of hire and to outline how training is coordinated between SPC Manager/Operations Management, and QEMS Representative. Included sections on R&Rs for performance reporting within OCWA (s. 3.3.7 to s. 3.3.9) and to Client (3.4.1). Replaced identification of media spokesperson (s. 3.6.1) with 'as identified in Facility Emergency Plan'. Added reference to site-specific records/documents used for recording tours (s. 3.6.3). Other minor edits.
Jan. 24, 2019	6	Corrected the location of the QEMS policy in step 3.6.2 and added step 3.6.5 to describe how complaints are handled by the City.
Sep. 1, 2022	7	Updated Step 3.6.4 to change the Senior Operator to Team Lead.
Jun. 24, 2024	8	Procedure revised to reference updated title of Corporate Emergency Response Plan, to add the link to OCWA's public website and to change Team Lead to ORO. Removed watermark.

ESSENTIAL SUPPLIES AND SERVICES

Reviewed by: I. Bruneau, QEMS Representative	Approved by: V. Legault, Sr. Operations Manager

1. Purpose

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

2. Definitions

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

3. Procedure

3.1 Essential supplies and services for the Temiskaming Shores Drinking Water Systems are contained in the Facility Emergency Plan on the Essential Supplies and Services List. The list is reviewed at least once every calendar year by the QEMS Representative and updated as required.

3.2 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.

Sole sourced purchases are made through vendors that have been researched by OCWA's procurement department and are capable of delivering the required product or service when needed.

3.3 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 and service providers (including those contracted locally) are sent a letter that provides an overview of the relevant aspects of the QEMS.

3.4 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.

3.5 All third-party drinking water testing services are provided by accredited and licensed laboratories. The Ministry has agreement with The Canadian Association for Laboratory Accreditation (CALA) for accreditation of laboratories testing drinking water. The QEMS Representative is responsible for notifying the Ministry of any change to the drinking water testing services being utilized.

3.6 Internal verification and calibration activities (e.g. chlorine analyzer, turbidimeter, flowmeters, etc.) are conducted by operations personnel in accordance with equipment manuals and/or procedures (Refer to OP-17 Measurement Recording Equipment Calibration and Maintenance).

3.7 External calibration activities, if required are conducted by qualified third-party providers. Qualifications of the service provider are verified during the procurement process. The service provider is responsible for providing a record/certificate of all calibrations conducted.

3.8 Chemicals purchased for use in the drinking water treatment process must meet AWWA Standards and be ANSI/NSF certified as per the Municipal Drinking Water Licence (MDWL).

3.9 The facility orders and receives ongoing deliveries of chemicals to satisfy current short-term needs based on processing volumes and storage capacities. Incoming chemical orders are verified by reviewing the manifest or invoice in order to confirm that the product received is the product ordered.

3.10 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.

3.11 To ensure the safe delivery of drinking water, the City maintains an inventory of critical repair components. The City orders these distribution components through reliable suppliers that provide parts with applicable certification and standards. Components are verified by the Public Works Department to ensure the correct product was received.

4. Related Documents

ANSI/NSF Documentation
AWWA Standards
Calibration Certificates/Records
Essential Supplies and Services List
Municipal Drinking Water Licence (MDWL)
OP-17 Measurement Recording Equipment Calibration and Maintenance

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Jun. 26, 2012	1	Addition of Procedure 5.3 clarifying how suppliers are informed of relevant aspects of OCWA's QEMS; changed Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Nov. 03, 2013	2	Removed references to Process Compliance Manager, as the position has been discontinued.
Sep. 08, 2017	3	Changed Senior Operations Manager title to Regional Hub Manager and Operations Manager title to Senior Operations Manager. Revised procedure to include step 5.9 to inspect and verify products when received. Updated step 5.7 to better clarify the requirements for chemicals and materials used in the drinking water system.
Aug. 28, 2018	4	QP-05 procedure renamed OP-13. Removed Scope and Responsibilities sections. Changes to wording to provide clarification on ensuring quality of essential supplies and services (s. 3.5, 3.6, 3.7 and 3.9).
Sep. 30, 2019	5	Added step 3.11 to describe the City's purchasing and receiving process for distribution components. Updated MOECC to MECP.
May 30, 2023	6	Step 3.2 was revised to include a statement regarding sole sourced purchases.

REVIEW AND PROVISION OF INFRASTRUCTURE

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

1. Purpose

To describe OCWA's procedure for reviewing the adequacy of infrastructure necessary to operate and maintain the Temiskaming Shores Drinking Water Systems.

2. 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

3. Procedure

3.1 At least once every calendar year, Operations Management in conjunction with operations personnel conducts a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system. Operations personnel assist with identifying the need for infrastructure repairs, replacements or alterations and with prioritizing each identified item. Documents and records that are reviewed may include:

- Maintenance records
- Call-in reports
- Adverse Water Quality Incidents (AWQIs) or other incidents
- Health & Safety Inspections
- Ministry Inspection Reports
- QEMS Audit Reports

3.2 The outcomes of the risk assessment documented as per OP-08 are considered as part of this review.

3.3 The output of the review is a minimum 5 year rolling Recommended Capital and Major Maintenance Report to assist the Owner and OCWA with planning infrastructure needs for the short and long-term. A letter, summarizing capital works recommendations and estimated expenditures for the upcoming year, is submitted to the Owner for review and approval. A capital letter is submitted, at least once every calendar year by Operations Management.

3.4 The final approved capital items form the long term forecast for any major infrastructure maintenance, rehabilitation and renewal activities as per OP-15.

3.5 Operations Management ensures that results of this review are considered during the Management Review process (OP-20).

4. Related Documents

Capital and Major Maintenance Recommendations Report
Capital Letter & Acknowledgement/Approval from the Owner
Management Review Minutes
OP-08 Risk Assessment Outcomes
OP-15 Infrastructure Maintenance, Rehabilitation and Renewal
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Jun. 26, 2012	1	Revised to include the position of Process Compliance Manager; changed Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Mar. 11, 2013	2	Removed references to Process Compliance Manager, as the position has been discontinued.
May 31, 2017	3	Changed Senior Operations Manager title to Regional Hub Manager and Operations Manager title to Senior Operations Manager.
Aug. 28, 2018	4	QP-06 procedure renamed OP-14. Removed Scope and Responsibilities sections. Replaced ‘once every 12 months’ with ‘once every calendar year’ (s. 3.1) to reflect wording in DWQMS v. 2.0. Added s. 3.2 to consider the outcomes of the risk assessment under Element 8 during the review to reflect wording in DWQMS v. 2.0. Changes to wording to provide clarification on who is required to attend the review and what documents and records may be considered during the review (s. 3.1). Linked the procedure with OP-15 in terms of documenting a long-term forecast (s. 3.3 and s. 3.4).
Sep. 30, 2019	5	Updated MOECC to MECP.
Jun. 24, 2024	6	Added the word “minimum” prior the statement; 5 year rolling Recommended Capital and Major Maintenance Report in Step 3.3 as additional years can be forecasted. Changed MECP to Ministry. Removed watermark.

INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL

1. Purpose

To describe OCWA's infrastructure maintenance, rehabilitation and renewal program for the Temiskaming Shores Drinking Water Systems.

2. 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

Rehabilitation – the process of repairing or refurbishing an infrastructure element.

Renewal – the process of replacing the infrastructure elements with new elements.

3. Procedure

3.1 OCWA, under contract with the Owner, maintains a computerized Work Management System (WMS) to manage maintenance, rehabilitation and renewal of infrastructure for which it is operationally responsible. The major components of the WMS consist of planned maintenance, unplanned maintenance, rehabilitation, renewal and program monitoring and reporting.

3.1.1 Planned Maintenance

Routine planned maintenance activities include:

- Inspect, adjust and calibrate process control equipment to ensure proper operation of water systems, pumps, chemical feeders, and all other equipment installed at the facilities
- Inspect clearwells and reservoirs
- Perform routine maintenance duties to equipment including checking machinery and electrical equipment when required.
- Maintain an inventory of all equipment
- Maintain accurate records of work conducted, activities, and achievements.

Planned maintenance activities are scheduled in the WMS that allows the user to:

- Enter detailed asset information;
- Generate and process work orders;
- Access maintenance and inspection procedures;
- Plan preventive maintenance and inspection work;
- Plan, schedule and document all asset related tasks and activities; and
- 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 automatically generated on a daily, weekly, monthly, quarterly and annual schedule as determined based on manufacturer's recommendations and site specific operational and maintenance needs and are assigned directly to the appropriate operations personnel. This schedule is set up by the Operations Supervisor. Work orders are completed and electronically entered into WMS by the person responsible for completing the task. Records of these activities are maintained as per OP-05 Document and Records Control.

The Operations Manager or designate 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 operations personnel at the locations specified in OP-05 Document and Records Control.

3.1.2 Unplanned Maintenance

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Operations Management. Unplanned maintenance activities are recorded in the facility's logbook and as corrective/emergency work order and are entered into WMS by the person responsible for completing the unplanned maintenance activity.

3.1.3 Rehabilitation and Renewal

Rehabilitation and renewal activities including capital upgrades (major infrastructure maintenance) are determined at least once every calendar year in consultation with Operations Management and the Owner. A list of required replacement or desired new equipment is compiled and prioritized by Operations Management in conjunction with operations personnel and is presented to the Owner for review and comment. All major expenditures require the approval of the Owner. In addition to the short-term facility needs (i.e. current year), the Capital and Major Maintenance Recommendations Report also provides a long-term (i.e. rolling 5-year) list of major maintenance recommendations. (Refer to OP-14 Review and Provision of Infrastructure).

3.1.4 Program Monitoring and Reporting

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 work orders. Additionally, Operations Management and operations personnel conduct a review of the drinking water system's infrastructure to assess its adequacy for the

operation and maintenance of the system. (Refer to OP-14 Review and Provision of Infrastructure).

To assist in monitoring the effectiveness of the program, Operations Management (or designate) can review the WMS dashboard for a quick visualization of work order status and they generate summary reports as needed.

3.2 OCWA's infrastructure maintenance, rehabilitation and renewal program is initially communicated to the Owner through the operating agreement. OCWA's program is communicated to the Owner on an on-going basis through quarterly reports and at a minimum once every calendar year through submission of the capital letter and the results of the Management Review.

4. Related Documents

Capital and Major Maintenance Recommendations Report
Capital Letter & Acknowledgement/Approval from the Owner
Minutes of Management Review
OP-05 Document and Records Control
OP-14 Review and Provision of Infrastructure

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – Information within OP-15 (s. 3) was originally set out in main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added the requirement to ensure the long term forecast is reviewed at once every calendar year and to document a long term forecast (s. 3.1.3) to reflect in DWQMS v. 2.0. Minor wording updates to reflect OCWA's current WMS.
Oct. 2, 2020	1	Updated step 3.1.4 to include the WMS dashboard as a means of monitoring the effectiveness of the program.
May 30, 2023	2	Changed Team Lead to Operations Supervisor in Step 3.1.1 and removed the distribution flushing and valve cycling from the list in Step 3.1.1. The City performs distribution maintenance.
Jun. 24, 2024	3	Revised Step 3.1.1 to remove Operations Supervisor and to add Operations Manager and designate as personnel responsible for maintaining the WMS. Removed watermark.

1. Purpose

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

2. Definitions

Challenging Conditions – any existing characteristic of the water source or event-driven fluctuations that impact the operational process as identified and listed under OP-06 Drinking Water System

3. Procedure

3.1 All sampling, monitoring and testing is conducted at a minimum in accordance with SDWA O. Reg. 170/03 and the facility's Municipal Drinking Water License (MDWL).

3.2 Sampling requirements for the facility are defined in the facility's sampling schedule which is available to operations personnel, at the location(s) noted in OP-05 Document and Records Control. The sampling schedule is maintained by the PCT and is updated as required.

3.3 Samples that are required to be tested by an accredited and licensed laboratory, are collected, handled and submitted according to the directions provided by the licensed laboratory(ies) that conducts the analysis. The laboratory(ies) used for this facility are listed in the Essential Supplies and Services List (within the Facility Emergency Plan (FEP)).

Electronic and/or hardcopy reports received from the laboratory are maintained as per OP-05 Document and Records Control. Analytical results from laboratory reports are uploaded into OCWA's Process Data Management system (PDM).

3.4 Continuous monitoring equipment is used to sample and test for the following parameters related to process control and finished drinking water quality:

Haileybury Drinking Water System

- *Temperature* – raw water, treated water leaving the reservoir (point of entry)
- *pH* – raw water, process, clearwell water leaving the plant and treated water (point of entry)
- *Turbidity* – raw water, filter 1, 2 & 3 effluent, clearwell water leaving the plant, treated/distribution water (point of entry)
- *Free chlorine residual* – clearwell and treated/distribution water (point of entry)
- *Total chlorine residual* – treated/distribution water (point of entry), pressure zones

- *Discharge pressure* – treated water into distribution system (point of entry), zone 2 & 3 header, and zone 4 header
- *Distribution pressure* – Station Street pump station
- *Flow rates* (including totalized flows) – raw water, clearwell water leaving the plant, pump chamber, gravity zone and pressure zone (zone 2 & 3) and zone 4)
- *Levels* – clearwell, reservoir & pump chamber, chemical (soda ash, alum, polymer, ammonia sulphate)
- *Weight* – chlorine cylinders

New Liskeard Drinking Water System

- *Flow rates* (including totalized flows) – raw water (well 3 & 4), treated water, backwash water and filtered water (each filter)
- *Free chlorine residual* – clearwell inlet, treated water (point of entry) and distribution water (Dymond & Shepherdson Road reservoirs)
- *Levels* – clearwell & reservoirs
- *Turbidity* – filter 1 & 2
- *pH* – treated water at the plant
- *Temperature* – treated water at the plant
- *Weight* – chlorine cylinders

Test results from continuous monitoring equipment are captured by the plant's SCADA systems and are reviewed by a certified operator in accordance with the requirements of SDWA O. Reg. 170/03. A Standard Operating Procedure for the Continuous Monitoring of Operational Parameters for Drinking Water Systems is available in the systems Operations Manual.

3.5 Adverse water quality incidents are responded to and reported as per Environmental Emergency Procedures (EEPs) found in the Facility Emergency Plan Binder.

3.6 In-house process control activities are conducted on a regular basis by the certified operator(s) on duty and at a minimum are conducted as follows:

Haileybury Drinking Water System

Operational Parameter	Location	Frequency
Aluminum Residual	Treated water (POE)	Grab weekly
Alkalinity	Raw water Process water	Grab weekly
Colour	Raw water Treated water	Grab weekly

Operational Parameter	Location	Frequency
Free Chlorine Residual	Treated water (POE) Distribution water (various locations)	Grab weekly Grab 7x/week (4&3)
Total Chlorine Residual	Treated water – (gravity & pressure) Distribution water (various locations)	Grab weekly Grab 7x/week (4&3)
Combined Chlorine Residual	Treated water (POE) Distribution water (various locations)	Calc. 7x/week (4&3)
Temperature	Treated water (clearwell) Pump chamber (reservoir)	Grab weekly
Turbidity	Process water Treated water	Grab weekly
Aluminum Sulphate Usage	Chemical room/SCADA	Weekly – as required
Chlorine Usage	Chlorine room/SCADA	Weekly – as required
Polymer Usage	Chemical room/SCADA	Weekly – as required
Soda Ash Usage (pre & post)	Chemical room/SCADA	Weekly – as required
Ammonium Usage	Chemical room (reservoir)/SCADA	Weekly – as required

New Liskeard DWS

Operational Parameter	Location	Frequency
Colour	Raw water (well 3 & 4) Treated water	Grab weekly
Free Chlorine Residual	Treated water (POE) Distribution water (various locations)	Grab weekly Grab 7x/week (4&3)
Iron and manganese	Raw water (well 3 & 4) Treated water	Grab monthly
Hardness	Raw water (well 3 & 4) Treated water	Grab monthly
Temperature	Clearwell	Reading weekly
Turbidity	Raw water (well 3 & 4)	Grab weekly
Aquifer Levels	Raw water (well 3 & 4)	Reading weekly
Chlorine Usage	SCADA	Reading daily
Sodium Hypochlorite Usage	Chemical room/SCADA	Weekly – as required
UV Dosage, flow rate, lamp hours and salt levels	Manitoulin Transport (399 Radley Hill Rd.)	Weekly – as required

In-house samples are analyzed following approved laboratory procedures. The sampling results are recorded on a facility round sheet and are entered into the PDM system. Any required operational process adjustments are recorded in the facility log book.

3.7 Additional sampling, testing and monitoring activities related to the facility's most challenging conditions are captured in the existing in-house program as described above.

Monitoring/sampling for harmful algal blooms (HABs) is conducted during the HAB season (the warm seasonal period at a minimum starting on June 1st and continuing until October 31st each year) based on the drinking water systems HAB Monitoring, Reporting and Sampling Plan.

3.8 There are no relevant upstream sampling, testing and monitoring activities that take place for the Temiskaming Shores Drinking Water Systems.

3.9 Sampling, testing and monitoring results are readily accessible to the Owner at the Kirkland Lake Process and Compliance office and/or Haileybury Water Treatment Plant.

The Owner is provided Quarterly Operations Reports which discusses regulatory results and operational issues. Owners are also provided with an annual summary of sampling, testing and monitoring results through the SDWA O. Reg. 170/03 Section 11 - Annual Report, Schedule 22 - Municipal Summary Report and through the Management Review process outlined in OP-20 Management Review.

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

4. Related Documents

Annual Report (O. Reg. 170 Section 11)
Continuous Monitoring of Operational Parameters for Drinking Water Systems SOP
Data Review Protocol
Emergency Contact List/Essential Supplies & Services List (Contacts section of FEP)
Facility Emergency Plan (FEP) Binder
Facility Logbook
Facility Round Sheets
HAB Monitoring, Reporting and Sampling Plan
Laboratory Analysis Reports
Laboratory Chain of Custody Forms
Municipal Summary Report (O. Reg. 170 Schedule 22)
Process Data Management System (PDM)
Quarterly Operations Reports
Reporting Adverse Water Quality (EEP)
Sampling Schedules
SCADA Records
WMS Records
OP-05 Document and Records Control
OP-06 Drinking Water System

OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Jun. 26, 2012	1	Addition of Process and Compliance Manager (3.0 Responsibility), clarification of sampling under 5.0 Procedure, added in-house process control parameters, changed Operations Manager title to Senior Operations Manager and the Cluster Manager title to Operations Manager.
Mar. 11, 2013	2	Removed references to Process Compliance Manager, as the position has been discontinued. Updated the continuous monitoring equipment for the Haileybury water treatment system.
May 31, 2017	3	Changed title of Senior Operations Manager to Regional Hub Manager and changed Operations Manager to Senior Operations Manager. Changed PDC to WISKI. Added Client Reports to section 6.0.
Sep. 08, 2017	4	Added the definition of Environmental Emergency Procedure. Added continuously monitoring for treated water temperature at Haileybury DWS. Changed the location of the Continuous Monitoring SOP to the Operations Manual. Updated Table 1 by removing free ammonium. Updated Table 2 by adding SCADA Report as a location for selected parameters and adding UV Dosage at Manitoulin Transport. Removed the municipal office in step 5.7.
Aug. 28, 2018	5	QP-07 procedure renamed OP-16. Removed Scope and Responsibilities sections. Updated s. 3.1 to reference Municipal Drinking Water License and s. 3.2 to reference sampling calendar/plan and removed sampling table. Expanded information related to accredited and licensed laboratories (s. 3.3). Updated continuous monitoring and in-house parameters in steps 3.4 and 3.6. Reordered some sections and other minor edits.
Sep. 30, 2019	6	In step 3.4, added treated water pH and temperature readings for the New Liskeard Drinking Water System and added a weekly grab temperature reading at the reservoir pump chamber.
Oct. 2, 2020	7	Updated the table for the New Liskeard DWS in section 3.6 to include monthly sampling of the raw and treated water for iron, manganese and hardness.
May 30, 2023	8	Removed total chlorine residual from the gravity zone in Step 3.3 as the analyzer was removed. The table for the Hailebury WTP in Step 3.6 was updated to remove the pH readings for raw water, process water and clearwell because they are listed in step 3.4. The table for the New Liskeard WTP was updated to include flow rate, lamp hours and salt levels which are recorded for the UV system at Manitoulin Transport.
Jun. 24, 2024	9	Updated continuous monitoring parameters in Step 3.4. Modified section 3.6 to clarify that the frequency of in-house process control activities is at a ‘minimum’ frequency which will allow for flexibility if additional sampling conducted beyond that referenced in table/sampling

Date	Revision #	Reason for Revision
		schedule. Updated tables in Step 3.6 to include SCADA as a location to obtain chemical readings. Added reference to HAB Plan under Step 3.7 and updated Section. 4 – Reference. Removed watermark.

MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE

1. Purpose

To describe the procedure for the calibration and/or verification and maintenance of measurement and recording equipment at the Temiskaming Shores Drinking Water Systems.

2. Definitions

None

3. Procedure

3.1 All measurement and recording equipment calibration and maintenance activities must be performed by appropriately trained and qualified personnel or by a qualified third-party calibration service provider (refer to OP-13 Essential Supplies and Services).

3.2 The Instrumentation Technician establishes and maintains a list of measurement and recording devices and associated calibration and/or verification schedules using the automated Work Management System (WMS). When a new device is installed, it is added to the WMS system by a SuperUser (Operations Manager or designate). The new device is tagged with a unique identification number and the maintenance schedule is set up. Work orders are then automatically generated as per the schedule (refer to OP-15 Infrastructure Maintenance, Rehabilitation and Renewal).

3.3 Details regarding the results of the calibration and/or verification are recorded within each individual work order generated by the WMS, and in the facility logbook.

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

3.5 Standards, reagents and/or chemicals that may be utilized during calibration and/or verification and/or maintenance activities are verified before use to ensure they are not expired. Any expired standards, reagents and/or chemicals are appropriately disposed of and are replaced with new standards, reagents and/or chemicals as applicable.

3.6 Any measurement device which does not meet its specified performance requirements during calibration and/or verification must be removed from service (if practical) until repaired, replaced or successfully calibrated. The failure must be reported to Operations Management and the ORO as soon as possible so that immediate 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 and/or WMS work order. Operations Management or the PCT ensures that any notifications required by applicable legislation are completed and documented within the specified time period.

3.7 Calibration and maintenance records and maintenance/equipment manuals are maintained as per OP-05 Document and Records Control.

4. Related Documents

Calibration/Maintenance Records
Facility Logbook
Maintenance/Equipment Manuals
WMS Records
OP-05 Document and Records Control
OP-13 Essential Supplies and Services
OP-15 Infrastructure Maintenance, Rehabilitation and Renewal

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Jun. 26, 2012	1	Revised to include proper title for Process Compliance Manager, changed Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Mar. 11, 2013	2	Removed references to Process Compliance Manager, as the position was discontinued.
May 31, 2017	3	Added operators and Safety Process and Compliance Manager under responsibilities. Changed Operations Manager title to Senior Operations Manager. Changed Water Treatment to Drinking Water System. Changed designate in step 5.4 to ORO.
Sep. 08, 2017	4	Added Electronic Technician under *Responsibilities.*
Aug. 28, 2018	5	QP-08 procedure renamed OP-17. Removed Scope and Responsibilities sections. Added s. 3.3 to clarify how calibration and/or verification activities are documented. Added s. 3.5 to include how standards, reagents and/or chemicals are verified before use to ensure they are not expired. Other minor edits.
Sep. 30, 2019	6	Updated step 3.2 by replacing the Instrumentation Technician with the Team Lead or Electronic Technician as the one that establishes and maintains a list of calibration and verification schedules.
May 30, 2023	7	Updated titles – replaced Team Lead with Operations Management in Steps 3.2 and 3.6 and changed Electronic Technician with Instrumentation Technician in Step 3.2.
Jun. 24, 2024	8	Updated Step 3.2 to clarify SuperUser and 3.6 to change location of recording equipment failures. Removed watermark.

1. Purpose

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

2. Definitions

Corporate Emergency Response Plan (ERP) – a corporate-level emergency preparedness plan for responding to and supporting serious (Level 3) operations emergencies

Facility Emergency Plan (FEP) – a facility-level emergency preparedness plan for responding to and recovering from operations emergencies

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

3. Procedure

3.1 The Facility Emergency Plan (FEP) is the corporate standard for emergency management at OCWA-operated facilities. The FEP supports the facility-level response to and recovery from Level 1, 2 and 3 events related to water and wastewater operations and directly links to the Corporate Emergency Response Plan (CERP) for management of Level 3 events that require corporate support. Operations Management is responsible for establishing a site-specific FEP that meets the corporate standard for this drinking water system.

3.2 OCWA recognizes three levels of events:

Level 1 is an event that can be handled entirely by plant staff and regular contractors. The event and the actions taken to resolve it (and to prevent a reoccurrence, if possible) are then included in regular reporting (both internally and externally). Examples may include response to an operational alarm, first aid incident, small on-site spill, or a process upset that can be easily brought under control.

Level 2 is an event that is more serious and requires immediate notification of others (regulator, owner). Examples may include minor basement flooding, injury to staff that requires medical attention, or a spill that causes or is likely to cause localized, off-site adverse effects. If the event reaches this level, the instructions indicate the need to contact the Safety, Process and Compliance Manager and/or Regional Hub Manager.

Level 3 is an actual or potential situation that will likely require significant additional resources and/or threatens continued operations. It may require corporate-level support including activation of the OCWA Action Group and opening of an Emergency Operations Centre (EOC) as described in the corporate ERP. Level 3 events usually

involve intervention from outside organizations (client, emergency responders, Ministry, media, etc.). Examples may include:

- Disruption of service/inability to meet demand;
- Critical injury including loss of life;
- Breach of security that is a threat to public health;
- Intense media attention;
- Community emergency affecting water supply/treatment;
- Declared pandemic; or
- Catastrophic failure that could impact public health or the environment or cause significant property damage.

3.3 Potential emergency situations or service interruptions identified for the Temiskaming Shores Drinking Water Systems include:

- Unsafe Water
- Spill Response
- Critical Injury
- Critical Shortage of Staff
- Loss of Service
- Security Breach

3.4 The processes for responding to and recovering from each potential emergency situation/service disruption are documented within a contingency plan (CP). The CPs and related site specific environmental emergency procedures (EEPs) are contained within the FEP. To better support management and operational staff when dealing with emergency situations, the CPs are linked to related EEPs.

3.5 OCWA's training requirements related to the FEP are as follows:

Training Topic	Training Provider	Type of Training	Frequency	Required For
Establishing and maintaining a FEP that meets the corporate standard	Safety, Process and Compliance Manager and/or Corporate Compliance (as required)	On-the-Job Practical	Upon hire and when changes are made to the corporate standard*	PCTs (or others identified by the Operations Management)
Contents of the site-specific FEP	Facility Level (coordinated by QEMS Representative)	On-the-Job Practical	Upon hire and when changes to the FEP are made*	All operations personnel with responsibilities for responding to an emergency

*Note: Changes to the corporate standard or site-specific FEP may only require the change to be communicated to Operations for implementation. Therefore, not all changes will require training.

3.6 At least one CP must be tested each calendar year and each CP must be reviewed at least once in a five-calendar year period. The reviews and tests are recorded on the FEP-01 Contingency Plan Review/Test Summary Form. This record includes the outcomes of the review/test, and identifies any opportunities for improvement and

actions taken. A scheduled test of a CP may be regarded as a review of that particular CP as long as the outcomes are evaluated using the FEP-01 form. A CP-related response to an actual event may also be considered a review or a test. A review of the incident including lessons learned should be recorded on FEP-01 following the resolution of the actual event, along with any opportunities for improvement/actions identified.

3.7 Revisions to the CPs, EEPs and other FEP documents are made (as necessary) following a review, test, actual event or other significant change (e.g., changes in regulatory requirements, corporate policy or operational processes and/or equipment, etc.). Results of the emergency response testing and any opportunities for improvement/actions identified are considered during the Management Review (OP-20).

3.8 Roles and responsibilities for emergency management at OCWA-operated facilities are set out in the FEP. Specific roles and responsibilities related to a particular emergency situation or service interruption (including those of the Owner where applicable) are set out in the relevant site-specific CP. A general description of the respective responsibilities of the Owner and the operating authority in the event an emergency occurs is included in the service agreement with the Owner (as required by the *Safe Drinking Water Act*).

3.9 Where they exist, any relevant sections of the Municipal Emergency Response Plan (MERP) are included or referenced in the appendices section of the FEP. Measures specified in the MERP are incorporated into CPs where appropriate.

3.10 An emergency contact list in conjunction with the essential supplies and services list is contained within the FEP and is reviewed/updated at least once per calendar year. An emergency communications protocol is contained within the FEP. Specific notification requirements during emergency situations or service interruptions are set out in the individual CPs and in the ERP.

4. Related Documents

Corporate Emergency Response Plan
Emergency Contact List/Essential Supplies & Services List (Contacts section of FEP)
Facility Emergency Plan
FEP-01 Contingency Plan Review/Test Summary Form
Municipal Emergency Response Plan (as applicable)
WMS
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Jun. 26, 2012	1	Corrected Process Compliance Manager's title, changed Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Mar. 11, 2013	2	Removed reference to Process Compliance Manager, as the position was discontinued.
May 31, 2017	3	Updated procedure as per OCWA's revised corporate template which; reflects updates to OCWA's improved Facility Emergency Plan; References the three levels of operations-related events, OCWA's Emergency Management Program and OCWA's Emergency Communications Protocol; Clarifies training requirements in step 5.5; Updates reviewing frequencies of CPs in step 5.6; Describes when revision changes to procedures are required in step 5.7. Changed Standard Operating Procedure (SOPs) to site specific Environmental Emergency Procedures (EEPs).
Aug. 28, 2018	4	QP-09 procedure renamed OP-18. Removed Scope and Responsibilities sections and reordered some sections. Added definition 'Operations Management'. Throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Removed references to *'OCWA's Approach to Facility Emergency Planning'* document throughout procedure and referenced FEP instead. Aligned wording for level 1, 2 & 3 events (s. 3.2) with wording in '*OCWA's Emergency Response Plan*'. Updated training section to include role of SPC Manager (s. 3.5) and expanded testing/review section specifically to clarify how an actual test is documented (s. 3.6). Other minor edits.
Sep. 30, 2019	5	Updated Ministry of the Environment and Climate Change to Ministry of the Environment, Conservation and Parks in step 3.2.
Jun. 24, 2024	6	Ministry of Environment and Climate Change revised to Ministry. Modified references to Emergency Response Plan to indicate it is now referred to as Corporate Emergency Response Plan (CERP). Updated Step 3.4 to indicate the link between the CPs to the EEPs. Removed watermark.

INTERNAL QEMS AUDITS

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

1. 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).

This procedure applies to Internal QEMS Audits conducted at the Temiskaming Shores Drinking Water Systems for the purpose of meeting the DWQMS requirements for internal audits.

Note**:** This procedure does not apply to internal compliance audits conducted in accordance with OCWA's Internal Audit Program.

2. Definitions

Audit Team – one or more Internal Auditors conducting an audit

Internal Auditor – an individual selected to conduct an Internal QEMS Audit

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

Lead Auditor – Internal Auditor responsible for leading an Audit Team

Non-conformance – non-fulfillment of a DWQMS requirement

Objective Evidence – verifiable information, records or statements of facts. Audit evidence is typically based on interviews, examination of documents, observations of activities and conditions, reviewing results of measurements and tests or other means. Information gathered through interviews should be verified by acquiring supporting information from independent sources

Opportunity for Improvement (OFI) – an observation about the QEMS that may, in the opinion of the Internal Auditor, offer an opportunity to improve the effectiveness of the system or prevent future problems; implementation of an OFI is optional

3. Procedure

3.1 Audit Objectives, Scope and Criteria

3.1.1 In general, the objectives of an internal QEMS audit are:

- To evaluate conformance of the implemented QEMS to the requirements of the DWQMS;
- To identify non-conformances with the documented QEMS; and

- To assess the effectiveness of the QEMS and assist in its continual improvement.

3.1.2 The scope of an internal QEMS audit includes activities and processes related to the QEMS as documented in the Operational Plan.

3.1.3 The criteria covered by an internal QEMS audit include:
- Drinking Water Quality Management Standard (DWQMS)
- Current Operational Plan
- QEMS-related documents and records

3.1.4 The audit scope and criteria may be customized as necessary to focus on a particular process/critical control point and/or any elements of the DWQMS which may warrant specific attention. The results of previous internal and external audits should also be considered.

3.2 Audit Frequency

3.2.1 Internal QEMS audits may be scheduled and conducted once every calendar year or may be separated into smaller audit sessions scheduled at various intervals throughout the calendar year. However, all elements of the DWQMS must be audited at least once every calendar year.

3.2.2 The QEMS Representative is responsible for maintaining the internal QEMS audit schedule. The audit schedule may be modified based on previous audit results.

3.3 Internal Auditor Qualifications

3.3.1 Internal QEMS audits shall only be conducted by persons approved by the QEMS Representative and having the following minimum qualifications:
- Internal auditor training or experience in conducting management system audits; and
- Familiarity with the DWQMS requirements.

3.3.2 Internal Auditors that do not meet the qualifications in s.3.3.1 may form part of the Audit Team for training purposes, but cannot act as Lead Auditor.

3.3.3 Internal Auditors must remain objective and, where practical, be independent of the areas/activities being audited. It may not be possible for internal auditors to be fully independent of the activity being audited, but every effort should be made to remove bias and encourage objectivity. Auditors should maintain objectivity throughout the audit process to ensure that the audit findings and conclusions are based only on the audit evidence. Objectivity can be demonstrated by obtaining sufficient appropriate evidence to provide a reasonable basis for the

audit findings.

3.4 Audit Preparation

3.4.1 Together, the QEMS Representative and the Lead Auditor:

- Establish the audit objectives, scope and criteria;
- Confirm the audit logistics (locations, dates, expected time and duration of audit activities, any health and safety considerations, availability of key personnel, audit team assignments, etc.).

3.4.2 Each Internal Auditor is responsible for:

- Reviewing documentation to prepare for their audit assignments including:
  - the Operational Plan and related procedures;
  - results of previous internal and external QEMS audits;
  - the status and effectiveness of corrective and preventive actions implemented;
  - the results of the management review;
  - the status/consideration of OFIs identified in previous audits; and
  - other relevant documentation.
- Preparing work documents (e.g., checklists, forms, etc.) for reference purposes and for recording objective evidence collected during the audit

3.5 Conducting the Audit

3.5.1 Opening and closing meetings are not required, but may be conducted at the discretion of the QEMS Representative and the Lead Auditor taking into account expectations of Top Management.

3.5.2 The Audit Team gathers and records objective evidence by engaging in activities that may include conducting interviews with Operations Management and staff (in person, over the phone and/or through e-mail), observing operational activities and reviewing documents and records.

3.5.3 The Audit Team generates the audit findings by evaluating the objective evidence against the audit criteria (s. 3.1.3). In addition to indicating conformance or non-conformance, the audit findings may also lead to the identification of opportunities for improvement (OFIs). The Lead Auditor is responsible for resolving any differences of opinion among Audit Team members with respect to the audit findings and conclusions.

3.6 Reporting the Results

3.6.1 The Lead Auditor reviews the audit findings and conclusions with the QEMS Representative and Top Management. Other audit participants may also take part in this review as appropriate. This review may take place in person (e.g.,

during a closing meeting) or through other means (phone call, email, etc.). Any diverging opinions regarding the audit findings and conclusions should be discussed and, if possible, resolved. If not resolved, this should be noted by the Lead Auditor.

3.6.2 The Lead Auditor submits a written report and/or completed work documents to the QEMS Representative. The submitted documentation must identify (at a minimum):

- Audit objectives, scope and criteria;
- Audit Team member(s) and audit participants;
- Date(s) and location(s) where audit activities where conducted;
- Audit findings including:
    - Related objective evidence for each element;
    - Any non-conformance identified referencing the requirement that was not met; and
    - OFIs or other observations.
- Audit conclusions.

3.6.3 The QEMS Representative distributes the audit results to Top Management and others as appropriate.

3.6.4 The QEMS Representative ensures that results of internal QEMS audits are included as inputs to the Management Review as per OP-20 Management Review.

3.7 Corrective Actions and Opportunities for Improvement (OFIs)

3.7.1 Corrective actions are initiated when non-conformances are identified through internal QEMS audits and are documented and monitored as per OP-21 Continual Improvement.

3.7.2 OFIs are considered, and preventive actions initiated, documented and monitored as per OP-21 Continual Improvement.

3.8 Record-Keeping

3.8.1 Internal QEMS audit records are filed by the QEMS Representative and retained as per OP-05 Document and Records Control.

4. Related Documents

Internal Audit Records (checklists, forms, reports, etc.)
QEMS – Summary of Findings spreadsheet
OP-05 Document and Records Control
OP-20 Management Review

OP-21 Continual Improvement

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Jun. 26, 2012	1	Clarification of time frames in Procedure 5.1; corrected Process Compliance Manager's title; updated the development of audit protocol in Procedure 5.2; changed Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Mar. 11, 2013	2	Removed references to Process Compliance Manager, as the position was discontinued.
May 31, 2017	3	Major revisions throughout procedure to clarify requirements for conducting internal QEMS audits, reporting results and dealing with corrective actions. Title of Senior Operations manager changed to Regional Hub Manager and the title of Operations Manager to Senior Operations Manager. Changed frequency of review from every 12 months to once every calendar year (s. 3.2.1, s. 3.2.3 and s. 3.4.1) to reflect wording in DWQMS v. 2.0.
Sep. 09, 2017	4	Removed Team Lead and added new position for Safety, Process and Compliance Manager.
Aug. 28, 2018	5	QP-10 procedure renamed OP-19. Removed Scope and Responsibilities sections and moved scope wording to purpose section. Added definition 'Objective Evidence' and modified 'non-conformance' definition. Replaced 'audit evidence' with 'objective evidence', and 'conformity' with 'conformance' throughout procedure. Added s. 3.2.3 (and modified s. 3.4.1) to describe the frequency for auditing all DWSs covered in multi-facility Operational Plans. Changed s. 3.4.2 to include preventive actions, the results of the management review and the status/consideration of OFIs. Included wording 'for each element', and 'identified referencing the requirement that was not met' to s. 3.6.2. Moved description of process for corrective actions from QP-10 s. 5.7 and OFIs from QP-10 s. 5.8 to OP-21. Added s. 3.7 to refer to OP-21.
Jun. 24, 2024	6	Procedure updated to describe and document how objectivity is maintained when an internal auditor is not fully independent of the activity being audited with additions to s. 3.3.3. Removed watermark.

MANAGEMENT REVIEW

Reviewed by: I. Bruneau, QEMS Representative	Approved by: Y. Rondeau, SPC Manager

1. Purpose

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

2. Definitions

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

Operations Management – refers to the Senior Operations Manager and/or Operations Manager that directly oversees a facility's operations

Top Management – a person, persons or group of people at the highest management level within an operating authority that makes decisions respecting the QMS and recommendations to the owner respecting the subject system or subject systems.

OCWA has defined Top Management for the Temiskaming Shores Drinking Water Systems as:

- Operations Management – Temiskaming Shores Cluster
- Regional Hub Manager – Northeastern Ontario Regional Hub
- Safety, Process & Compliance (SPC) Manager – Northeastern Ontario Regional Hub

3. Procedure

3.1 Top Management ensures that a Management Review is conducted at least once every calendar year.

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 3.4 below are taken into account for each individual system and documented in the Management Review meeting minutes.

3.2 At a minimum, the QEMS Representative, at least one member of Top Management and at least one facility operator must attend the Management Review meeting. Other members of Top Management may participate though their attendance is optional.

3.3 Other staff may be invited to attend the Management Review meeting or to assist with presenting information or in reviewing the information presented, where they offer additional expertise regarding the subject matter.

3.4 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 effectiveness of the risk assessment process;
e) Internal and third-party audit results (including any preventive actions implemented to address Opportunities for Improvement (OFI) or rationale as to why OFIs were not implemented);
f) Results of emergency response testing (including any OFIs identified);
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;
p) Staff suggestions; and
q) Consideration of applicable Best Management Practices (BMPs).

3.5 In relation to standing agenda item q), applicable BMPs, if any, to address drinking water system risks discussed during other agenda items, are identified and documented in the Management Review minutes. Review and possible adoption of applicable BMPs are revisited during subsequent Management Reviews and are incorporated into preventive and/or corrective actions as per OP-21 as appropriate.

3.6 The SPC Manager 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.

3.7 The Management Review participants review the data presented and make recommendations and/or initiate action to address identified deficiencies as appropriate as per OP-21.

3.8 The QEMS Representative ensures that minutes of and actions resulting from the Management Review meeting are prepared and distributed to the appropriate OCWA Top Management, personnel and the Owner.

3.9 The QEMS Representative monitors the progress and documents the completion of actions resulting from the Management Review.

4. Related Documents

Management Review Reference Materials
Minutes and actions resulting from the Management Review
OP-21 Continual Improvement

5. Revision History

Date	Revision #	Reason for Revision
Oct. 30, 2009	0	Procedure issued.
Jun. 26, 2012	1	Corrected Process Compliance Manager's title; changed Operations Manager title to Senior Operations Manager and Cluster Manager title to Operations Manager.
Mar. 11, 2013	2	Removed references to Process Compliance Manager, as the position was discontinued.
May 31, 2017	3	Changed title of Senior Operations Manager to Regional Hub Manager and changed Operations Manager to Senior Operations Manager. Changed frequency of review from every 12 months to once every calendar year (s. 3.1) based on new requirements of the Standard.
Sep. 8, 2017	4	Added new position for Safety, Process and Compliance Manager, removed Regional Compliance Advisor and Corporate Compliance Advisor from *Responsibilities,* changed Senior Operations Manager to QEMS Representative in step 5.5.
Aug. 28, 2018	5	Removed Scope and Responsibilities sections. Added definitions for Top Management and Operations Management. Revisions based on new requirements of the Standard; efficacy changed to effectiveness (s. 3.4). Added s. 3.2 and s. 3.3 to describe who is participating in the Management Review process. Added clarification on including any preventive actions implemented to address Opportunities for Improvement (OFI) or rationale as to why OFIs were not implemented when reviewing audit results (s. 3.4.e). Added Best Management Practices (BMPs) as a standing agenda item (s. 3.4.q). Added s. 3.5 to include consideration of BMPs and link OP-20 to OP-21 Continual Improvement.

CONTINUAL IMPROVEMENT

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

1. Purpose

To describe the procedure for tracking and measuring continual improvement of the Quality & Environmental Management System (QEMS) for the Temiskaming Shores Drinking Water Systems.

2. Definitions

Continual Improvement - recurring activity to enhance performance *(ISO 14001:2014)*

Corrective Action – action to eliminate the cause of detected nonconformity of the QMS with the requirements of the DWQMS or other undesirable situation

Non-conformance – the non-fulfilment of a DWQMS requirement

Preventive Action – action to prevent the occurrence of nonconformity of the QMS with the requirements of the DWQMS or other undesirable situation

3. Procedure

3.1 OCWA strives to continually improve the effectiveness of its QEMS for this drinking water system(s) through the identification and implementation of corrective/preventive actions and, as appropriate, through review and consideration of applicable Best Management Practices (BMPs).

3.2 Corrective Actions

3.2.1 Non-conformances may be identified through an internal or external QEMS audit(s) conducted for this drinking water system. They may also be identified as a result of other events such as:

- an incident/emergency;
- community/Owner complaint;
- other reviews; and
- operational checks, inspections or audits.

3.2.2 The QEMS Representative (in consultation with Operations Management and/or the SPC Manager) investigates the need for a corrective action to eliminate the root cause(s) so as to prevent the non-conformance from recurring. The investigation may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate.

3.2.3 The QEMS Representative determines the corrective action needed based on this consultation. The Operations Management (or designate) assigns responsibility and a target date for resolution.

3.2.4 The QEMS Representative ensures corrective actions are documented using the QEMS - Summary of Findings spreadsheet. A root cause analysis is performed on any major or minor non-conformance identified during the audit. The QEMS Representative monitors the progress of corrective action(s) and provides status updates to Top Management.

3.2.5 The implementation and effectiveness of corrective actions are verified during subsequent internal QEMS audits and are considered during the Management Review. If there is evidence that the action taken was not effective, the Operations Management (or designate) initiates further corrective action and assigns resources as appropriate until the non-conformance is fully resolved.

3.3 Preventive Actions

3.3.1 Potential preventive actions may be identified through an internal or external QEMS audit as Opportunities For Improvement (OFIs), during the Management Review or through other means such as:

- staff/Owner suggestions;
- regulator observations;
- evaluation of incidents/emergency response/tests;
- the analysis of facility/Regional Hub or OCWA-wide data/trends;
- non-conformances identified at other drinking water systems; or
- a result of considering a BMP.

3.3.2 The QEMS Representative (in consultation with Operations Management and/or the SPC Manager) considers whether a preventive action is necessary. The review may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate.

3.3.3 If it is decided that a preventive action is necessary, the QEMS Representative determines the action to be taken based on this consultation and the Operations Management (or designate) assigns responsibility and a target date for implementation.

3.3.4 The implementation of preventive actions are tracked by the QEMS Representative using the QEMS - Summary of Findings spreadsheet.

3.3.5 The implementation and effectiveness of preventive actions are verified during subsequent internal QEMS audits and are considered during the Management Review. If there is evidence that the action taken was not effective, the Operations Management (or designate) may consider further preventive actions and assigns resources as appropriate.

3.4 The QEMS Rep. and Operations Management monitor corrective/preventive actions on an ongoing basis and review the status and effectiveness of the actions during

subsequent Management Review meetings.

3.5 Best Management Practices (BMPs)

3.5.1 The QEMS Representative and/or Operations Management in consultation with the SPC Manager will review and consider applicable internal and/or external BMPs identified by internal and/or external sources as part of the Management Review (OP-20) and in the corrective and preventive action processes described above.

3.5.2 BMPs may include, but are not limited to:

- Facility/Regional Hub practices developed and adopted as a result of changes to legislative or regulatory requirements, trends from audit findings or drinking water system performance trends;
- OCWA-wide BMPs/guidance or recommended actions;
- Drinking water industry based standards/BMPs or recommendations; or
- Those published by the Ministry.

3.5.3 At a minimum, applicable BMPs must be reviewed and considered once every 36 months.

4. Related Documents

Internal Audit Records
QEMS - Summary of Findings spreadsheet
OP-05 Document and Records Control
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
Aug. 28, 2018	0	Procedure issued – The original information within the main body of the Haileybury and New Liskeard Drinking Water and Distribution Systems Operational Plan (revision 5, dated September 8, 2017) was not used in OP-21 as it did meet the requirements of the new DWQMS v. 2.0. Information from QP-10 Internal Audit (s. 5.7 and s. 5.8) was incorporated into s. 3.2 and s. 3.3 of OP-21 but was modified to address non-conformances identified from additional inputs other than internal audits and preventive actions resulting from means other than OFIs from internal audits. In addition R&Rs were revised to include the SPC Manager, and to clarify the role of the QEMS Representative in investigating and determining corrective and preventive actions needed. A section on Best Management Practices (s. 3.5) was added to meet the new requirements of DWQMS v. 2.0.
Sep. 30, 2019	1	Updated Ministry of the Environment and Climate Change to Ministry of the Environment, Conservation and Parks in step 3.5.2.

CONTINUAL IMPROVEMENT

Reviewed by: I. Bruneau, QEMS Representative	Approved by: B. Logan, Sr. Operations Manager

Date	Revision #	Reason for Revision
Jun. 26, 2024	2	Updated Ministry of the Environment, Conservation and Parks to Ministry in step 3.5.2.

Ontario

Ministry of the Environment, Conservation and Parks

Print Form

Schedule C – Director's Directions for Operational Plans (Subject System Description Form)

Municipal Residential Drinking Water System

Fields marked with an asterisk (*) are mandatory.

Owner of Municipal Residential Drinking Water System *

The Corporation of the City of Temiskaming Shores

Subject Systems

Name of Drinking Water System (DWS) *	Licence Number *	Name of Operating Subsystems (if applicable)	Name of Operating Authority *	DWS Number(s) *	
1. Haileybury Drinking Water System	218-102		Ontario Clean Water Agency	220000309	-
2. New Liskeard Drinking water System	218-103		Ontario Clean Water Agency	220000344	-

Add item (+)

Contact Information for Questions Regarding the Operational Plan

i

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