ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

OPERATIONAL PLAN

For the Tri-County Drinking Water System

QEMS

QEMS Ontario Clean Water Agency	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Doc: OP-ToC Issue Date: 2019-08-16 Rev. No: 1 Pages: 1 of 1

TABLE OF CONTENTS

Reviewed by: QEMS Representative	Approved by: Operations Management

Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	ToC issued
2019-08-16	1	Change MOECC to MECP

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-01 Rev Date: 2024-08-12 Rev No: 2 Pages: 1 of 2

QEMS
Ontario Clean Water Agency

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS)	
Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To document OCWA's Quality & Environmental Management System (QEMS). This Operational Plan defines and documents the QEMS for the Tri-County Drinking Water System operated by the Ontario Clean Water Agency (OCWA). It sets out 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 Tri-County Drinking Water System is owned by the Tri-County Water Board. OCWA is the contracted Operating Authority for the Tri-County Drinking Water System.

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 facility listed above fulfils the requirements of the MECP'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
2018-01-22	0	Procedure issued – Information within OP-01 was originally set out in the Main body of OCWA's Operational Plan (last revision # 12, dated 2017-06-09). Revised as per corporate template

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS)

Reviewed by: QEMS Representative	Approved by: Operations Management

2019-08-16	1	Change MOECC to MECP
2024-08-12	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. As per IA OFI 2024-07-24

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-02 Rev Date: 2024-08-12 Rev No: 1 Pages: 1 of 2

QEMS
Ontario Clean Water Agency

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) POLICY

Reviewed by: QEMS Representative	Approved by: Operations Management

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 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.

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) POLICY

Reviewed by: QEMS Representative	Approved by: Operations Management

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
2018-01-22	0	Procedure issued – Section 3.4, 3.5 and 3.6 were added to the information originally set out in the main body of OCWA's Operational Plan (last revision # 12, dated 2017-06-09). Revised as per corporate template. The full revision history for the QEMS policy is available on OCWA's intranet.
2024-08-12	1	The first bullet of the QEMS Policy (approved in 2016) was revised to align with OCWA's updated Mission statement. s. 3.3 and 3.6 were modified to add information/clarify how to access the QEMS Policy and the Policy revision history document. OP updated as per IA OFI 2024-07-24

COMMITMENT AND ENDORSEMENT	
Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To document the endorsement of the Operational Plan for the Tri-County Drinking Water System by OCWA Top Management and the Tri-County Water Board (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's 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 Operations Management and the Safety, Process and Compliance Manager.

3.2 Any major revision of the operational plan will be re-endorsed by OCWA's 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 significant 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.
5. Changes to the Drinking Water Quality Management Standard.

Any other changes would be considered minor 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

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-03 Rev Date: 2024-08-12 Rev No: 4 Pages: 2 of 2

Ontario Clean Water Agency

COMMITMENT AND ENDORSEMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

5. Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Information within OP-03 was originally set out in the main body of OCWA's Operational Plan (last revision # 12, dated 2017-06-09). Revised as per corporate template.
2019-08-16	1	Remove Senior Operations Manager from 3.1 and include Operations Management as per OFI from IA 2019-06-25
2020-10-30	2	Revise document in include significant changes s3.2.3 as per IA-OFI 2020-10-26
2021-11-09	3	Add changes to the DWQMS.
2024-08-12	4	Remove watermark.

SIGNED COMMITMENT AND ENDORSEMENT

This Operational Plan sets out the framework for OCWA's 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 Tri County Water Board (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 Tri-County Drinking Water System 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   Owner Endorsement

Sam Smith	Date	*Corey Pemberton*	Date
Senior Operations Manager, Tri-County Drinking Water System		Chairperson	
Maegan Garber	Date	*Magda Badura*	Date
Safety, Process and Compliance Manger, Southwest Region		Administrative Authority	

The endorsement above is based on the Operational Plan that was current as of the revision date of this document (OP-03A).

Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Information within OP-03A was originally set out in the main body of OCWA's Operational Plan (last revision # 12, dated 2017-06-09). Revised as per corporate template.
2018-04-17	1	Revise to change name of Administrative Authority
2020-11-16	2	Revised Chairperson and Administrative Authority
2023-10-25	3	Revised OCWA Top Management and Owner Endorsement

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) REPRESENTATIVE

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To identify and describe the specific roles and responsibilities of the QEMS Representative(s) for the Tri-County Drinking Water System.

2. Definitions

None

3. Procedure

3.1 The role of QEMS Representative for the Tri-County Drinking Water System is the Process and Compliance Technician (PCT). The Safety, Process and Compliance Manager will act as an alternate QEMS Representative when required.

3.2 The QEMS Representative is responsible for:

- Administering the QEMS for the Tri-County Drinking Water System 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
2018-01-22	0	Procedure issued – Information within OP-04 was originally set out in the main body of OCWA's Operational Plan (last revision # 12, dated 2017-06-09). Revised as per corporate template.
2024-08-12	1	Removed watermark

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-05 Rev Date: 2024-08-12 Rev No: 18 Pages: 1 of 5
Ontario Clean Water Agency		

DOCUMENT AND RECORDS CONTROL

Reviewed by: QEMS Representative	Approved by: Operations Management

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. Applies to QEMS Documents and QEMS records pertaining to the Tri-County Drinking Water System, 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 issue 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.

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

Review   QEMS Representative
Approval   Operations Management

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.

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-05 Rev Date: 2024-08-12 Rev No: 18 Pages: 2 of 5

QEMS
Ontario Clean Water Agency

DOCUMENT AND RECORDS CONTROL

Reviewed by: QEMS Representative	Approved by: Operations Management

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., 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.

SCADA records are maintained as per Appendix OP-05A and are accessible to all staff when required.

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

The QEMS Representative communicates any changes made to QEMS documents to relevant 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 the electronic copy of the document (as applicable) are promptly removed from the applicable designated document control locations specified in OP-05A. The QEMS Representative ensures that the hardcopy and electronic copy are disposed of or retained (as appropriate).

3.8 The authorized method for disposal of hardcopy documents and records after the specified retention requirements have been met is shredding. Electronic records are retained as per the specified retention requirements. The authorized method for disposal of electronic documents and records after the specified retention requirements have been met is determined by the QEMS Representative. The QEMS Representative will maintain obsolete files accordingly.

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
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	OCWA Requirement

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-05 Rev Date: 2024-08-12 Rev No: 18 Pages: 3 of 5

DOCUMENT AND RECORDS CONTROL

Reviewed by: QEMS Representative	Approved by: Operations Management

Type of Document/Record	Minimum Retention Time	Requirement Reference
	in the facility's legal instruments *	
Log Books or other record-keeping mechanisms	5 years	O. Reg. 128/04
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 required 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	10 years	DWWP

DOCUMENT AND RECORDS CONTROL

Reviewed by: QEMS Representative	Approved by: Operations Management

Type of Document/Record	Minimum Retention Time	Requirement Reference
completed by OCWA as the authorized by the owner)		

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 policies 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 Minutes

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2010-04-07	1	Revise Wording in Section 5.4 and Tables 1 and 2
2010-10-21	2	Modify Locations of Documents in Table 1; Table 2 change DWQMS Docs and Records from 2 yrs to 3 yrs;
2010-12-02	3	Modify Table 1; Change 5.9 to London Server from Flash Drive
2011-05-13	4	Revise wording in 5.6 to eliminate requests in writing
2011-07-22	5	Corporate Revision: Revise 5.4 to identify PCT role and 5.5 to add security IT has; Modify wording in Table 2; add Appendix Title page; Modify date formatting
2011-12-06	6	Change header to read Senior Operations Manager (instead of Dale LeBritton); 5.4 capitalize personnel; Table 1: add Equipment Breakdown, remove Request for Staff Development; add client connection to records
2012-04-12	7	Revise Operations Manager to Senior Operations Manager
2012-05-11	8	Revise Table 1 as per OFI in Internal Audit Report dated May 7, 2012
2013-06-28	9	revise issue date; Change London Server to shared drive in table
2014-05-02	10	Revise to state in 5.9 that the server has changed to Toronto; change Table 1 Client Connection to Operations Report
2014-07-23	11	Change of Ownership from Municipality of West Elgin to Tri-County Water Board, Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	12	Add admin to 3.0; in 5.4 change the word master to controlled; 5.6 add that changes are communicated through email or staff meetings; revise Table 2 as per OFI EA 2014-05-06 and OFI IA 2015-02-02; change name to Tri-County DWS from Tri-County WTP.
2016-04-22	13	Add Community compliant form and ORO schedule to Table 1; change PCT to OCTL and Senior Operations Manager to RHM

DOCUMENT AND RECORDS CONTROL

Reviewed by: QEMS Representative	Approved by: Operations Management

2017-06-09	14	Revise to new org structure; revise as per OFI IA 2017-01-12 to add watermain repair form as a document and record.
2018-01-22	15	New Procedure Issued. Revised procedure using corporate template.
2019-08-16	16	Clarify section 3.8 to identify the disposal method of electronic files as per Management Review 2019-08-12
2022-03-16	17	Procedure updated as per Corporate revisions: clarity to version control requirements to align with the Director's Directions dated May 2021, detail to the approval process for Operational Plan, clarity on how electronic documents are handled, 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).
2024-08-12	18	Procedure updated [update revision history based on your current procedure] as follows: added multi factor authentication to 3.5, section 3.9 table 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, minor wording and type-o's, removed watermark. As per IA OFI 2024-07-24.

DOCUMENT AND RECORDS CONTROL LOCATIONS		
Reviewed by: QEMS Representative		Approved by: Operations Management

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

DRCC-Document and Records Control Centre (specified in the Table)

Type of Document/Record	**Designated Document Control Location** (HC = Hardcopy, E = Electronic)
Internal QEMS Documents	
Chain of Custody Forms	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\Hub Files\Chain of Custody
Community Complaint Form	E- \\OCWFILEREG\Public\Southwest\Regional\Forms
Contingency Plan Review/Test Summary Form (FEP-01)	E-\\OCWFILEREG\Public\Southwest\Regional\Forms
Essential/Emergency Service and Supply Contact List	HC-FEP Binder E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\Hub Files\Contact List
Corporate Emergency Response Plan (CERP)	E - OCWA's Sharepoint
Facility Emergency Plans (FEP)	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\9 Facility Emergency Plan Binder
Internal Audit Protocol and Report	E- P:\Everyone\PCT\DWQMS, MDWL and DWWP\DWQMS\Internal Audit Guidance Materials and Templates
On-call Schedule	HC-DRCC- Tri-County WTP Admin Office E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\Hub Files\Schedules--On call, rotations
Operational Plan (OP-01 to OP-21 and appendices, including Schedule "C" – Subject System Description Form)	E – \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\7 Operational Plan
Operations Manual	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\8 Operations Manual HC-DRCC- Tri-County WTP Control Room
Operations Reports	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\4 Correspondence\Client E- Aylmer Cluster Operations Reports - OneDrive (sharepoint.com)
QEMS Policy	E - OCWA's Sharepoint and public website HC-posted at Tri-County WTP
Round Sheets	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\Hub Files\Rounds Sheets
Request for Staff Development	E-\\OCWFILEREG\Public\Southwest\Regional\Forms\Administrative
Sampling Schedule	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\Hub Files\Sample Schedules
Standard Operating Procedures (referenced in Operational Plan)	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\8 Operations Manual

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
Summary Table of Action Items	E- \\OCWFILEREG\Public\Southwest\Regional\Forms
Training Record Form	E- \\OCWFILEREG\Public\Southwest\Regional\Forms
Vacation Request Form	E- \\OCWFILEREG\Public\Southwest\Regional\Forms
Vacation Schedule	E – Outlook Calendar (Admin)
Disinfection Forms	E- \\OCWFILEREG\Public\Southwest\Regional\Forms
WMS Work Orders	E-Maximo
External QEMS Documents	
ANSI/NSF product registration documentation for Chemicals/Materials Used	E – \\OCWFILEREG\Public\Southwest\Regional\Contractor Safety Program and Qualifications
Applicable federal and provincial legislation and municipal by-laws	Provincial Online at www.e-laws.gov.on.ca Federal online at www.laws.justice.gc.ca
AWWA Standards	E - P:\Everyone\PCT\AWWA Standards
Drinking Water Works Permit	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\2 ECA-MDWL-DWWP
DWQMS	E - https://www.ontario.ca
Engineering schematics/plans/drawings	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\10 Drawings-Watermains HC – DRCC- Tri- County WTP
Maintenance/equipment manuals	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\8 Operations Manual HC – DRCC- Tri- County WTP
Ministry forms referenced in the Drinking Water Works Permit, 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)	E- \\OCWFILEREG\Public\Southwest\Regional\Forms\Operations
Municipal Drinking Water Licence	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\2 ECA-MDWL-DWWP
Ontario's Watermain Disinfection Procedure	E - https://www.ontario.ca
Operator certificates	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\Hub Files\Operator Certificates and Licences\Area 4-Aylmer
Permit to Take Water	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\2 ECA-MDWL-DWWP
Source Water Protection Plan	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\Infrastructure Review and Capital Reports\Infrastructure Reports\Source Protection Plan
QEMS Records	
Action & Analysis Plan Form	\\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\MECP Inspection Reports

Ontario Clean Water Agency

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: QEMS Representative	Approved by: Operations Management

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
Annual Reports (Section 11 and Schedule 22)	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\Annual Reports
AWQI Reports	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\AWQI-Non Compliance
Back Flow Reports	E-\\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\Calibration Reports
Call In/Call Out/Call Back Reports	E-Maximo
Chain of Custodies	E - \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\6 Yellow Folder
Community complaint records	E – OPEX database
Contingency Plan Review/Test Summary Form (FEP-01)	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\Miscellaneous
External audit reports	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\DWQMS Audit Reports\External Audits
External Calibration records	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\Calibration Reports
Facility Operations Logbook(s)	HC- (historical) Old WTP E - https://ocwa.eriscloud.com
Infrastructure review (recommended capital/major maintenance)	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\Infrastructure Review and Capital Reports
In-house lab results	E - maintained through PDM E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\6 Yellow Folder
Internal QEMS audit reports	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\DWQMS Audit Reports\Internal Audits
Internal and External QEMS Communications	E-PCT Folder on Corporate Server and Email E-\\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\4 Correspondence\DWQMS
Internal Calibration records	E - maintained through WMS E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\6 Yellow Folder
Laboratory analyses	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\6 Yellow Folder E-PDM
Maintenance records	E - maintained in WMS
Management Review documentation	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\DWQMS Management Review

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: QEMS Representative	Approved by: Operations Management

Type of Document/Record	**Designated Document Control Location** (HC = Hardcopy, E = Electronic)
MECP inspection reports	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\MECP Inspection Reports
Ministry forms referenced in the Drinking Water Works Permit, 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)	E-\\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\2 ECA-MDWL-DWWP
Plant Tour Records	HC – Logbooks on-site
Results of emergency test exercises/emergency response debriefs	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\Miscellaneous\FEP Review and Tests
Request For Staff Development	HC – Tri-County WTP Admin Office
Rounds sheets	HC – DRCC- Tri- County WTP E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\6 Yellow Folder
SCADA Records (Plant SCADA, Client Owned)	E – SCADA System
Sampling Schedule	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\6 Yellow Folder
Summary Table of Action Items	E – \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\DWQMS Management Review
Training records	HC- DRCC- Tri- County WTP Admin Office E - maintained in OCWA's Training Summary dB
Vacation Request Forms	HC- DRCC- Tri- County WTP Admin Office
Vacation Schedule	HC- DRCC- Tri- County WTP Admin Office E-Outlook calendar
Visitor's Logbook	HC – DRCC- Tri- County WTP
Disinfection Forms	E- \\OCWFILEREG\Public\Southwest\Aylmer Cluster\6634 Tri-County WTP\6634\5 Reports-Audits\Infrastructure Review and Capital Reports\Infrastructure Reports

Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2010-04-07	1	Revise Wording in Section 5.4 and Tables 1 and 2
2010-10-21	2	Modify Locations of Documents in Table 1; Table 2 change DWQMS Docs and Records from 2 yrs to 3 yrs;
2010-12-02	3	Modify Table 1; Change 5.9 to London Server from Flash Drive
2011-05-13	4	Revise wording in 5.6 to eliminate requests in writing

DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: QEMS Representative	Approved by: Operations Management

2011-07-22	5		Corporate Revision: Revise 5.4 to identify PCT role and 5.5 to add security IT has; Modify wording in Table 2; add Appendix Title page; Modify date formatting
2011-12-06	6		Change header to read Senior Operations Manager (instead of Dale LeBritton); 5.4 capitalize personnel; Table 1: add Equipment Breakdown, remove Request for Staff Development; add client connection to records
2012-04-12	7		Revise Operations Manager to Senior Operations Manager
2012-05-11	8		Revise Table 1 as per OFI in Internal Audit Report dated May 7, 2012
2013-06-28	9		revise issue date; Change London Server to shared drive in table
2014-05-02	10		Revise to state in 5.9 that the server has changed to Toronto; change Table 1 Client Connection to Operations Report
2014-07-23	11		Change of Ownership from Municipality of West Elgin to Tri-County Water Board, Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	12		Add admin to 3.0; in 5.4 change the word master to controlled; 5.6 add that changes are communicated through email or staff meetings; revise Table 2 as per OFI EA 2014-05-06 and OFI IA 2015-02-02; change name to Tri-County DWS from Tri-County WTP.
2016-04-22	13		Add Community compliant form and ORO schedule to Table 1; change PCT to OCTL and Senior Operations Manager to RHM
2017-06-09	14		Revise to new org structure; revise as per OFI IA 2017-01-12 to add watermain repair form as a document and record.
2018-01-22	15		Appendix issued; Table was originally included within the Document and Records Control Procedure (QP-01) (last revision # 14 dated 2017-06-09). Revised procedure using corporate template.
2018-04-17	16		Revise table as per IA 2018-03-29 OFI
2019-08-16	17		Revise table as per IA 2019-06-25 OFI, add Operations Report, change MOECC to MECP
2020-10-30	18		Revise table to change Call In Report to Call Back Report as recommended in IA-OFI 2020-10-26
2021-11-09	19		Revise electronic locations as per IA-OFI 2021-08-25, add request for staff development form
2022-03-16	20		Revisions as per Corporate Compliance, added: document review and approve title, instructions (specify exact location of documents/records and list maintenance records not in WMS), clarity on which documents are included under the Operational Plan, new documents/records (Watermain Disinfection Procedure, results of emergency test exercises/emergency response debriefs and Ministry forms referenced in the Drinking Water Works Permit) and clarity to external communications and inspection reports; Removed: reference to OCWA's intranet (replaced with OCWA's Sharepoint site). Clarify DRCC locations
2022-11-28	21		Revise location of documents located in the PCT folder as per IA OFI 2022-10-27
2024-08-12	22		Appendix updated with MECP revised to Ministry, updated Corporate Emergency Plan (CERP) name, minor wording, removed watermark. Added Disinfection Forms, added Sharepoint link for Operations Reports and added hard copies of manuals as per IA OFI 2024-07-24.

QEMS Ontario Clean Water Agency	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-06 Rev Date: 2024-08-12 Rev No: 6 Pages: 1 of 8

DRINKING WATER SYSTEM

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To document the following for the Tri-County Drinking Water System:
- 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

3.1 Drinking Water System Overview

The Tri-County Drinking Water System (DWS#260091117) is owned by the Tri-County Water Board and is operated by Ontario Clean Water Agency.

The water plant provides water to several municipalities spread amongst three counties. The members of the Tri-County Water Board include:
- the Corporation of the Municipality of West Elgin,

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-06 Rev Date: 2024-08-12 Rev No: 6 Pages: 2 of 8

DRINKING WATER SYSTEM

Reviewed by: QEMS Representative	Approved by: Operations Management

- the Corporation of the Municipality of Dutton Dunwich,
- the Corporation of the Municipality of Southwest Middlesex,
- the Corporation of the Municipality of Chatham Kent and
- the Corporation of the Village of Newbury.

The following table is a list of systems to which the Tri-County Drinking Water System supplies water to:

Distribution System	Waterworks #	Owner	Operating Authority	Water Supply
West Elgin	260094627	The Corporation of the Municipality of West Elgin	Ontario Clean Water Agency	Continuous from Tri-County Distribution System
Dutton-Dunwich	220002967	The Corporation of the Municipality of Dutton-Dunwich	Ontario Clean Water Agency	Continuous from Tri-County Distribution System
Southwest Middlesex	260005202	The Corporation of the Municipality of Southwest Middlesex	Ontario Clean Water Agency	Continuous from West Elgin Distribution System
Newbury	260005463	The Corporation of the Village of Newbury	Newbury Water Services	Continuous from Southwest Middlesex Distribution System
Bothwell	260002551	The Corporation of the Municipality of Chatham Kent	Chatham Kent PUC	Continuous from Southwest Middlesex Distribution System
Southwold	210001362	The Corporation of the Township of Southwold	Ontario Clean Water Agency	Emergency from Dutton Dunwich Distribution System

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-06 Rev Date: 2024-08-12 Rev No: 6 Pages: 3 of 8

QEMS
Ontario Clean Water Agency

DRINKING WATER SYSTEM

Reviewed by: QEMS Representative	Approved by: Operations Management

- Map of distribution systems the Tri-County Drinking Water Supply System serves.
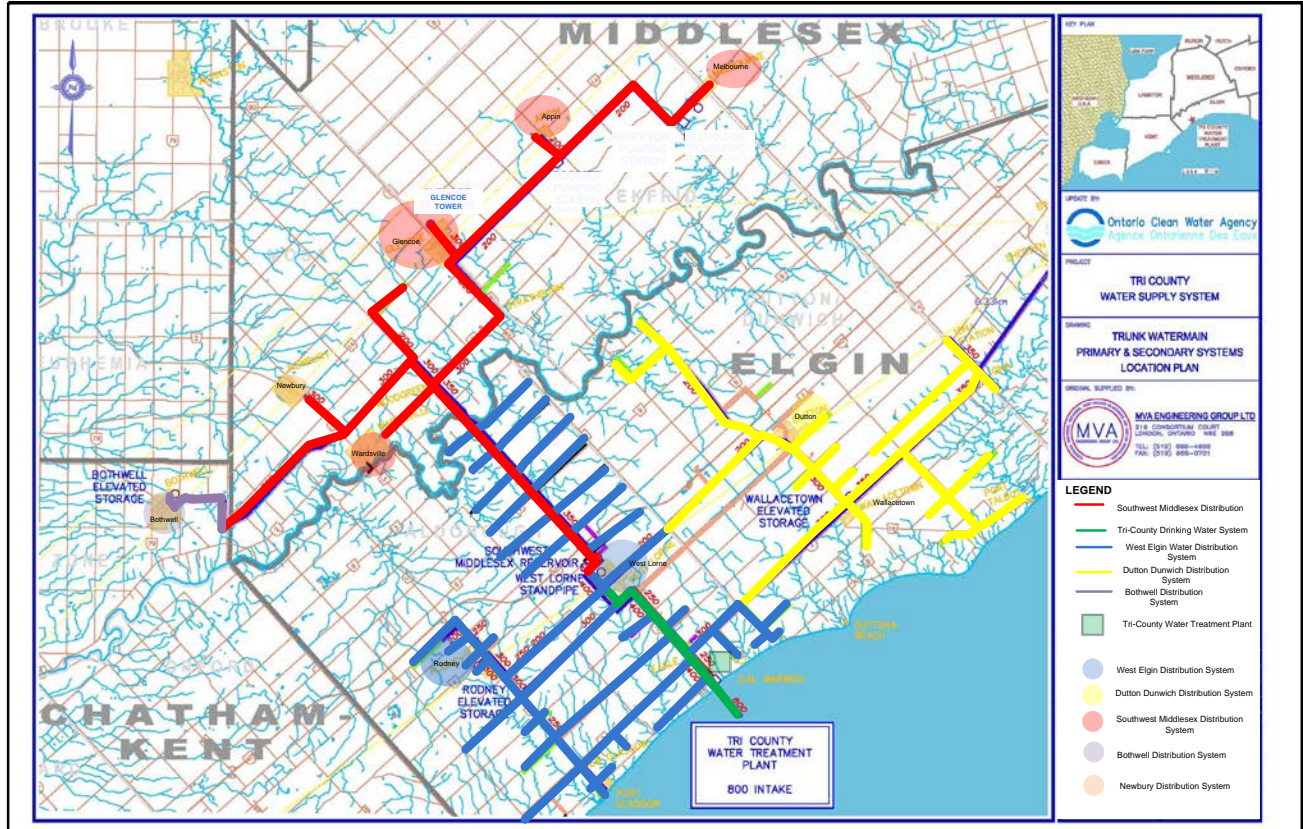
3.2 Source Water

General Characteristics

The raw water source for the treatment plant is Lake Erie. The water from Lake Erie is typically low in turbidity, slightly basic and low in conductivity. Temperature fluctuates significantly through the seasons ranging from approximately 1 ºC in the winter to as high as 24 ºC during the summer. Bacteriological analysis of the raw water indicates a source of relatively good quality. The results of chemical analyses of treated water consistently meet the Ontario Drinking Water Quality Standards.

Raw Water Characteristics at Intake (based on 2021 data)

Characteristic	Minimum	Maximum	Annual Average
Temperature (ºC)	4.5	25.1	14.3
Turbidity (NTU)	5.32	655.16	46.9
pH	6.32	8.75	7.93
E. coli (CFU/100 mL)	0	100	35.3

	OPERATIONAL PLAN	QEMS Proc.: OP-06
QEMS Ontario Clean Water Agency	Tri-County Drinking Water System	Rev Date: 2024-08-12 Rev No: 6 Pages: 4 of 8

DRINKING WATER SYSTEM

Reviewed by: QEMS Representative	Approved by: Operations Management

Total Coliforms	1	13400	620.4

*Raw data will be reviewed annually however, updates will only be made if there are significant changes

Common Fluctuations

Raw water quality changes seasonally and during significant storm conditions. The pre-membrane filter strainers will reduce turbidity and algae entering the membrane filtration system.

Water temperature also changes seasonally. Warm summer temperatures may result in an increase of taste and odour concerns. An Advanced Oxidation Process (AOP) using UV and hydrogen peroxide is available if taste and odour problems occur.

Threats

The main potential source of raw water contamination from upstream and downstream is agricultural runoff and the growth of algae.

Zebra mussels pose a clogging threat on mechanical equipment and the intake. Zebra mussels are controlled by pre-chlorination to the intake.

The Thames-Sydenham and Region Source Protection Plan identifies the intake area as low to moderate policy area. Refer to Source Protection Plan for more details.

Operational Challenges

Under abnormal operating conditions, an alternate intake is available for use.

During those occasions that frazil ice restricts the intake the plant can be operated at a decreased capacity and/or the intake can be back-flushed. The alternate intake can also be used.

If an algae bloom binds to the membranes or the plant experiences a high raw water turbidity event for an extended period of time, the membrane run times become reduced and reverse filtration frequency increases, as well as chemical cleaning procedures. This reduces membrane filter efficiencies causing an increased use of process water and therefore, a decrease in water production capacity if the situation is prolonged. Since algae can also be toxic, sampling for microcystin of the raw and treated water is conducted during possible contamination periods. Detection of algae blooms in the area are closely monitored though communication with the MECP and monitoring satellite images.

In 2012, manganese had been identified in the raw water that is soluble and therefore passes through the membrane filtration system. When oxidized by the chlorine the treated water becomes discoloured. The WTP has experience short term episodes where the discoloured water is released to the distribution system causing aesthetic issues. The WTP now continuously monitors for dissolved oxygen as an early detection that a problem may be experienced. As well, increased sampling of manganese is conducted during possible episodes. Operations can switch to the standby intake if the dissolved oxygen levels are greater there. A sodium permanganate dosing system is now available to covert dissolved manganese in the

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-06 Rev Date: 2024-08-12 Rev No: 6 Pages: 5 of 8

QEMS

Ontario Clean Water Agency

DRINKING WATER SYSTEM

Reviewed by: QEMS Representative	Approved by: Operations Management

raw water to particulate form, which can then be removed by the membrane filtration system.

3.3 Treatment System Description

Intake
The intake consists of one 700mm diameter polyethylene pipe extending approximately 610 m into Lake Erie at a depth of 5.7m. A chlorine gas zebra mussel control system is used seasonally.   The raw water is screened by two coarse screens. A sodium permanganate injection system is used seasonally to oxidize manganese.

Low Lift Pumping Station
Raw water is pumped from the low lift wet wells by four low lift pumps to the Water Treatment Plant.

Filtration
At the Water Treatment Plant the water is pre-filtered by four automated strainers to protect the filter membranes from coarser particles and algae in the raw water.

After the water has been strained it enters the membrane filtration system which removes fine particles, sediment, algae, protozoa and bacteria. Filtered water can be directed through the UV Advanced Oxidation Process (AOP) unit to the treated water storage tanks.

pH Adjustment
Combined filtered water is injected with carbon dioxide downstream of the membrane filters and upstream of the UV disinfection to adjust pH levels to optimize the primary disinfection process.

Disinfection
Disinfection is achieved by the use of sodium hypochlorite for primary and secondary disinfection. Note that UV is intended for use with hydrogen peroxide (AOP) for taste and odour control, but can be used as back up for primary disinfection. The treated water is stored in treated water storage tanks where it is pumped into the distribution network by the High Lift pumps. Post chlorination of the treated water is done at two points. Secondary disinfection is monitored after the treated water storage tanks. If required, secondary disinfection can be increased at the sodium hypochlorite dosing point downstream of the high lift pumps.

Process Drain Water
Waste water from the floor drains and on line analyzers are directed to the process water handling facilities that include a settling basin and constructed wetlands. Flush water that cleans the pre-strainers and the membranes is also sent to the process water handling facilities.

Monitoring and Control

![QEMS logo] **QEMS** Ontario Clean Water Agency	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-06 Rev Date: 2024-08-12 Rev No: 6 Pages: 6 of 8

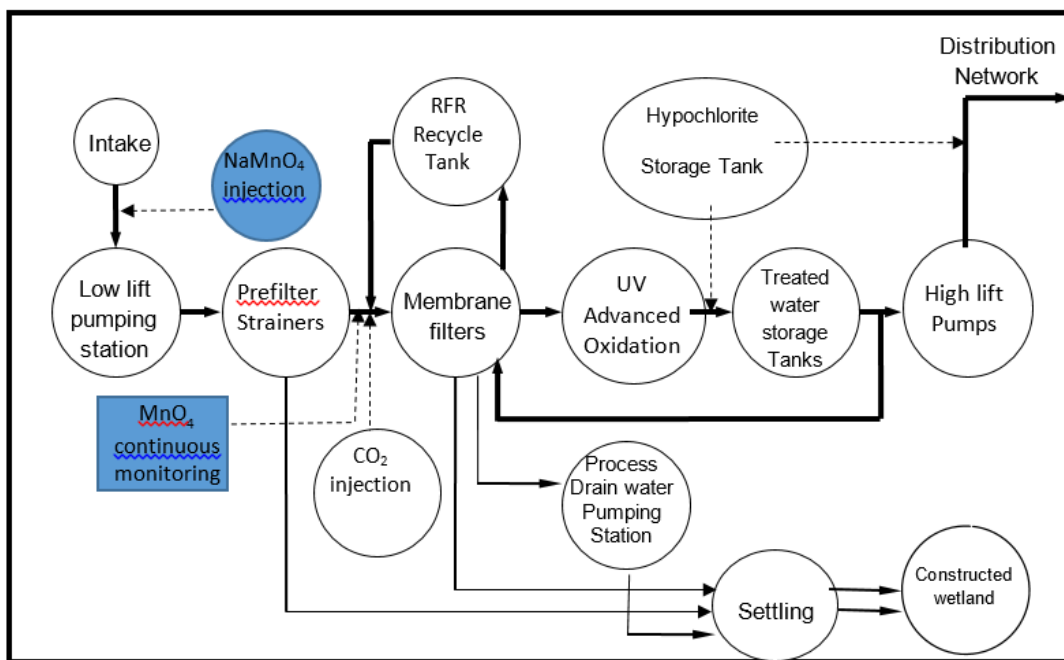**DRINKING WATER SYSTEM**

Reviewed by: QEMS Representative	Approved by: Operations Management

The water treatment process and distribution components are controlled by a dedicated Supervisory Control and Data Acquisition (SCADA) computer system and monitored by certified operators.

Standby Power
Two diesel generators are available to permit the treatment plant to remain in operation should a power failure occur.

3.4   Treatment System Process Flow Chart

3.5   Description of the Distribution System Components

The Tri-County Drinking Water System serves several communities. The primary transmission line from the WTP ends at the West Lorne Standpipe. The West Lorne Standpipe is 38.6m high and has a capacity of $2889m^3$. The West Lorne Standpipe is controlled and monitored from the water treatment plant via SCADA. In emergency situations the Tri-County Drinking Water System can feed the Southwold Distribution System through the Iona interconnection which is part of the Dutton-Dunwich Distribution System.

Conditions upstream of the treatment plant, in Lake Erie (the raw water source) are monitored through MECP reports, advisories and other operating authorities to ensure the operating effectiveness of the treatment plant to provide safe drinking water.

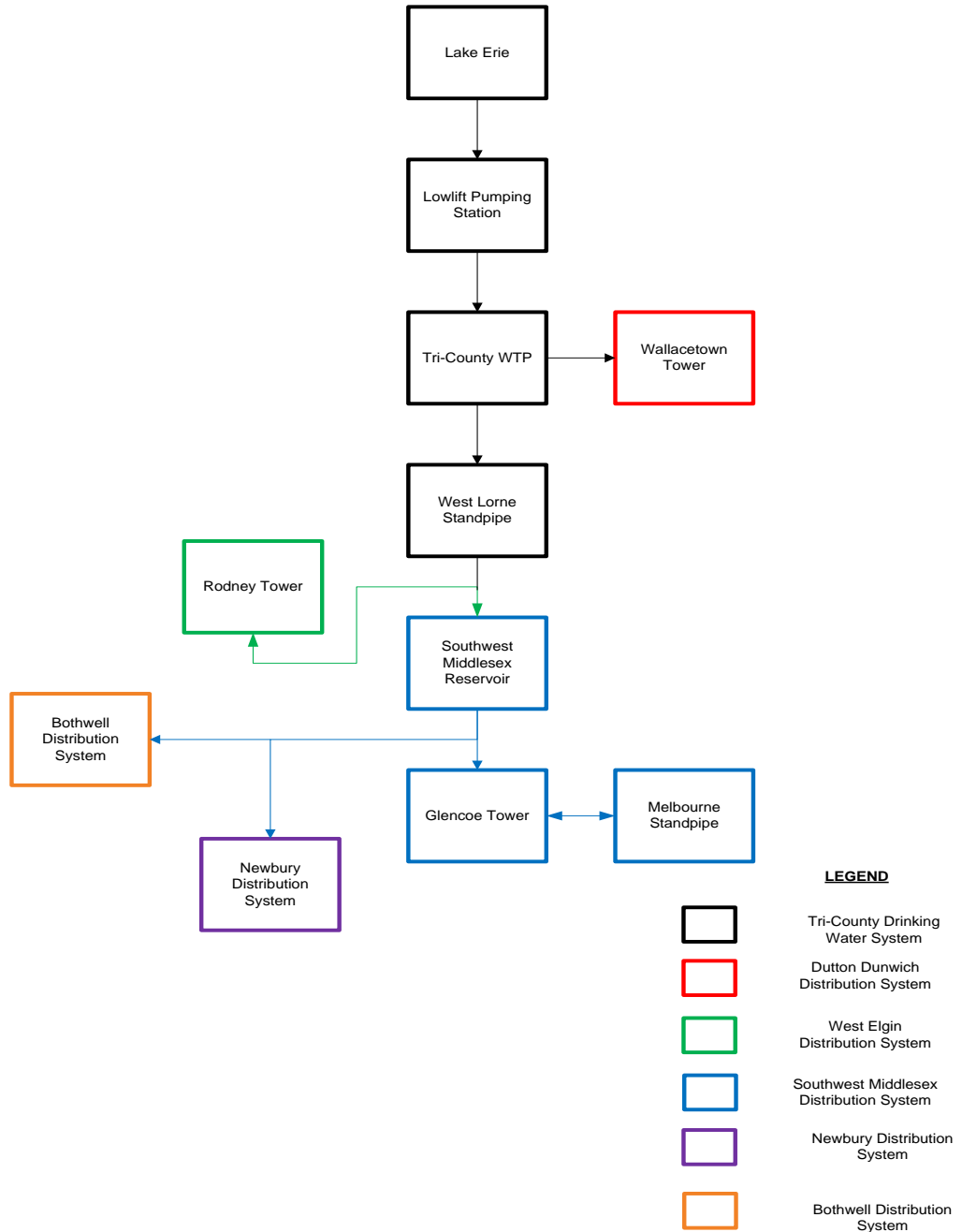| QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-06 Rev Date: 2024-08-12 Rev No: 6 Pages: 7 of 8
Ontario Clean Water Agency		

DRINKING WATER SYSTEM

Reviewed by: QEMS Representative	Approved by: Operations Management

The treatment plant relies on information from the downstream distribution systems in order to enhance or modify the treatment process.

3.6   Distribution System Components Flow Chart

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-06 Rev Date: 2024-08-12 Rev No: 6 Pages: 8 of 8
Ontario Clean Water Agency		

DRINKING WATER SYSTEM

Reviewed by: QEMS Representative	Approved by: Operations Management

4. Related Documents

SOP# WTP-23: Frazil Ice
SOP# WTP-28: Harmful Algal Bloom Monitoring, Reporting and Sampling Plan
SOP# WTP-32: Raw water Low Dissolved Oxygen and Manganese Issue
SOP# WTP-33: Raw Water Intake Obstruction
SOP# WTP-47: Provision of Alternative Water Supply
SOP# WTP-49: Spill and other Discharges
SOP# WTP-56: Low Range Mn Testing
SOP# WTP-57: Flushing Raw Watermain
SOP# WTP-58: Dosing Sodium Permanganate and Gas Chlorine
Thames-Sydenham and Region Source Protection Plan

5. Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Information within OP-06 was originally set out in the Main body of OCWA's Operational Plan (last revision # 12, dated 2017-06-09). New revision as per corporate template.
2018-04-17	1	Revised to include DWS# as per OFI IA 2018-03-29.
2019-08-16	2	Update table with 2018 data, change MOECC to MECP as per OFIs IA 2019-06-25
2020-10-30	3	Revised s3.2 to update raw water source data to 2019 & Updated title of SOP#28 s.4 as recommended by IA-OFI 2020-10-26
2021-11-09	4	Add CO2 addition to s.3.3 and clarify Disinfection as per IA-OFI 2021-08-25, updated raw water characteristics with 2020 data
2022-12-02	5	Updated raw data table as per IA OFI 2022-10-27
2024-08-12	6	Add sodium perm system, revise schematic, change OA for Dutton-Dunwich, add statement below raw water table, add SOPs as per IA OFI 2024-07-24

RISK ASSESSMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

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 any thing 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 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.

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-07 Rev Date: 2024-08-12 Rev No: 3 Pages: 2 of 4

RISK ASSESSMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

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 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, SOPs/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).

As a minimum, the following must be included as CCPs (as applicable):

- 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 along with their associated outcome (hazards/risk) for the remaining activities/process steps (i.e., those not 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:

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-07 Rev Date: 2024-08-12 Rev No: 3 Pages: 3 of 4

RISK ASSESSMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

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:

3.3.7.1 The associated hazardous event has a ranking of 12 or greater;

3.3.7.2 The associated hazardous event can be controlled through control measure(s);

3.3.7.3 Operation of the control measures can be monitored and corrective actions can be applied in a timely fashion;

3.3.7.4 Specific control limits can be established for the control measure(s); and

3.3.7.5 Failure of the control measures would lead to immediate notification of Medical Officer of Health (MOH) or Ministry or both.

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-07 Rev Date: 2024-08-12 Rev No: 3 Pages: 4 of 4

RISK ASSESSMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

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

OP-08 Risk Assessment Outcomes
OP-20 Management Review
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)

5. Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Information within OP-07 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (last revision #11, 2017-06-09). Revision as per new corporate template.
2019-08-16	1	Change MOECC to MECP, revise 3.3.5 as per OFI EA 2018-07-09, revise numbering in 3.7 to be consistent with OP-08A
2022-05-18	2	Procedure updated - Replaced MOECC 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 currency of the information in the risk assessment)].
2024-08-12	3	Remove watermark

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-08 Rev Date: 2024-08-12 Rev No: 4 Pages: 1 of 2
Ontario Clean Water Agency		

RISK ASSESSMENT OUTCOMES	
Reviewed by: QEMS Representative	Approved by: Operations Management

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 as required.

3.2 The results of the risk assessment conducted as per OP-07 are documented in Table 1 of OP-08A. 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 not 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.

RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

3.4 A summary of the results of the once every calendar year review/36-month risk assessment is recorded in Table 3 of OP-08A.

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

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

5. Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Information within OP-07 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (last revision #11, 2017-06-09). Revision as per new corporate template.
2018-04-17	1	Revise 3.4 as per IA 2018-03-29
2019-08-16	2	Change MOECC to MECP as per OFIs IA 2019-06-25
2022-05-18	3	Procedure updated - Replaced MOECC 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)].
2024-08-12	4	Remove watermark.

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Table 1: Risk Assessment Table

Note: Processes referred to in section 3.3.4 of OP-07 Risk Assessment must be identified as mandatory Critical Control Points (CCPs) as applicable. Mandatory CCPs are not required to be ranked.

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
Source/Intake	Raw Water Quality Issue	-AWQI -Inability to treat water -Aesthetic issues -Taste and odour issues - Drinking Water Advisory	-Raw water pH, DO, temperature, free chlorine and turbidity analyzers -Increased monitoring of source problem (Mn, Fe, Microcystin etc.) -Back up shoreline intake -AOP System Operation -SCADA Trending -Storage of treated water in Treated Water Storage Tanks and Distribution - Sodium permanganate addition -SOP #: WTP-02, WTP-28, WTP-56,WTP-57, WTP-58 ALRM-18, ALRM-19	*1,3,4,12*	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				9	4	3	12	
	Frazil Ice	-Inability to supply water	-Storage of treated water in Treated Water Storage Tanks and Distribution - Backflush intake -Back up shoreline intake	*1*	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1)

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Doc.: OP-08A Rev Date: 2024-08-12 Rev No: 22 Pages: 2 of 18

QEMS — Ontario Clean Water Agency

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
			-SOP #: WTP-23, ALRM-12 -VFD pump control	3, 4	3	3	9	
	Plugged Intake or Failure of Intake	-Inability to supply water	-Storage of treated water in Treated Water Storage Tanks and Distribution -Intake Inspections -back up shoreline intake -SOP #: WTP-23, WTP-33, ALRM-12 -Backflush intake	2	1	3	3	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				4,6	2	3	6	
	Zebra Mussel Control System Failure	-Plugged or partially plugged intake -Inability to supply water	-Storage of treated water in Treated Water Storage Tanks and Distribution -Maintenance to the chlorine gas system -Intake Inspections -Back up shoreline intake -Backflush intake -SOP #: WTP-23, WTP-33, ALRM-12	1, 4	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				9, 12	3	3	9	

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
	Manganese Control System Failure	-AWQI -Aesthetic issues -Taste and odour issues - Drinking Water Advisory - Overdose of chemical	- Redundancy: 2 raw watermains - Continuous monitoring - Raw well isolation - Raw watermain flushing - SOP# WTP-02, WTP- 56, WTP-57, WTP-58	*1,4*	4	3	12	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
				9, 12	3	3	9	
Low Lift Pumping Station	Low Lift Pump Failure	-Inability to supply water	-Redundancy: 4 pumps -Pump rentals -Storage of treated water in Treated Water Storage Tanks and Distribution -SOP #: ALRM-16	*3, 4*	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6,13	2	3	6	
	Raw Watermains to WTP Failure	-Inability to supply water	-Storage of treated water in Treated Water Storage Tanks and Distribution -Redundancy: 2 Raw Watermains	*3, 4*	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Doc.: OP-08A Rev Date: 2024-08-12 Rev No: 22 Pages: 4 of 18

Ontario Clean Water Agency

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
			-SOP #: WTP-22, WTP-40	6	2	3	6	
	Biofilm Formation in Raw Watermains	-Water quality issue -High chlorine demand	-Storage of treated water in Treated Water Storage Tanks and Distribution -Rotation of Raw Watermains -Flushing of raw watermains, use of chlorine -SOP #: WTP-27, WTP-22	1	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				9	3	3	9	
	Power Failure	-Inability to supply water	-Storage of treated water in Treated Water Storage Tanks and Distribution -Generator onsite, or rental -SOP #: ALRM-08, ALRM-09	3, 4	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6, 13	2	3	6	
Filtration Process	Strainer Failure	-Inability to supply water to the treatment process	-Redundancy: 4 Strainers -SCADA Monitoring -SOP #: ALRM-20	2	3	2	6	Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6,13	1	3	3	
				12	2	3	6	
	High Turbidity on discharge of Racks	-AWQI for >1NTU for 15 minutes	-Rack Shutdown (out of service) and Alarms -Redundancy: 4 Racks	10	3	4	12	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
		-Drinking Water Advisory	-SCADA Monitoring -SOP #: WTP-02, WTP-15, WTP-37, WTP-50, ALRM-22					☐ No
	Failure on Rack Integrity Test	-Rack out of service -Possible high turbidity -Failure to meet Procedure for Disinfection requirements -AWQI -Drinking Water Advisory	-Redundancy: 4 Racks -Spare parts -Pall Operations Manual -SCADA Monitoring -SOP #: WTP-02, WTP-41	10	3	3	9	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility
				13	2	3	6	☐ No
	Leak/Breaks on Racks	-Rack out of service	-Redundancy: 4 Racks -Spare parts -Pall Operations Manual -SCADA Monitoring - SOP#: WTP-41	10	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
	Mechanical Failure on Racks	-Rack out of service	-Redundancy: 4 Racks -Spare Parts -Pall Operations Manual -SCADA Monitoring	10	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
	Air Compressor Failure	-Inability to treat water	-Redundancy: 2 Air Compressors - Air compressor rental	10	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
			-SCADA Monitoring -Maintenance program -Storage of treated water in Treated Water Storage Tanks and Distribution -SOP #: ALRM-22	13	2	3	6	☒ No, OP-07 3.3.7 (1) doesn't apply
	EFM/CIP System Failure	-Inability to chemically clean membranes -Decreased efficiency and possible failure	-Redundancy: 4 Racks -Routine maintenance -SCADA Monitoring	3, 4	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility
				13	2	2	4	☒ No, OP-07 3.3.7 (1) doesn't apply
	Power Failure	-Inability to treat water	-Storage of treated water in Treated Water Storage Tanks and Distribution -Generator onsite or rental -SOP #: ALRM-02, ALRM-03	3, 4	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
Primary Disinfection	Sodium Hypochlorite Pump Failure	-AWQI: Failure to meet CT -Low chlorine - Drinking Water Advisory	-Redundancy: 2 Chemical Feed Pumps -UV System as back for Primary Disinfection by sodium hypochlorite -Shutdown of Low Lift Pumps -Storage of treated water in Treated Water Storage Tanks and Distribution	3, 4	4	3	12	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No

QEMS
Ontario Clean Water Agency

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
			-SCADA monitoring -SOP #: WTP-02, WTP-04, WTP-15, WTP-27, WTP-35, WTP-50, ALRM-02, ALRM-03, ALRM-26, ALRM-28	*10*	3	3	9	
Storage Tanks	Milltronics Failure	-Low level treated water storage tanks -Loss of pump control -AWQI: Failure of meeting CT requirements -Drinking Water Advisory	-Redundancy: 2 Treated Water Storage Tanks -Routine maintenance/calibration -Pressure transmitter reading -Manual Operation -SOP #: WTP-04, ALRM-29, ALRM-30	*3, 4*	4	3	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (4) doesn't apply
	Freezing or ice build-up in Tanks	-Loss of level control and pump control -AWQI: Failure to meet CT requirements - Drinking Water Advisory	-Redundancy: 2 Treated Water Storage Tanks -Manual operation; summer/winter mode operation -Pressure transmitter readings -SOP #: WTP-04, ALRM-29, ALRM-30	*3,4*	4	3	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				10	3	3	9	
	Low Level			*2*	3	3	9	☒ Yes – Mandatory CCP

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
		-AWQI: Failure to meet CT -Inability to supply treated water - Drinking Water Advisory	-Storage of treated water in distribution system -SOP #: WTP-02, WTP-04, WTP-15, ALRM-29, ALRM-30 -SCADA monitoring and alarms	*6*	1	3	3	☐ Yes – Additional CCP identified for facility ☐ No
				10	3	3	9	
	Tank Failure	-Reduced storage capacity of treated water	-Redundancy: 2 Treated Water Storage Tanks - Routine inspections -Storage of treated water in distribution system -Isolation of failed tank -SOP #: WTP-04, ALRM-29, ALRM-30	*3,4*	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6	1	3	3	
				10	2	3	6	
	Power Failure	-Loss of pump control - Low pressure	-Storage of treated water in Treated Water Storage Tanks and Distribution -Generator onsite or rental -SOP #: ALRM-02, ALRM-03	*3, 4*	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6, 13	1	3	3	

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
Secondary Disinfection	Sodium Hypochlorite Failure	-AWQI <0.05ppm -Inability to provide 0.20ppm to all parts of the distribution system -Low chlorine - Drinking Water Advisory	-Redundancy: 2 Chemical Feed Pumps -Shutdown of High Lift Pumps -Storage of treated water in Treated Water Storage Tanks and Distribution -Generator onsite -SCADA monitoring -SOP #: WTP-02, WTP-15, WTP-27, WTP-35, WTP-50, ALRM-02, ALRM-03, ALRM-27, ALRM-33, ALRM-37, ALRM-38	*3, 4,11*	3	3	9	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No OP-07 3.3.7 (1) doesn't apply
				6	1	3	3	
	Treated Water Quality Issue	-AWQI -Taste and Odour - Coloured water -Low chlorine	-Shutdown of High Lift Pumps -Storage of treated water in Treated Water Storage Tanks and Distribution - Overflow storage tanks - Sodium permanganate addition - Visual monitoring - Increased monitoring of source problem (Mn, Fe, Microcystin etc.) - Routine sampling	*1,5,6,8,9*	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				4,7,11	2	3	6	

QEMS Ontario Clean Water Agency	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Doc.: OP-08A Rev Date: 2024-08-12 Rev No: 22 Pages: 10 of 18
	SUMMARY OF RISK ASSESSMENT OUTCOMES	
Reviewed by: QEMS Representative		Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
High Lift Pumping Station	High Lift Pump Failure	-Inability to supply water to distribution systems - Low pressure	-Redundancy: 4 High Lift Pumps -Regular Maintenance -Storage of treated water in distribution systems -SOP #: ALRM-32, ALRM-34, ALRM-39, ALRM-40, WTP-46	*3, 4*	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6, 13	1	3	3	
	Flow Control Valve Failure	-Inability to supply water to distribution systems - Low pressure	-Storage of treated water in distribution systems -Split Mode/Combined Mode Operation -SOP #: WTP-36, ALRM-32, ALRM-34, ALRM-39, ALRM-40, ALRM-41	*3, 4*	4	3	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (4) doesn't apply
				6, 13	1	3	3	
	Power Failure	-Inability to supply water to distribution systems	-Storage of treated water in distribution systems -Generator onsite or rental -SOP #: ALRM-02, ALRM-03, ALRM-32, ALRM-34	*3, 4*	4	2	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6, 13	1	3	3	

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
Back Up Power Supply	Low Lift Generator Failure	-Inability to supply water	-Storage of treated water in Treated Water Storage Tanks and Distribution -Regular maintenance on generator -Generator onsite, or rental -SOP #: ALRM-08, ALRM-09	*3, 4*	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6	1	3	3	
	WTP Generator Failure	-Inability to supply water	-Storage of treated water in distribution -Regular maintenance on generator -Generator onsite, or rental -SOP #: ALRM-02, ALRM-03	*3, 4*	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6	1	3	3	
	Single Phase	-Inability to supply water	-Storage of treated water in Treated Water Storage Tanks and Distribution -Generator onsite, or rental -SOP #: ALRM-02, ALRM-03, ALRM-08, ALRM-09	*3, 4*	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6	1	3	3	

QEMS
Ontario Clean Water Agency

OPERATIONAL PLAN
Tri-County Drinking Water System

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
Dialer	Failure of Alarm Dialer	-no monitoring of WTP -AWQI - Drinking Water Advisory	-Monthly testing -WIN 911 backup -SOP #: WTP-02	3, 4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6, 13	1	3	3	
SCADA System	SCADA Computer Failure	-Loss of continuous monitoring -Historian failure -Failure to meet regulatory requirements	-Retrieval of data from Eramosa -Backup datalogger on the historian for critical process monitoring -Computer replaced 2023 -SOP #: WTP-21, WTP-25, ALRM-01 -Back-up Claros data on turbidimeters - Manual readings	3, 4, 10	3	4	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (2,4) doesn't apply
				6, 13	1	3	3	
	Loss of Communication at Low Lift	-Loss of continuous monitoring system	-Retrieval of data from Eramosa -onsite PLC to store data temporarily - Manual operation - Fiber optic communication -SOP #: WTP-08, WTP-21, WTP-25, ALRM-01	3, 4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6, 13	1	3	3	
	Loss of Communication at WTP	-Loss of continuous monitoring system	-Retrieval of data from Eramosa	3, 4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility

OPERATIONAL PLAN
Tri-County Drinking Water System

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
		-Failure to meet regulatory requirements	- Backup datalogger on the historian for critical process monitoring -Back-up Claros data - Fiber optic communication -SOP #: WTP-08, WTP-21, WTP-25, ALRM-01	6, 13	1	3	3	☒ No, OP-07 3.3.7 (1) doesn't apply
	Loss of Communication at Remote Sites	-Loss of continuous monitoring system	-Retrieval of data from Eramosa -onsite PLC to store data temporarily	3, 4	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility
			-SOP #: WTP-21, WTP-25, WTP-08, ALRM-01 -Storage of treated water in distribution - Pressure mode operation	6, 13	1	3	3	☒ No, OP-07 3.3.7 (1) doesn't apply
	PLC Failure	-Historian failure -HMI/SCADA failure -No control of operations	-Retrieval of data from Eramosa - Backup datalogger on the historian for critical process monitoring	3, 4	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility
			-SOP #: WTP-08, WTP-21, WTP-25, ALRM-01 -Back-up Claros data	6, 13	1	3	3	☒ No, OP-07 3.3.7 (1) doesn't apply
Transmission Main	Watermain Break	-Inability to supply water -AWQI - Drinking Water Advisory - Low pressure	-Storage of treated water in treated water storage tanks and distribution system -SOP #: WTP-40, ALRM-39, ALRM-40, WTP-46	3, 4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility
				6	1	3	3	☒ No, OP-07 3.3.7 (1) doesn't apply
				8	2	3	6	

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
	Chamber Failure -Air Release	-AWQI - Drinking Water Advisory	-Regular Maintenance and Inspection -SOP #: WTP-02	3,4	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6	1	3	3	
				7,8	2	3	6	
	Valve Failure	-Inability to isolate -Inability to supply water during repair -Water leak -Low pressure -AWQI -Drinking Water Advisory	-Storage of treated water in distribution systems. - Routine maintenance -SOP#: WTP-40	4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				6	1	3	3	
West Lorne Standpipe	Low Level	-Low pressure in system - AWQI - Drinking Water Advisory	-Storage of treated water in treated water storage tanks and distribution system -Operation of HLP in pressure mode -SOP #: ALRM-69, ALRM-70, WTP-46	2	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1) doesn't apply
				3,4,7,8	2	3	6	
				6	1	3	3	
	Low Chlorine	-AWQI: <0.05ppm -Low chlorine residuals - Drinking Water Advisory	-Regular monitoring from grab samples -Flushing -SOP #: WTP-02, WTP-15, WTP-27	4	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1,3) doesn't apply
	Power Failure	-loss of level control and communications	-Operate high lift pumps based on pressure at the plant - portable generator	3, 4	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards/Risks)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
			-Altitude valve to control level -SOP #: ALRM-70, ALRM-71	*6*	1	3	3	☒ No, OP-07 3.3.7 (1,4) doesn't apply
	Aging Infrastructure	-loss of storage -AWQI	-routine inspections -capital improvements/rehabilitations -SOP#: ALRM-70, WTP-46	*2,7*	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ No, OP-07 3.3.7 (1,4) doesn't apply

Table 2: Identified Critical Control Points (CCPs)

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Low Lift -High Sodium Permanganate Residual (only operated seasonally, as required)	- 0.05 mg/L or more for 600 secs calls out alarm - 0.10 mg/L or more for 600 secs shuts down the low lift pumps and calls out alarm	- Alarm banner on SCADA -Continuous monitoring by analyzer - Visual inspection	- Redundancy: 2 raw watermains -Raw watermain flushing -Raw wet well isolation -Plant and Distribution System Storage -Automatic shut-down -Facility Emergency Pan -SOP #: WTP-02. WTP-56. WTP-57, WTP-58
Filtration -High Turbidity -Integrity of Membranes	-Individual Rack turbidity 0.3NTU or greater for 600sec shuts down individual rack and calls out alarm -Failed IT test disables rack waiting for operator response to rectify situation before allowing to go back to forward flow	-Alarm banner on SCADA -Continuous Monitoring by Turbidity Meter -SCADA Monitoring -Hand Held Turbidity Meter -Visual inspection	-Equipment Redundancy: 4 Racks -Alternate Source of Water from Southwold Distribution System -Plant and Distribution System Storage -Automatic Shut down of Rack -SOP #: WTP-02, WTP-15, WTP-37, WTP-50, ALRM-22 -Facility Emergency Plan

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Doc.: OP-08A Rev Date: 2024-08-12 Rev No: 22 Pages: 16 of 18

Ontario Clean Water Agency

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Primary Disinfection - Low Free Chlorine Residual	-0.5mg/L or less free chlorine for 600sec on AIT5006 call out alarm and shutdown of low lift -1.10mg/L or less free chlorine for 60sec on AIT7001 calls out alarm -1.00mg/L or less free chlorine for 60sec on AIT7001 calls out alarm and shuts down high pumps	-Continuous Chlorine Analyzer -SCADA Monitoring -Alarms to Dialer and banner on SCADA -Pocket Colorimeter	-Equipment Redundancy: 2 Chemical Feed Pumps -Alternate Source of Water from Southwold Distribution System -Plant and Distribution System Storage -Automatic Shut down of High Lift Pumps -SOP #: WTP-02, WTP-04, WTP-15, WTP-27, WTP-50, ALRM-26, ALRM-33 -Facility Emergency Plan
Secondary Disinfection – Low Free Chlorine Residual	-1.00mg/L or less free chlorine for 300sec on AIT7004 calls out alarm -0.90mg/L or less free chlorine for 300sec on AIT7004 calls out alarm and shuts down high lift pumps	-Continuous Chlorine Analyzer -SCADA Monitoring -Alarms to Dialer and banner on SCADA -Pocket Colorimeter	-Equipment Redundancy: 2 Chemical Feed Pumps -Alternate Source of Water from Southwold Distribution System -Plant and Distribution System Storage -Automatic Shut down of High Lift Pumps -SOP #: WTP-02, WTP-15, WTP-27, WTP-50, ALRM-37, ALRM-38 -Facility Emergency Plan
Storage Tanks -Low Level	<u>Two Tank Operation* (Winter or Summer Mode)</u> -6.40m or less on LIT6011 or 6.50m on LIT6021 for 300sec; call out alarm -6.00m or less on LIT6011 or 6.10m on LIT6021 for 300sec; call out alarm and shuts down high lift pumps <u>One Tank Operation* (Summer Mode Only)</u> -8.00m or less on LIT6011 or 8.10m on LIT6021 for 300sec; call out alarm -7.75m or less on LIT6011 or 7.85m on LIT6021 for 300sec; call out alarm and shuts down the high lift pumps *alarm set points change based on current demand, refer to SOP#WTP-04	-SCADA Monitoring -Alarms to Dialer and banner on SCADA	-Equipment Redundancy: milltronics in each tank can be duty level indicator -Alternate Source of Water from Southwold Distribution System -Distribution System Storage -Automatic Shutdown of High Lift Pumps -SOP #: WTP-02, WTP-04, WTP-15, ALRM-29, ALRM-30 -Facility Emergency Plan

Note: Standard Operating Procedures (SOPs) referenced in Tables 1 and 2 are controlled as per OP-05 Document and Records Control.

<u>Standard Operating Procedures (SOPs)</u>

SOP# WTP-02:   Reporting Adverse Water Quality
SOP# WTP-04:   Primary Disinfection
SOP# WTP-08:   72 Hour Review of Continuous Monitoring Equipment
SOP# WTP-15:   Critical Control Point Limit Reached

SOP# WTP-21:   Excel Historian Data
SOP# WTP-22:   Filling of the Raw Watermain
SOP# WTP-23:   Frazil Ice

SOP# WTP-25:   Historian Fault on SCADA Computer
SOP# WTP-27:   Low Free Chlorine Residuals

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

SOP# WTP-28: Harmful Algal Bloom Monitoring, Reporting and Sampling Plan
SOP# WTP-32: Raw Water Low DO and Manganese Issue
SOP# WTP-33: Raw Water Intake Obstruction
SOP# WTP-35: Sodium Hypochlorite Feed Pumps
SOP# WTP-36: Split Mode Operation
SOP# WTP-37: Turbidity on Pall Racks
SOP# WTP-40: Watermain Repair
SOP# WTP-41: Integrity Test Failure
SOP# WTP-46: Low Distribution System Pressure
SOP# WTP-50: Calibration/verification of Continuous Monitoring Equipment
SOP# WTP- 56: Low Range Mn Testing
SOP# WTP- 57 Flushing Raw Watermain
SOP# WTP- 58 Dosing Sodium Permanganate and Gas Chlorine

Alarm Standard Operating Procedures (SOP):

SOP# ALRM-01: Communication Failure Alarms
SOP# ALRM-02: Power Failure Alarms at WTP
SOP# ALRM-03: Water Treatment Plant Generator Alarms
SOP# ALRM-08: Power Failure at Low Lift Building

SOP# ALRM-09: Low Lift Generator Fault Alarm
SOP# ALRM-12: Wet Well Low Level Alarms
SOP# ALRM-16: Low Lift Pump Faults
SOP# ALRM-18: Raw Water pH and Chlorine Alarms
SOP# ALRM-19: Raw Water Turbidity
SOP# ALRM-20: Strainer Inlet Valve Fault
SOP# ALRM-22: PALL System Critical Alarms
SOP# ALRM-26: Discharge UV Chlorine Analyzer Alarms
SOP# ALRM-27: Trim Chlorination Pump Faults

SOP# ALRM-28: Post Treatment Chlorination Pump Faults
SOP# ALRM-29: TW Storage Tank Level Alarms
SOP# ALRM-30: TW Storage tank High Lift Shutdown Alarms
SOP# ALRM-32: High Lift Pump Alarms
SOP# ALRM-33: Suction Header Free Chlorine and pH Analyzers
SOP# ALRM-34: High Lift Pressure Alarms
SOP# ALRM-37: Distribution Free Chlorine and pH Analyzer
SOP# ALRM-38: Distribution Free Chlorine High Lift Shutdown
SOP# ALRM-39: WL Train Distribution Flow Shutdown
SOP# ALRM-40: Wallacetown Train Dist. Flow Shutdown
SOP# ALRM-41: Discharge Surge Valve Fault Alarms
SOP# ALRM-69: West Lorne Standpipe Low Low Level
SOP# ALRM-70: West Lorne Standpipe Alarms
SOP# ALRM-71: West Lorne Standpipe Communications Failure Alarms

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

OPERATIONAL PLAN
Tri-County Drinking Water System

QEMS
Ontario Clean Water Agency

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

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
2012-01-25	Risk Assessment Redo	Dale LeBritton, Cindy Sigurdson	Complete 36 months Risk Assessment Redo. No new CCPs identified, completely revised Risk Assessment.
2013-04-19	Risk Assessment Review	Cindy Sigurdson	Reviewed risk assessment and made some revisions
2014-07-23	Risk Assessment Review	Cindy Sigurdson, Maegan Garber	Annual risk assessment review.
2015-01-19	36 Month Risk Assessment Redo	Dale LeBritton, Cindy Sigurdson, Dan MacLeod, Maegan Garber	36 month redo of Risk Assessment, revised risk values and clarified hazardous events.
2016-02-26	Annual Review	Dale LeBritton and Cindy Sigurdson	Added in CCP? column the reason why the event is not considered a CCP indicated by the step in QP-02
2017-02-24	Annual Review	Dale LeBritton, Cindy Sigurdson	Remove 5.7.1 and add 5.7.4 to terrorism on the Risk Assessment Outcomes.
2018-01-19	36 Month Risk Assessment	Mike Taylor, Cindy Sigurdson, Uma Pancholy	Revise to include guidance document on hazardous events from the MOECC and to update to new corporate template.
2018-04-16	Once every calendar year review	Mike Taylor, Cindy Sigurdson, Uma Pancholy	Revise as per findings from IA 2018-03-29
2019-08-12	Once every calendar year review	Mike Taylor, Cindy Sigurdson, Maegan Garber	Annual Risk Assessment Review, revise as per findings from IA 2019-06-25
2020-11-16	Once every calendar year review	Mike Taylor, Cindy Sigurdson, Stephanie Baronette	Annual Risk Assessment Review, revised Zebra Mussel Control System Failure to include maintenance of chlorine system

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Doc.: OP-08A Rev Date: 2024-08-12 Rev No: 22 Pages: 19 of 18

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

2021-01-13	36 Month Risk Assessment	Maegan Garber, Cindy Sigurdson, Stephanie Baronette, Mike Taylor, Vitality Talashok	Revise to include additional control measures, add MECP hazards, revised likelihoods and risk values due to system upgrades, review SOPs and titles
2021-11-04	Annual Review	Vitaliy Talashok, Cindy Sigurdson, Mark Harris, Maegan Garber	Add aging infrastructure to West Lorne Standpipe, add SOP#WTP-46. Change MOECC to MECP.
2022-11-10	Annual Review	Vitaliy Talashok, Maegan Garber, Sam Smith, Matt Belding	Revise to include Cyber Security
2023-11-03	Annual Review	Meagan Garber, Matt Belding	Revise to add back-up Claros data, stored treated water, VFD pump control and backflushing the intake.
2024-01-12	36 Month Risk Assessment	Matt Belding, Sam Smith, Josh Manneke, Andrew Trask	Revised to add DWA where applicable, added sodium permanganate system, added control measures, added treated water quality issue, added SOPs where applicable.

Table 4: Potential Hazardous Event/Hazard Reference Numbers (based on the Ministry'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

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

			(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

Revision History

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Date	Revision #	Reason for Revision
2009-02-09	0	Initial risk assessment conducted
2010-04-06	1	Initial assessment was conducted before the plant was in operation; plant has now been operating for one year
2011-04-12	2	Add risk values to the mandatory CCPs; Table 2: remove 0.90NTU alarm since it is not a compliance point and change alarm set points to reflect changes made on SCADA
2011-07-25	3	Add Table 3
2011-12-06	4	Add to Table 1 CCP? Check boxes for Frazil ice and spill
2012-01-25	5	Risk Assessment Re-do. See Table 3 for details
2012-05-11	6	Revise Table 1 and 2 and list of SOPs as per Minor Non Conformance and OFI's in the Internal Audit Report dated May 7, 2012
2013-04-19	7	Revise to include coloured water event due to Mn; shoreline intake now operational
2014-07-23	8	Change of Ownership from Municipality of West Elgin to Tri-County Water Board; Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant; remove Iona Rechlorination from risk assessment; rename SOP#'s;
2015-01-19	9	36 Month Risk Assessment Redo. Changed name to Tri-County Drinking Water System; added UV as a back up for primary disinfection with sodium hypochlorite; modified risk values to reflect operation of plant and issues that we have had in the last 3 years; revised SCADA system hazardous events to specify clearer events that can happen.
2015-03-27	10	As per OFI IA 2015-02-02 add high/low to Table 2.
2016-04-22	11	Update CCP? as per OFI 2015-04-08; annual review revisions
2017-06-09	12	Revise as per annual review.
2018-01-22	13	Revised as per corporate template and 36 Month Risk Assessment
2018-04-17	14	Revise as per once every calendar year review
2019-08-16	15	Revise as per once every calendar year review and as per OFIs from IA-2019-06-25 and EA- 2018-04-26 and EA- 2018-07-09
2020-11-16	16	Revise as per once every calendar year review and included maintenance to the chlorine gas system within Zebra Control System
2021-01-13	17	36 month risk assessment, see Table 3 for details.

2021-11-04	18	Revised as per annual risk assessment, see Table 3 for details.
2022-11-10	19	Revised as per annual review, see Table 3
2023-11-03	20	Revised as per annual review, see table 3
2024-01-12	21	Revised as per 36 month review. See Table 3 and track changes
2024-08-12	22	Added sodium permanganate system, added related SOPs, add CCP, revise date of MECPs Potential Hazards as per IA OFI 2024-07-24

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To document the following for the Tri-County Drinking Water System:
- 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 General Manager, 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 Tri-County Drinking Water System is owned by Tri-County Water Board.

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

3.2 Top Management

Top Management for the Tri-County Drinking Water System consists of:
- Operations Management – Aylmer Cluster
- Regional Hub Manager – Southwest Region
- Safety, Process & Compliance Manager – Southwest Region

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);

QEMS Ontario Clean Water Agency	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-09 Rev Date: 2024-08-12 Rev No: 2 Pages: 2 of 6

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: QEMS Representative	Approved by: Operations Management

- 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

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-09 Rev Date: 2024-08-12 Rev No: 2 Pages: 3 of 6

QEMS
Ontario Clean Water Agency

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: QEMS Representative	Approved by: Operations Management

3.4 Regional Hub Roles, Responsibilities and Authorities

QEMS roles, responsibilities and authorities of 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 Aylmer Cluster

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 (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

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-09 Rev Date: 2024-08-12 Rev No: 2 Pages: 4 of 6
Ontario Clean Water Agency		

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: QEMS Representative	Approved by: Operations Management

Role/Position	Responsibilities and Authorities
	• 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) • Act as Overall Responsible Operator (ORO) when required (based on certification). Refer to SOP# WTP- 31.
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 their Regional Hub and any need for improvement • Act as alternate QEMS Representative (when required) • May act as Operator-in-Charge (OIC) and/or ORO when required (based on certification). Refer to SOP# WTP-30 and WTP-31.
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 • 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

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-09 Rev Date: 2024-08-12 Rev No: 2 Pages: 5 of 6

QEMS
Ontario Clean Water Agency

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: QEMS Representative	Approved by: Operations Management

Role/Position	Responsibilities and Authorities
	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 act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required. • May fulfil role of Certified Operator when required (based on certification)
Certified Operator May include the following positions: • Operations Supervisor Water & Wastewater • Water & Wastewater Lead • Water & Wastewater Operator • Water & Wastewater Operator-In-Training (OIT)	• Perform duties as assigned by Operations Management or designate • 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 • 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 OIC and/or ORO when required (based on certification). Refer to SOP# WTP-30 and WTP-31 • **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.
Administrative Assistant	• Support the administrative functions of the regional hub/cluster/facility including coordinating delivery of training as directed • Assist with entering operational data (including operational training records and maintenance records) into the appropriate database as directed

4. Related Documents

OP-03 Commitment and Endorsement

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-09 Rev Date: 2024-08-12 Rev No: 2 Pages: 6 of 6

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: QEMS Representative	Approved by: Operations Management

OP-04 QEMS Representative
OP-05 Document and Records Control
OP-09A Organizational Structure
OP-12 Communications
OP-20 Management Review
SOP# WTP-30 OIC Designation
SOP# WTP-31 ORO Designation
OCWA Position Descriptions/Job Specifications

5. Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Information within OP-09 was originally set out in the main body of OCWA's Operational Plan (Last revision # 12, dated 2017-06-09).
2020-10-30	1	Revised to change Tri-County Cluster to Aylmer Cluster as per IA-OFI 2020-10-26
2024-08-12	2	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. Additional revisions include replaced MOECC with Ministry, minor rewording and type-o's, removed watermark. Add SOPs where required, all as per IA OFI 2024-08-12.
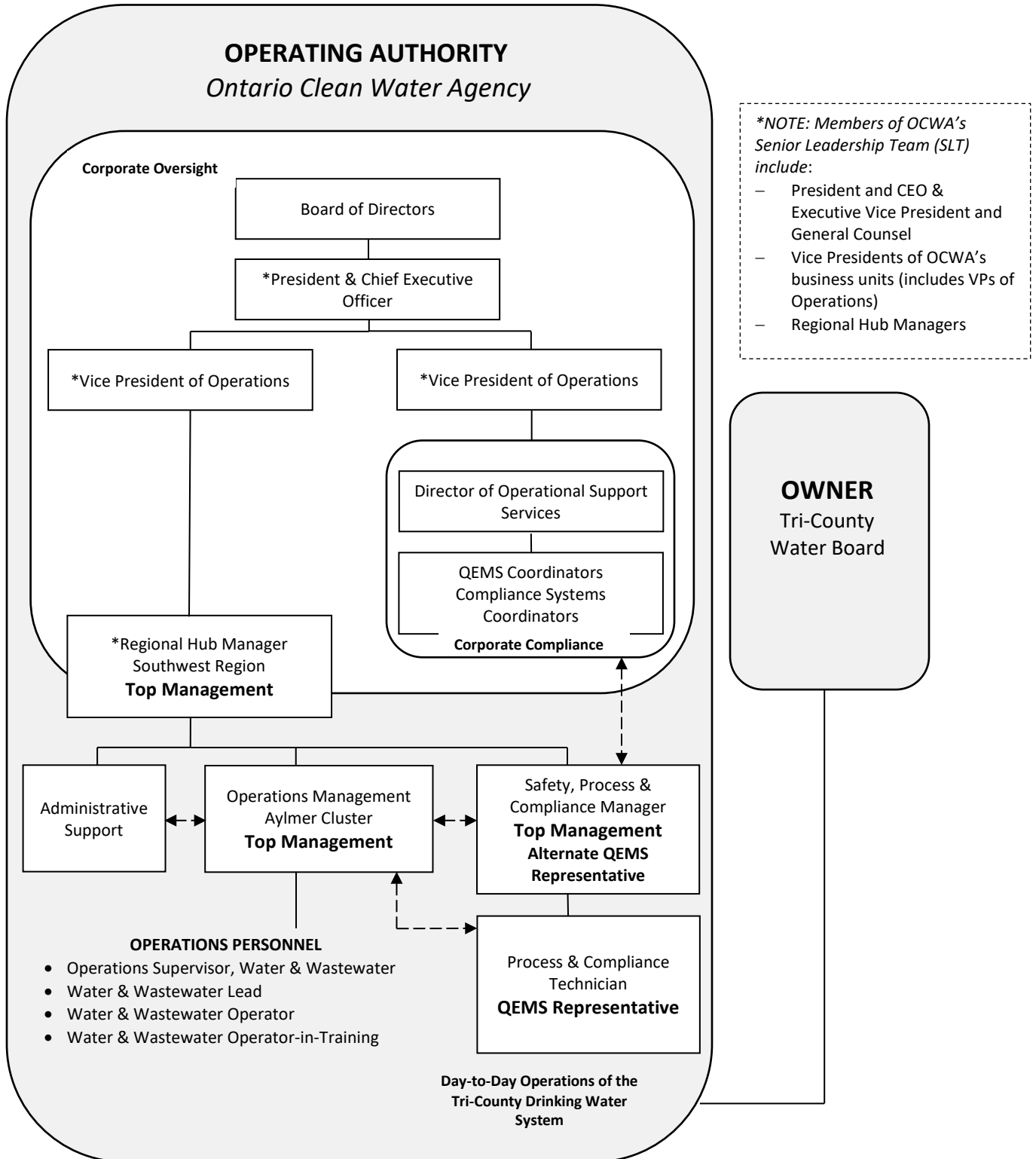
QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Doc.: OP-09A Rev Date: 2024-08-12 Rev No: 12 Pages: 1 of 2
Ontario Clean Water Agency		

ORGANIZATIONAL STRUCTURE

Reviewed by: QEMS Representative	Approved by: Operations Management

OPERATING AUTHORITY
Ontario Clean Water Agency

Corporate Oversight

Board of Directors

*President & Chief Executive Officer

*Vice President of Operations

*Vice President of Operations

Director of Operational Support Services

QEMS Coordinators Compliance Systems Coordinators

Corporate Compliance

*Regional Hub Manager Southwest Region **Top Management**

Administrative Support

Operations Management Aylmer Cluster **Top Management**

Safety, Process & Compliance Manager **Top Management Alternate QEMS Representative**

OPERATIONS PERSONNEL
- Operations Supervisor, Water & Wastewater
- Water & Wastewater Lead
- Water & Wastewater Operator
- Water & Wastewater Operator-in-Training

Process & Compliance Technician **QEMS Representative**

Day-to-Day Operations of the Tri-County Drinking Water System

OWNER
Tri-County Water Board

NOTE: Members of OCWA's Senior Leadership Team (SLT) include:
- President and CEO & Executive Vice President and General Counsel
- Vice Presidents of OCWA's business units (includes VPs of Operations)
- Regional Hub Managers

ORGANIZATIONAL STRUCTURE

Reviewed by: QEMS Representative	Approved by: Operations Management

Revision History

Date	Revision #	Reason for Revision
2018-01-22	9	Appendix issued - Organizational Chart previously contained as Appendix C of the Operational Plan. Moved to a new Appendix [Last revision # 8, dated 2017-06-09].
2020-08-05	10	Revision to reflect change to reporting structure - Corporate Compliance now reports to VP of Operations. [Last revision # 9, dated 2018-01-22].
2020-10-30	11	Revise to change Tri-County Cluster to Aylmer Cluster as per IA-OFI 2020-10-26
2024-08-12	12	Revised to include Senior Leadership Team (SLT) in reporting structure and identify members, added Compliance System Coordinators, updated Operations Personnel position titles, removed watermark as per IA OFI 2024-08-12.

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-10 Rev Date: 2024-08-12 Rev No: 5 Pages: 1 of 5
Ontario Clean Water Agency		

COMPETENCIES

Reviewed by: QEMS Representative	Approved by: Operations Management

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 General Manager, 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	• 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/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 and experience as an OCWA WMS Primary User • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems

COMPETENCIES

Reviewed by: QEMS Representative	Approved by: Operations Management

Role/Position	Required Minimum Competencies
Safety, Process & Compliance (SPC) Manager (Top Management) (May also fulfill the role of Alternate QEMS Representative)	· Valid operator certification required to fulfil certified operator duties (if assigned). · 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 (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
Certified Operator May include the following: • Operations Supervisor Water & Wastewater • Water & Wastewater Lead • 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 · 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

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-10 Rev Date: 2024-08-12 Rev No: 5 Pages: 3 of 5

COMPETENCIES

Reviewed by: QEMS Representative	Approved by: Operations Management

3.2 The following table presents the minimum competencies required by staff that provide administrative support to operations personnel.

Role and/or Position	Required Minimum Competencies
Administrative Assistant	• Experience and/or training related to procurement and business administration practices • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers

3.3 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.

3.4 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.

3.5 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.

3.6 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 upon scheduling and availability, and a refresher course every 3 years. 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.

3.7 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

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-10 Rev Date: 2024-08-12 Rev No: 5 Pages: 4 of 5

QEMS
Ontario Clean Water Agency

COMPETENCIES

Reviewed by: QEMS Representative	Approved by: Operations Management

well as the training deemed mandatory by OCWA corporate and Ontario Public Service (OPS) policies and is available on OCWA's intranet (sharepoint site).

3.8   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.

3.9   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.

3.10 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.

3.11 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.

3.12 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. Training records maintained at the facility are controlled as per OP-05 Document and Records Control.

4. Related Documents

OCWA's Learning and Development Resources (OCWA Intranet/sharepoint)
[Orientation checklists/documentation]
OCWA's Mandatory Training Requirements (OCWA intranet/sharepoint)
Performance Planning and Review Database
OP-5 Document and Records Control
OCWA Training Summary Database
Request for Staff Development

5. Revision History

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-10 Rev Date: 2024-08-12 Rev No: 5 Pages: 5 of 5

QEMS

Ontario Clean Water Agency

COMPETENCIES

Reviewed by: QEMS Representative	Approved by: Operations Management

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Information within OP-10 was originally set out in the main body of OCWA's Operational Plan (last revision # 12 dated 2017-06-09).
2018-04-17	1	Revise as per IA 2018-03-29
2019-08-16	2	Revise minimum competencies as per OFIs IA 2019-06-25 and Management Review 2019-08-13
2020-10-30	3	Revise to include EC101 refresher course as per IA-OFI 2020-10-26
2021-11-09	4	Revise numbering as per IA OFI 2021-08-25, add Request for Staff Development to 4.
2024-08-12	5	Procedure updated with revisions to table in 3.1 Role/Position updated to clarify roles are performed by multiple positions, position titles updated, removed watermark, updated Procedure to reflect changes to title and content of OCWA's Mandatory Training Requirements Document, added sharepoin as per IA OFI 2024-07-24.

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-11 Rev Date: 2024-08-12 Rev No: 16 Pages: 1 of 3
QEMS Ontario Clean Water Agency		

PERSONNEL COVERAGE

Reviewed by: QEMS Representative	Approved by: Operations Management

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 Tri-County Drinking Water System.

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 Tri-County Drinking Water System is staffed by OCWA personnel as follows:

- o 07:30 to 16:00 five days a week Monday to Friday.
- o Staff on call after hours

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 outlined in SOP# WTP-30 and SOP# WTP-31.   .

The overall responsible operator (ORO) is assigned for the facility and is recorded in the facility logbook. When the designated ORO is unavailable, a replacement ORO is assigned and designated as such in the facility logbook.

The designated OIC for each shift is recorded in the facility logbook.

3.4 Operations Management assigns an on-call operator for the time that the facility is not staffed (i.e., evenings, weekends and Statutory Holidays).   The on-call shift change is the start of the business day on Monday and follows a weekly rotation of staff. The

---

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

PERSONNEL COVERAGE

Reviewed by: QEMS Representative	Approved by: Operations Management

Operations Management prepares a schedule of on call operators which is posted in the Administrative Office.

3.5 The on-call operator is available to conduct a physical inspection of the facility and take appropriate readings after hours, if necessary. On Statutory Holidays the on-call operator performs normal operating tasks. Details of the physical inspection are recorded in the facility logbook and daily round sheets.

3.6 The SCADA system auto dialer is programmed to contact a contracted call-centre operator whenever there is an alarm condition. The call-centre operator contacts the on-call operator through a designated on-call pager. The on-call operator contacts the call-centre to acknowledge the alarm and responds to the alarm conditions. 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 records details of the call-in in the facility logbook along with call back reports generated through Maximo.

3.7 Each manager (e.g. Operations Management/SPC Manager) is responsible for approving time off for their staff in a manner which ensures sufficient personnel are available for the performance of normal operating duties as well as on-call coverage. The Operations Management is responsible for ensuring facilities are appropriately staffed and on-call coverage is maintained when an operator is away due to illness, training, emergency, vacation or resignation.

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.

3.9 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.

4. Related Documents

OP-10 Competencies
Facility Logbook
Daily Round Sheets
On-Call Schedule
Call-Back Reports
Vacation Schedule
Critical Shortage of Staff Contingency Plan (Facility Emergency Plan)
SOP# WTP-30: Operator In Charge
SOP# WTP-31: Overall Responsible Operator

	OPERATIONAL PLAN	QEMS Proc.: OP-11
QEMS Ontario Clean Water Agency	Tri-County Drinking Water System	Rev Date: 2024-08-12
		Rev No: 16
		Pages: 3 of 3

PERSONNEL COVERAGE

Reviewed by: QEMS Representative	Approved by: Operations Management

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2010-04-22	1	Change duties on Weekend rounds, 5.2 and 5.5
2011-04-12	2	Remove Call In Overtime Sheets from 5.6 and 6.0
2011-07-25	3	Corporate Revision Add 5.9 and related doc.; Add Appendix Title Page; Change Date Formatting
2011-12-06	4	5.2 Remove italics on West Elgin Water Treatment Plant; 5.4 change "appropriate work locations" to Senior Operations Manager's Office;6.0 remove Daily from Rounds Sheets
2012-04-12	5	Change Operations Manager to Senior Operations Manager
2012-05-11	6	6.0 Remove "Elgin-Middlesex Hub" from Vacation/Training Schedule
2013-06-28	7	Revise issue date to current date
2014-05-02	8	Revise 5.2-hours and weekend checks and 5.3 OIC info
2014-07-23	9	Change of Ownership from Municipality of West Elgin to Tri-County Water Board, Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	10	Revise Tri-County WTP to DWS; Add to 5.3 and 6.0 SOP# WTP-30 and WTP-31 as per OFI IA 2015-02-02.
2016-04-22	11	Revise to reflect changes in positions PCT to OCTL and Senior Operations Manager to RHM where appropriate; add in 5.8 to deal with routine absence due to illness, emergency or training of a operator as per OFI IA 2016-01-24.
2017-06-09	12	Revise with new org structure.
2018-01-22	13	Procedure issued. Revise as per corporate template.
2019-08-16	14	Revise 3.6 to include Maximo call in reports as per Management Review 2019-08-13 and revise 3.7 to include coverage of on-call as per OFI IA 2019-06-25
2020-10-30	15	Revise to change Call-In Report to Call Back Report as per IA-OFI 2020-10-26
2024-08-12	16	Remove watermark

	OPERATIONAL PLAN	QEMS Proc.: OP-12
QEMS / Ontario Clean Water Agency	Tri-County Drinking Water System	Rev Date: 2024-08-12
		Rev No: 13
		Pages: 1 of 4

COMMUNICATIONS

| Reviewed by: QEMS Representative | Approved by: Operations Management |

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 General Manager, 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 Corporate Emergency Management Program (i.e., Facility Emergency Plan and OCWA's 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 and complete a refresher course every 3 years, upon scheduling and availability. 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 SPC Manager is responsible for ensuring training is provided for the Regional Hub (in consultation with Operations Management as required) on applicable legislative and

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-12 Rev Date: 2024-08-12 Rev No: 13 Pages: 2 of 4

COMMUNICATIONS

Reviewed by: QEMS Representative	Approved by: Operations Management

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 Safety, Process and Compliance 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 Operations Management 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 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

Ontario Clean Water Agency	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-12 Rev Date: 2024-08-12 Rev No: 13 Pages: 3 of 4

COMMUNICATIONS

Reviewed by: QEMS Representative	Approved by: Operations Management

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 Water Treatment Plant.

3.6.3 Facility tours of interested parties must be approved in advance by the Operations Management.

3.6.4 All complaints, whether received from the consumer, the community or other interested parties, are documented in the OPEX database following SOP# WTP-42. As appropriate, the Operations Management 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.

4. Related Documents

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
SOP# WTP-42 Community Complaints
Facility Emergency Plan
Corporate Emergency Response Plan
OPEX Incident Reports

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2011-04-12	1	Modify 5.5 to state Senior Operations Manager and not Media Spokesperson
2011-07-25	2	Internal Audit Revisions: 3.0 Responsibility removed Client Service Rep.; 5.2 Removed "Upon hire", 5.5 Added "or Designate" Corporate Revision: Add wording to 5.2; Add QP-01 to Related Documents; Add Appendix Title Page; Modify date formatting
2011-12-06	3	5.6 Capitalize Water Treatment Plant
2012-04-12	4	Change Operations Manager to Senior Operations Manager
2013-06-28	5	Revise 5.2 to specify when the Env. Compliance course is taken as identified as an OFI in the external audit; update issue date
2014-07-23	6	Change of Ownership from Municipality of West Elgin to Tri-County Water Board, Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	7	Change Tri-County WTP to DWS; add Operations manager to 3.0 and 5.6
2016-04-22	8	Change PCT to OCTL and Senior Operations Manager to RHM where Appropriate
2017-06-09	9	Revise to new org structure
2018-01-22	10	Procedure issued. Revise as per template.

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-12 Rev Date: 2024-08-12 Rev No: 13 Pages: 4 of 4
Ontario Clean Water Agency		

COMMUNICATIONS		
Reviewed by: QEMS Representative		Approved by: Operations Management

2020-10-30	11	Revised to include EC101 Refresher course every 3 years as per IA-OFI 2020-10-26
2022-12-02	12	Clarify 3.3.1 and add SOP reference to 3.6.4 and Related Documents
2024-08-12	13	Procedure revised to reference updated title of Corporate Emergency Response Plan, removed watermark as IA OFI 2024-07-24.

ESSENTIAL SUPPLIES AND SERVICES	
Reviewed by: QEMS Representative	Approved by: Operations Management

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 Tri County Drinking Water System are contained in the Facility Emergency Plan, Essential/Emergency Service and Supply Contact List. The list is reviewed and updated at least once every calendar year by the QEMS Representative.

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.

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 of the Environment, Conservation and Parks (MECP) 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 MOECC of any change to the drinking water testing services being utilized.

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

QEMS	**OPERATIONAL PLAN**	QEMS Proc.: OP-13
	Tri-County Drinking Water System	Rev Date: 2024-08-12
Ontario Clean Water Agency		Rev No: 13
		Pages: 2 of 2

ESSENTIAL SUPPLIES AND SERVICES

| Reviewed by: QEMS Representative | Approved by: Operations Management |

3.7 External calibration activities (e.g. flow meters) 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.

4. Related Documents

Facility Emergency Plan Binder
Essential/Emergency Service and Supply Contact List
OP-17 Measurement Recording Equipment Calibration and Maintenance
ANSI/NSF Documentation
AWWA Standards
MDWL
Calibration Certificates/Records

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2010-09-21	1	Corporate issued revision (added 5.3)
2011-07-25	2	Corporate Revision: Add Appendix Title Page; Modify date formatting
2012-04-12	3	Change Operations Manager to Senior Operations Manager
2012-05-11	4	Add Emergency to title page, include name of contact list in 5.1 and 6.0
2013-06-28	5	Remove Emergency to title
2014-07-23	6	Change of Ownership from Municipality of West Elgin to Tri-County Water Board, Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	7	Change Tri-County WTP to DWS
2016-04-22	8	Change PCT to OCTL and Senior Operations Manager to RHM where Appropriate
2017-06-09	9	Revise to new org structure
2018-01-22	10	Procedure issued. Revised as per corporate template.
2018-04-17	11	Revised as per OFI IA 2018-03-29
2019-08-16	12	Change MOECC to MECP as per IA 2019-08-13
2024-08-12	13	Remove watermark

REVIEW AND PROVISION OF INFRASTRUCTURE	
Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To describe OCWA's procedure for reviewing the adequacy of infrastructure necessary to operate and maintain the Tri-County Drinking Water System.

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 conducts a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system. The Operations Management reviews infrastructure reports (hydrant, chamber, valve, intakes, storage inspection reports, etc.) that have been prepared through the year, previous infrastructure reviews and capital lists when conducting the current review. The specific areas reviewed are:
- Low Lift Buildings
- Water Treatment Plant
- West Lorne Standpipe
- Watermains, Hydrants and Valves
- Metering Chambers
- Water Quality

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

3.3 The output of the review is a six year recommended capital/major maintenance summary to assist the Owner and OCWA with planning infrastructure needs for the short and long-term. This report is submitted, at least once every calendar year by Operations Management, to the Owner for review and approval. Together with the Owner, Operations Management determines and documents timelines and responsibilities for implementation of priority items.

3.4 The final approved recommended capital/major maintenance summary forms 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

6 Year Recommended Capital/Major Maintenance
OP-08 Risk Assessment Outcomes
OP-15 Infrastructure Maintenance, Rehabilitation and Renewal
OP-20 Management Review

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-14 Rev Date: 2024-08-12 Rev No: 12 Pages: 2 of 2

REVIEW AND PROVISION OF INFRASTRUCTURE

Reviewed by: QEMS Representative	Approved by: Operations Management

Management Review Minutes

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2010-04-22	1	Modify 5.2 add 5.3
2011-07-25	2	Corporate Revision: Add Appendix Title Page, Modify date formatting
2012-04-12	3	Change Operations Manager to Senior Operations Manager
2012-05-11	4	5.3 revised to better describe the approval process
2013-06-28	5	Revise issue date to current issue
2014-07-23	6	Change of Ownership from Municipality of West Elgin to Tri-County Water Board; Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant; revise 5.3 to include Tri-County Water Board
2015-03-27	7	Change Tri-County WTP to DWS; 5.1 identify the specific areas reviewed during the infrastructure review.
2016-04-22	8	Change PCT to OCTL and Senior Operations Manager to RHM where Appropriate
2017-06-09	9	Revise to new org structure; revise as per OFI EA 2016-06-24 to include the types of reports reviewed.
2018-01-22	10	Procedure issued. Revise as per corporate template.
2019-08-16	11	Revise name of capital recommendations document as per OFI IA 2019-08-13
2024-08-12	12	Remove watermark

	OPERATIONAL PLAN	QEMS Proc.: OP-15
QEMS	Tri-County Drinking Water System	Rev Date: 2024-08-12
Ontario Clean Water Agency		Rev No: 3
		Pages: 1 of 3

INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL	
Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To describe OCWA's infrastructure maintenance, rehabilitation and renewal program for the Tri-County Drinking Water System.

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 are completed as per the preventative maintenance plan for all equipment at the Tri-County Drinking Water System.

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, schedule and document all asset related tasks and activities
- Access maintenance records and asset histories

Planned maintenance activities are communicated to the person responsible for completing the task through the issuance of WMS work orders. Work orders are automatically generated on a schedule (daily, weekly, monthly, quarterly and annually) that is set by WMS Primary user in accordance with the manufacturer's recommendations and/or regulatory requirements. These work order are then assigned directly to the appropriate operations personnel. 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.

An inventory of equipment in WMS 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. It is Operations Management that ensures work orders are generated accordingly. Equipment Operation and Maintenance (O&M) manuals are accessible to operations personnel at the locations specified in OP-05 Document and Records Control.

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-15 Rev Date: 2024-08-12 Rev No: 3 Pages: 2 of 3

INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL

Reviewed by: QEMS Representative	Approved by: Operations Management

3.1.2   Unplanned Maintenance

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Operations Management or designate. Unplanned maintenance activities are recorded into WMS by the person responsible for completing the unplanned maintenance activity filed as per QP-01.

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 and is presented to the Owner for review and comment. All major expenditures require the approval of the Owner.

All new equipment and repaired equipment must be documented in the WMS system. The operator is to complete the WMS Data Collection Sheet and assign a new WMS # for any new equipment. This form is submitted to the Operations Management to be entered and assigned appropriate maintenance procedures/schedules. Repaired equipment is to be documented into WMS by the person making repair.

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. Work order back logs are reviewed by Operations Management to ensure completion. Additionally, Operations Management conducts 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 review workorder summary reports for the facility.

On a quarterly basis the owner is provided an operations and maintenance report through the Operations Report.

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 once every calendar year through submission of the summary of capital and major maintenance recommendations report and through the results of the Management Review.

4. Related Documents

Minutes of Management Review
Capital and Major Maintenance Recommendations Report

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-15 Rev Date: 2024-08-12 Rev No: 3 Pages: 3 of 3

INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL

Reviewed by: QEMS Representative	Approved by: Operations Management

OP-05 Document and Records Control
OP-14 Review and Provision of Infrastructure
Operations Report

5. Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Information within OP-15 was originally set out in the Main body of OCWA's Operational Plan (last revision # 12, dated 2017-06-09). Revised as per corporate template.
2018-04-17	1	Revise procedure as per OFIs from IA 2018-03-29
2019-08-16	2	Revise as per OFIs from IA 2019-06-25 and Management Review 2019-08-13
2024-08-12	3	Remove watermark.

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-16 Rev Date: 2024-08-12 Rev No: 16 Pages: 1 of 3

Ontario Clean Water Agency

SAMPLING, TESTING AND MONITORING

Reviewed by: QEMS Representative	Approved by: Operations Management

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 as per 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 QEMS Representative 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 is SGS and they are listed in the Essential/Emergency Service and Supply Contact 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 turbidity (raw, strainers, membrane and treated), free chlorine (raw, strainers, before and after UV, treated), hydrogen peroxide (before and after quenching), pH (raw and treated) and temperature (raw).

3.5 Test results from continuous monitoring equipment are captured by the SCADA system and are reviewed by a certified operator in accordance with the requirements of SDWA O. Reg. 170/03.

The SCADA system also collects and records information on the following parameters related to process control and finished drinking water quality:

- Raw and treated water flow rates
- Raw well depth
- Membrane run times
- System pressures

3.6 Adverse water quality incidents are responded to and reported as per SOP #WTP-02.

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-16 Rev Date: 2024-08-12 Rev No: 16 Pages: 2 of 3

QEMS

Ontario Clean Water Agency

SAMPLING, TESTING AND MONITORING

Reviewed by: QEMS Representative	Approved by: Operations Management

3.7 In-house process control activities are conducted on a regular basis by the certified operator(s) on duty and at a minimum are conducted and analyzed following approved laboratory procedures. The results of these activities are recorded on the round sheet. The results are entered into PDM. Any adjustments made to process parameters are recorded in the facility logbook.

3.8 All sampling, testing and monitoring activities related to the facility's most challenging conditions are maintained. The facilities challenging conditions include algae blooms, iron/manganese and frazil ice. 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. When the algae bloom is approaching the intake the SOP #WTP-28 Harmful Algal Bloom Monitoring, Reporting and Sampling Plan is to be followed. Frazil ice can be monitored by the temperature of the lake and the level in the raw well. Follow the SOP #WTP-23 for Frazil Ice. In the event of low dissolved oxygen and elevated concentrations of iron and manganese in the raw water follow SOP# WTP-32 for Raw Water Low Dissolved Oxygen and Manganese Issues, SOP# WTP-56 Low Range Mn Testing and SOP# WTP-58 Dosing Sodium Permanganate and Chlorine Gas.

3.9 Upstream sampling, testing and monitoring activities are routinely completed for temperature, pH, dissolved oxygen and turbidity of the raw water. Non-routine sampling, testing and monitoring takes place in response to events/issues to determine effects to the raw water supply to the treatment plant.

3.10 Sampling, testing and monitoring results are readily accessible to the Owner by contacting Operations Management or QEMS Representative.

At a minimum, Owners are provided with an annual summary of sampling, testing and monitoring results through the SDWA O. Reg. 170/03 Section 11 Annual Report, the 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, through the Operations Report.

4. Related Documents

SOP #WTP-02: Reporting Adverse Water Quality
SOP #WTP-23: Frazil Ice
SOP #WTP-28: Harmful Algal Bloom Monitoring, Reporting and Sampling Plan
SOP# WTP-32: Raw Water Low Dissolved Oxygen and Manganese Issues
SOP# WTP-56: Low Range Mn Testing
SOP# WTP-58 Dosing Sodium Permanganate and Chlorine Gas.
Facility Logbook
MDWL
OP-05 Document and Records Control
OP-06 Drinking Water System
OP-20 Management Review
Laboratory Analysis Reports
Laboratory Chain of Custody Forms
Annual Report (O. Reg. 170 Section 11)

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-16 Rev Date: 2024-08-12 Rev No: 16 Pages: 3 of 3

SAMPLING, TESTING AND MONITORING

Reviewed by: QEMS Representative	Approved by: Operations Management

Municipal Summary Report (O. Reg. 170 Schedule 22)
Process Data Management System (PDM) records
Essential/ Emergency Service and Supply Contact List
Facility Emergency Plan (FEP) Binder
Rounds Sheets
Sampling Schedule
SCADA Records
Operations Report

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2010-04-22	1	Changes reflect MDWL; 5.3 item removed
2011-04-12	2	5.1 and 6.0 change to SOP AWQI; 6.0 change Municipal Summary Reports to Reports—Schedule 22, Section 11
2011-07-27	3	Add 5.6 Upstream sampling; Add Appendix Title Page; Modify Date Formatting
2012-04-11	4	Add Challenging conditions to 5.5, add SOPs for Related Documents
2012-05-11	5	Add in SOP # and spell out AWQI
2013-06-28	6	Revise 5.6 to provide more detail on raw water monitoring.
2014-05-02	7	Add mechanic to 3.0; add wording about analytical results to 5.2; modify 5.7 as per OFI from IA 2014.
2014-07-23	8	Change of Ownership from Municipality of West Elgin to Tri-County Water Board; Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	9	Change Tri-County WTP to DWS; add to 5.6 dissolved oxygen
2016-04-22	10	add to 5.5 re: low dissolved oxygen and manganese as per OFI EA 2015-04-08; Change PCT to OCTL and Senior Operations Manager to RHM where appropriate
2017-06-09	11	Revise to reflect new org structure.
2018-01-22	12	Procedure issued. Revised as per corporate template.
2018-04-17	13	Revised procedure as per OFIs from IA 2018-03-29
2019-08-16	14	Change MOECC to MECP as per OFI IA 2019-08-16
2021-11-09	15	Revised title of SOP#WTP-28 as per IA OFI 2021-08-25
2024-08-12	16	Removed OCWA watermark from document. Added reference to HAB Plan under s. 3.7 and s. 4. , add SOP to 3.7 and 4.0, add MDWL to 4.0 as per IA OFI 2024-07-24.

MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE	
Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To describe the procedure for the calibration and/or verification and maintenance of measurement and recording equipment at the Tri-County Drinking Water System.

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 Operations Management or designate establishes and maintains a list of measurement and recording devices and associated calibration and/or verification schedules using the automated Work Management System (WMS). A 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.

3.4 Calibration and maintenance activities are carried out in accordance with procedures specified in the manufacturer's manual, instructions specified in WMS and SOP# WTP-50 Calibration/Verification of Continuous Monitoring Equipment. The calibration schedule is as follows:

Type of Instrumentation	Instrument ID	WMS ID	Frequency
Flow Meters	FIT 1017	0000164355	Annually
	FIT 1027	0000164361	Annually
	FIT 7052	0000164528	Annually
	FIT 7062	0000164536	Annually
Raw Temperature	TIT 1403	0000164333	Annually
Turbidity Meters	AIT 3119	0000164638	Quarterly
	AIT 3219	0000164646	Quarterly
	AIT 3319	0000164653	Quarterly
	AIT 3419	0000164660	Quarterly
Chlorine Analyzers	AIT 7001	0000164522	Quarterly
Pressure Transmitters	PIT 3121	0000164641	Annually
	PIT 3221	0000164649	Annually
	PIT 3321	0000164656	Annually
	PIT 3421	0000164663	Annually
Storage Tank Level Transmitters	LIT 6021	0000062985	Annually
	LIT 6011	0000062990	Annually
Portable Chlorine Analyzer	Tri-County DWS	000062980	Monthly
	Tri-County DWS	000062964	Monthly

MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE

Reviewed by: QEMS Representative	Approved by: Operations Management

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 the Operations Management 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. The QEMS Representative 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

Facility Logbook
WMS Records
Calibration/Maintenance Records
Maintenance/Equipment Manuals
OP-05 Document and Records Control
OP-13 Essential Supplies and Services
OP-15 Infrastructure Maintenance, Rehabilitation and Renewal
SOP# WTP-50: Calibration/Verification of Continuous Monitoring Equipment

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2011-07-27	1	Add Appendix Title Page; Modify Date format
2012-04-12	2	Add table to 5.3
2012-05-11	3	fix table in 5.3; 6.0 add "/Emergency"
2013-06-28	4	Revise issue date to current issue; add mechanics to 3.0
2014-05-02	5	Revise 5.4 from Sen. Ops Manager to PCT in last sentence from OFI in IA 2014
2014-07-23	6	Change of Ownership from Municipality of West Elgin to Tri-County Water Board; Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	7	Change Tri-County WTP to DWS; Add Operations Manager and Admin to 3.0
2016-04-22	8	Change PCT to OCTL and Senior Operations Manager to RHM where Appropriate
2017-06-09	9	Revise to reflect new org structure
2018-01-22	10	Procedure issued. Revised as per corporate template.
2018-04-17	11	Revised as per OFIs IA 2018-03-29

2019-08-16	12	Revise as per OFI IA 2019-08-16
2021-11-09	13	Update table to include storage tank and raw temp as per IA OFI 2021-08-25
2023-04-04	14	Updated the instrument ID for portable analyzers

![QEMS logo] **Ontario Clean Water Agency**	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-18 Rev Date: 2024-08-12 Rev No: 14 Pages: 1 of 4
	EMERGENCY MANAGEMENT	
Reviewed by: QEMS Representative		Approved by: Operations Management

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 (CERP) – 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 General Manager, 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-level 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 Operations Management.

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 CERP. 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;

QEMS	**OPERATIONAL PLAN**	QEMS Proc.: OP-18
	Tri-County Drinking Water System	Rev Date: 2024-08-12
Ontario Clean Water Agency		Rev No: 14
		Pages: 2 of 4

EMERGENCY MANAGEMENT

Reviewed by: QEMS Representative | Approved by: Operations Management

- 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 Tri-County Drinking Water System 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 site-specific contingency plan (CP). The CPs and related standard operating procedures (SOPs) are contained within the FEP.

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, SOPs 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).

QEMS	**OPERATIONAL PLAN**	QEMS Proc.: OP-18
Ontario Clean Water Agency	Tri-County Drinking Water System	Rev Date: 2024-08-12 Rev No: 14 Pages: 3 of 4

EMERGENCY MANAGEMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

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 Essential/Emergency Service and Supply Contact 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 CERP.

4. Related Documents

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

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2011-07-27	1	Add Appendix Title Page; Modify Date Formatting
2011-12-06	2	5.2 remove italics from West Elgin Water Treatment Plant; 5.6 add title of contact list; 6.0 add Essential Emergency Service and Supply Contact List
2012-04-12	3	Change Operations Manager to Senior Operations Manager
2012-05-11	4	Add "/" to Essential/Emergency Service and Supply Contact List
2013-06-28	5	Revise Issue date; revise 5.3 to provide more info on training on FEP
2014-02-28	6	Update names of contingency plans as per AI2 of MR 2014-02-27
2014-05-02	7	Modify wording in 5.4 and 5.6 as per OFIs IA 2014
2014-07-23	8	Change of Ownership from Municipality of West Elgin to Tri-County Water Board; Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	9	Change Tri-County WTP to DWS; revise 5.3 to reflect corporate review and testing frequency also identified in IA 2015-02-02.
2016-04-22	10	Change PCT to OCTL and Senior Operations Manager to RHM where Appropriate
2017-06-09	11	Revise to current corporate template and revise as per new org structure.
2018-01-22	12	Procedure issued. Revised as per corporate template.

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-18 Rev Date: 2024-08-12 Rev No: 14 Pages: 4 of 4
Ontario Clean Water Agency		

EMERGENCY MANAGEMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

2018-04-17	13	Revised as per OFIs IA 2018-03-29
2024-08-12	14	Procedure updated as follows: Ministry of Environment and Climate Change revised to Ministry, removed watermark. Modified references to Emergency Response Plan to indicate it is now referred to as Corporate Emergency Response Plan (CERP), revise 3.10 to clarify contact list as per IA OFI 2024-08-12.

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 Tri-County Drinking Water System 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:

	OPERATIONAL PLAN	QEMS Proc.: OP-19
QEMS Ontario Clean Water Agency	Tri-County Drinking Water System	Rev Date: 2024-08-12 Rev No: 11 Pages: 2 of 5

INTERNAL QEMS AUDITS

Reviewed by: QEMS Representative	Approved by: Operations Management

- 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 are 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.

3.2.3   Regardless of the approach, the QEMS Representative must ensure that an internal audit is conducted at least once every 12 months.

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

	OPERATIONAL PLAN	QEMS Proc.: OP-19
QEMS Ontario Clean Water Agency	Tri-County Drinking Water System	Rev Date: 2024-08-12 Rev No: 11 Pages: 3 of 5

INTERNAL QEMS AUDITS

Reviewed by: QEMS Representative	Approved by: Operations Management

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;

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-19 Rev Date: 2024-08-12 Rev No: 11 Pages: 4 of 5

INTERNAL QEMS AUDITS

Reviewed by: QEMS Representative	Approved by: Operations Management

- o Any non-conformance identified referencing the requirement that was not met; and
- o 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.

3.7.3 The Operations Management (or designate) investigates the need for action to eliminate the root cause(s) so as to prevent the nonconformity from recurring. The investigation may include consultation with the SPC Manager, PCT, RHM, operators and others as appropriate.

3.7.4 The Operations Management (or designate) determines the corrective action needed and assigns responsibility and a target date for resolution.

3.7.5 Any necessary revisions to QEMS documents are completed as per OP-05 Document and Records Control.

3.7.6 The QEMS Representative ensures corrective actions are documented in the Summary of Action Items Table. The QEMS Representative monitors the progress of corrective action(s) and provides status updates to Facility Top Management.

3.7.7 The effectiveness of corrective actions is reviewed during subsequent internal QEMS audits. If there is evidence that the action taken was not effective, the Regional Hub Manager (or designate) initiates further corrective action and assigns resources as appropriate until the nonconformity is fully resolved.

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 Work Documents
Audit Reports
OP-05 Document and Records Control
OP-20 Management Review
OP-21 Continual Improvement

Summary Table of Action Items
Management Review Minutes

5. Revision History

Date	Revision #	Reason for Revision
2009-02-09	0	Procedure issued
2011-07-27	1	5.1 changed "on an annual basis" to "once every 12 months"; Added Appendix Title Page; Modified Date Formatting
2011-12-06	2	5.1 correct spelling mistake: months (moths)
2012-04-12	3	Change Operations Manager to Senior Operations Manager
2013-06-28	4	Revise 5.7 to identify how OFIs are addressed
2014-07-23	5	Change of Ownership from Municipality of West Elgin to Tri-County Water Board; Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	6	Revise with corporate revisions; change WTP to Drinking Water System
2016-04-22	7	Change PCT to OCTL and Senior Operations Manager to RHM where Appropriate
2017-06-09	8	Revise to reflect new org structure.
2018-01-22	9	Procedure issued. Revised as per corporate template.
2019-08-16	10	Revise section 3.1.4 as per OFI IA 2019-06-25, remove Senior Ops Manager and replace with Operations Management, remove DWQMS CA report and include Summary Table
2024-08-12	11	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 3.3.3, removed watermark, revise wording in 3.7 as per IA OFI 2024-07-24.

MANAGEMENT REVIEW

Reviewed by: QEMS Representative	Approved by: Operations Management

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 General Manager, 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 Tri-County Drinking Water System as:
- Operations Management – Aylmer Cluster
- Regional Hub Manager – Southwest Region
- Safety, Process & Compliance (SPC) Manager – Southwest Region

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 and at least one member of Top Management 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);

QEMS	**OPERATIONAL PLAN** Tri-County Drinking Water System	QEMS Proc.: OP-20 Rev Date: 2024-08-12 Rev No: 12 Pages: 2 of 3

MANAGEMENT REVIEW

Reviewed by: QEMS Representative	Approved by: Operations Management

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

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 Administrative Authority for the Tri-County Water Board.

3.9   The Operations Management 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
2009-02-09	0	Procedure issued
2011-04-12	1	5.2 Add f) MOE comments to agenda items and remove identified responsibilities and reference material to participants
2011-07-27	2	Added Appendix Title Page; Modified Date Formatting
2012-04-12	3	Change Operations Manager to Senior Operations Manager
2013-06-28	4	Revise to include re-endorsement discussion as an agenda item as identified in the external audit

MANAGEMENT REVIEW

Reviewed by: QEMS Representative	Approved by: Operations Management

2014-07-10	5	Revise 5.4 to read PCT instead of QEMS Representative in order to address NCR #2014-01 from external audit.
2014-07-23	6	Change of Ownership from Municipality of West Elgin to Tri-County Water Board; Change name of West Elgin Water Treatment Plant to Tri-County Water Treatment Plant
2015-03-27	7	Change Tri-County WTP to DWS; Add Operations Manage to 3.0; add Management Review Agenda to 6.0
2016-04-22	8	Change PCT to OCTL and Senior Operations Manager to RHM where Appropriate
2017-06-09	9	Revise to reflect new org structure
2018-01-22	10	Procedure issued. Revised as per corporate template.
2020-10-30	11	Revised to update Tri-County Cluster to Aylmer Cluster as per IA-OFI 2020-10-26
2024-08-12	12	Remove watermark.

	OPERATIONAL PLAN Tri-County Drinking Water System	QEMS Proc.: OP-21 Rev Date: 2024-08-12 Rev No: 2 Pages: 1 of 3

QEMS
Ontario Clean Water Agency

CONTINUAL IMPROVEMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To describe the procedure for tracking and measuring continual improvement of the Quality & Environmental Management System (QEMS) for the Tri-County Drinking Water System.

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 in the Summary of Action Items Table. The QEMS Representative monitors the progress of corrective action(s) and provides status updates to Top Management.

| **OPERATIONAL PLAN**
Tri-County Drinking Water System | QEMS Proc.: OP-21
Rev Date: 2024-08-12
Rev No: 2
Pages: 2 of 3 |

Ontario Clean Water Agency

CONTINUAL IMPROVEMENT

| Reviewed by: QEMS Representative | Approved by: Operations 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 is tracked by the QEMS Representative using the Management Review Minutes and associated action items.

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:

PRINTED COPIES OF THIS DOCUMENT ARE CONSIDERED TO BE UNCONTROLLED

	OPERATIONAL PLAN	QEMS Proc.: OP-21
QEMS Ontario Clean Water Agency	Tri-County Drinking Water System	Rev Date: 2024-08-12 Rev No: 2 Pages: 3 of 3

CONTINUAL IMPROVEMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

- 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 of the Environment and Climate Change.

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

4. Related Documents

OP-05 Document and Records Control
Summary of Action Items Table
OP-20 Management Review
Internal Audit Records
Management Review Minutes
Ministry Inspection Reports
Analysis and Action Plan

5. Revision History

Date	Revision #	Reason for Revision
2018-01-22	0	Procedure issued – Some of the information within OP-21 was originally set out in the main body of OCWA's Operational Plan (last revision # 12 dated 2017-06-09) and in QP-10 Internal Audit procedure (last revision # 8, dated 2017-06-09). Revised as per corporate template.
2019-08-16	1	Remove DWQMS Action Report and replace with Summary Table as per OFI IA 2019-08-16
2024-08-12	2	Add Ministry Inspection Reports and A &A Plan to 4.0, remove watermark as per IA OFI 2024-07-24.