ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

# OPERATIONAL PLAN

## For the Union Water Supply System

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

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

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

QEMS

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| Reviewed by: PCT | Approved by: Senior Operations Manager |
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## 1. Purpose

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

## 2. Definitions

*Drinking Water Quality Management Standard (DWQMS)* – means the quality management standard approved by the Minister in accordance with section 21 of the 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.

## 3. Procedure

3.1 The Union Water Supply System is jointly owned by the Towns of Kingsville and Essex, the Municipality of Lakeshore and the Municipality of Leamington, and is managed by the Union Water Supply System Joint Board of Management. OCWA is the contracted Operating Authority for the Union Water Supply 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

MECP's Drinking Water Quality Management Standard
All QEMS Procedures and Documents referenced in this Operational Plan

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-18-2018 | 0 | Procedure issued – Information within OP-01 was originally set out in the Main body of OCWA's Operational Plan (last revision #16 July 25, 2017). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Addition of new wording (s.3.3) to clarify that the OCWA's Operational Plan aligns with the 21 elements of the DWQMS. |
| 04-21-2020 | 1 | Updated name of Ministry from MOE to MECP |
| 03-09-2021 | 2 | Updated Town of Lakeshore to Municipality of Lakeshore |
| 03-02-2022 | 3 | Updated SPC manager with Senior Operations Manager in the Header |

# QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) POLICY

| Reviewed by: PCT | Approved by: Senior Operations Manager |
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## 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, reliable and cost-effective clean water services that protect public health and the environment.
- Comply with applicable legislation and regulations.
- Promote client, consumer and stakeholder confidence through service excellence, effective communications and reporting.
- Train staff on their QEMS responsibilities.
- Maintain and continually improve the QEMS.

Originally issued as Environmental Policy on June 8, 1995
**Last revised, approved by OCWA's Board of Directors on April 6, 2016**
(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, the Owner and the public through OCWA's intranet and public websites. A hardcopy of the QEMS Policy is posted as specified in the OP-05 Document and Records Control procedure.

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

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

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

## 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 |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued – Section 3.4, 3.5 and 3.6 were added to the information originally set out in the main body of OCWA's Operational Plan (last revision # 16 dated July 25, 2017). New sections: Purpose, Definitions, Procedure, Related Documents and a separate Revision History. Minor revisions to wording in s. 3.3 to reference location of posted copy of the policy. Added sections on how annual policy review is conducted (s. 3.5 and s. 3.6) and reference to OP-13 ESS (s. 3.4).The full revision history for the QEMS policy is available on OCWA's intranet. |
| 04-21-2020 | 1 | Annual Review |
| 03-09-2021 | 2 | Annual Review without changes |
| 03-02-2022 | 3 | Updated SPC Manager with Senior Operations Manager in the header |

## COMMITMENT AND ENDORSEMENT

| Reviewed by: PCT | Approved by: Senior Operations Manager |
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### 1. Purpose

To document the endorsement of the Operational Plan for the Union Water Supply System by OCWA Top Management and the Towns of Kingsville, Essex, and Municipality of Lakeshore and Leamington and to set out when re-endorsement would be required.

### 2. Definitions

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

### 3. Procedure

3.1 The Operational Plan is provided to OCWA Top Management and to the Owner for endorsement. The signed written endorsement is presented in 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 Senior Operations Manager Dale Dillen and Regional Hub Manager Dave Jubenville

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

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

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

### 4. Related Documents

OP-03A Signed Commitment and Endorsement
OP-05 Document and Records Control
OP-06 Drinking Water System

### 5. Revision History

## COMMITMENT AND ENDORSEMENT

| Reviewed by: PCT | Approved by: Senior Operations Manager |
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| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued – Information within OP-03 was originally set out in the main body of OCWA's Operational Plan (last revision #16 dated July 25, 2017). Procedure provides information on who from Top Management endorses the Operational Plan (s. 3.1); when owner re-endorsement is sought and 'criteria' as to what is considered a major revision to the Plan (s. 3.2). Element 3 of main body of OCWA's corporate template Operational Plan (last revised on 2011-12-13) was incorporated into Appendix OP-03A which also includes the Owner and Top Management sign-off section. |
| 04-21-2020 | 1 | Annual review |
| 03-10-2021 | 2 | Updated Town of Lakeshore to Municipality of Lakeshore |
| 03-02-2022 | 3 | Updated SPC Manager with Senior Operations Manager in the Header |

| QEMS Ontario Clean Water Agency | **OPERATIONAL PLAN**<br>Union Water Supply System | QEMS Doc:<br>Rev Date:<br>Rev No:<br>Pages: | OP-03A<br>01-18-2023<br>4<br>1 of 1 |
|---|---|---|---|

## 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 Towns of Kingsville and Essex, Municipality of Lakeshore and Municipality of Leamington 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 Union Water Supply 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**

01/18/23
Date

*Dale Dillen*
Senior Operations Manager

01/18/23
Date

*Dave Jubenville*
*Regional Hub Manager*

**Owner Endorsement**

01/20/23
Date

*Hilda MacDonald*
*Chair, Union Water Supply System*

01/18/23
Date

*Rodney Bouchard*
*Manager, Union Water Supply System*

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

# QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) REPRESENTATIVE

| Reviewed by: PCT | Approved by: Senior Operations Manager |
|---|---|

## 1. Purpose

To identify and describe the specific roles and responsibilities of the QEMS Representative(s) for the Union Water Supply System

## 2. Definitions

None

## 3. Procedure

3.1 The role of QEMS Representative for the Union Water Supply System is the Process and Compliance Technician (PCT). The Senior Operations Manager will act as an alternate QEMS Representative when required.

3.2 The QEMS Representative is responsible for:

- Administering the QEMS for the Union Water Supply 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 |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued – Information within OP-04 was originally set out in the main body of OCWA's Operational Plan (last revision #16 dated July 25, 2017). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Change to responsibilities: Operations Manager no longer considered QEMS Representative and SPC Manager to act as alternate as required (s. 3.1); added wording to clarify shared responsibilities for Top Management and QEMS Representative to ensure operations personnel are aware of applicable legislative and regulatory requirements (s. 3.2) |
| 05-05-2020 | 1 | Annual Review |
| 03-09-2021 | 2 | Annual review without changes |
| 03-03-2022 | 3 | Updated 3.1 alternate QEMS Rep and replaced SPC Manager with Senior Operations Manager in the header |

# DOCUMENT AND RECORDS CONTROL

| Reviewed by: PCT | Approved by: Senior Operations Manager |
|---|---|

## 1. Purpose

To describe how OCWA's QEMS documents are kept current and how QEMS documents and records are kept legible, readily identifiable, retrievable, stored, protected, retained and disposed of. Applies to QEMS Documents and QEMS records pertaining to the Union Water Supply 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 OP-05A Document and Records Control Locations.

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

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

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

| | |
|---|---|
| Review | PCT, QEMS Representative |
| Approval | Senior Operations Manager, Alternate QEMS Representative |

The QEMS Representative ensures that updated documents are provided to the above authorized personnel for review or approval prior to issuance.

Authorized personnel authenticate their review/approval of this Operational Plan by emails.

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 OP-05A.

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

3.5 Access to OCWA's computer network infrastructure is restricted through use of individually-assigned usernames and passwords and local area servers. Network security is maintained by OCWA's Information Technology department through a number of established mechanisms and practices such as daily back-up of files stored on servers, password expiry, limitations on login attempts and policies outlining specific conditions of use.

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

SCADA records are maintained as per OP-05A and are accessible to all staff when required. Union Water Supply System plant SCADA records are stored on Union SCADA server.

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.

The authorized method for disposal of electronic documents and records after the specified retention requirements have been met is deleting.

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

| Type of Document/Record | Minimum Retention Time | Requirement Reference |
|---|---|---|
| Operational Plan (OP-01 to OP-21 and appendices, including Schedule "C" – Subject System Description Form)<br>FEP<br>Long term forecast of major infrastructure maintenance, rehabilitation and renewal activities<br>Sampling plan/schedule/calendar | 10 years | Director's Direction under SDWA |
| Internal QEMS Audit Results | 10 years | OCWA Requirement |
| External QEMS Audit Results | 10 years | OCWA Requirement |
| Management Review Documentation | 10 years | OCWA Requirement |
| Documents/records required to demonstrate conformance with the DWQMS (specifically documents/records listed in OP-05A) | 3 years*if no specified legislative requirement identified in this table or in the facility's legal instruments * | OCWA Requirement |
| Log Books or other record-keeping mechanisms | 5 years | O. Reg. 128/04 |
| 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 (LMR) and THM, HAA, nitrates, nitrites and lead program sampling and testing, Section 11 Annual Reports and | 6 years | O. Reg. 170/03 |

| Type of Document/Record | Minimum Retention Time | Requirement Reference |
|---|---|---|
| Schedule 22 Summary Reports | | |
| Sodium test results and related corrective action records/reports, 60 month fluoride test results (if the system doesn't fluoridate), Engineering Reports | 15 years | O. Reg. 170/03 |
| Lead samples, correction 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)<br>15 years (SMR) | O. Reg. 170/03 |
| Flow Meter Calibration Records, Analyzer Calibration Reports Maintenance Records/Work Orders | 2 years | O. Reg. 170/03 |
| Records by or created in accordance with the Municipal Drinking Water Licence (MDWL) or Drinking Water Works Permit (DWWP). Except records specifically referenced in O. Reg. 170/03 or otherwise specified in the MDWL or DWWP. | 5 years | MDWL |
| Ministry forms referenced in the DWWP, including Form 1, Form 2, Form 3 and Director Notifications (applies to forms that have been completed by OCWA as the authorized by the owner) | 10 years | DWWP |

3.10 The Operational Plan is reviewed for currency by the QEMS Representative during internal/external audit and Management Review processes. Other QEMS-related documents are reviewed as per the frequencies set out in this Operational Plan or as significant changes (e.g., changes in regulatory requirements, corporate 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 |
|---|---|---|
| 2017-12-15 | 0 | Procedure issued |
| 2018-04-19 | 1 | QP-01 procedure renamed OP-05. Removed Scope and Responsibilities sections. Moved the former Table 1 (Designated location for documents and records required by OCWA's QEMS) to its own appendix (OP-05A). Assigned responsibility for ensuring current versions of QEMS documents are being used to the QEMS Representative (s. 3.4). Clarified that requests for revisions/new QEMS documents are made to the QEMS Representative (s. 3.6). Moved the former Table 2 (Relevant regulatory and corporate minimum retention periods) to be part of s. 3.9 and expanded on the minimum retention times for documents and records required to demonstrate compliance with legislation. Other minor wording changes. |
| 04-21-2020 | 2 | Annual Review |
| 03-09-2021 | 3 | Annual review without changes |
| 03-01-2022 | 4 | Procedure updated. Added: clarity to version control requirements to align with the Director's Directions dated May 2021, detail to the approval process for Operational Plan, 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. |

# DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: PCT | Approved by: Senior Operations Manager

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

Instructions: include specific locations of where documents and records can be found. (E.g., Instead of identifying that a hard copy of a document/record is located at the facility, identify that it is located in the 'control room of the facility'. Similarly, instead of identifying that an electronic copy of a document/record is located on a shared network drive, identify the specific pathway to document/record, including 'folder name and location on the shared network drive'

| Type of Document/Record | Designated Document Control Location<br>(HC = Hardcopy, E = Electronic) |
|---|---|
| **Internal QEMS Documents** | |
| Operational Plan (OP-01 to OP-21 and appendices, including Schedule "C" – Subject System Description Form) | HC – DWQMS Document Control Cabinet<br>E – S:\UNION\PUBLIC\Union WTP DWQMS\Union WTP Operational Plan |
| QEMS Policy | E - OCWA's Sharepoint site and public website<br>HC – Posted in WTP at Right to Know station |
| Facility Emergency Plans | HC – DWQMS Document Control Cabinet<br>E – S:\UNION\PUBLIC\Union WTP FEP Binder |
| Emergency Response Plan (corporate) | E - OCWA's Sharepoint site<br>HC – Facility Emergency Plan Binder (DWQMS control cabinet) |
| Standard Operating Procedures (referenced in Operational Plan and QEMS Procedures) | HC – DWQMS Document Control Cabinet<br>E – S:\UNION\PUBLIC\Union WTP SOP Binder |
| Emergency Contacts & Essential Supplies & Services List | HC – FEP Binder, DWQMS Document Control Cabinet<br>E - S:\UNION\PUBLIC\Union WTP FEP Binder |
| On-call/Shift/Vacation Operations Schedule | HC – Operators Desk<br>E – S:\UNION\PUBLIC\Union Operator Schedule |
| Plant Tour Release Form | E – S:\UNION\PUBLIC\Forms |
| Union Hub request for time off | E – S:\UNION\PUBLIC\Forms |
| Call-in Form | E – S:\UNION\PUBLIC\Forms |
| Coagulant Daily Use Form | HC – Behind Operators desk<br>E – S:\UNION\PUBLIC\Union Operators Folder\Daily Operations Sheets |
| Chlorine Daily Use Form | HC – Behind Operator desk<br>E – S:\UNION\PUBLIC\Union Operators Folder\Daily Operations Sheets |
| Community Complaint Form | HC - DWQMS Document Control Cabinet<br>E - S:\UNION\PUBLIC\Forms |
| Operational Data Log | HC – Operators Desk<br>E – S:\UNION\PUBLIC\Union Operators Folder\Operational Data log |
| Monthly filter turbidity exceedance over .30 NTU in minutes binder | HC – Posted in Union WTP 95% below .30 NTU Binder (PCT Area)<br>E- Union SCADA server, This report is generated on a monthly basis through SCADA |
| Sampling Calendar | HC – Posted on Sampler's bulletin board<br>E – S:\UNION\PUBLIC\Union WTP Sample calendar |
| Maintenance/equipment manuals | HC – Library area at WTP |
| OPEX Database Action Plan Form (Preventive/corrective)/ Summary table of Action Items(Preventive/Corrective) | E – S:\UNION\SECURED\COMPLIANCE\UWSS DWQMS\DWQMS Audits |
| **External QEMS Documents** | |
| Engineering System schematics/plans/drawings/ diagrams | E-S:\Union\Public\Union WTP Blue Prints |
| Municipal Drinking Water License | HC - DWQMS Document Control Cabinet<br>E – S:\UNION\PUBLIC\Union Drinking Water Licence and Permit |
| Drinking Water Works Permit | HC - DWQMS Document Control Cabinet<br>E – S:\UNION\PUBLIC\Union Drinking Water Licence and Permit |

# DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: PCT | Approved by: Senior Operations Manager

| Type of Document/Record | Designated Document Control Location (HC = Hardcopy, E = Electronic) |
|---|---|
| Permit to Take Water | HC - DWQMS Document Control Cabinet<br>E – S:\UNION\PUBLIC\Union Drinking Water Licence and Permit |
| Operator certificates | HC-Operator desk<br>E-S:\Union\Secured\COMPLIANCE\Employee Certification |
| AWWA Standards | E - S:\UNION\PUBLIC\Union Operators Folder\Operations Regulations\AWWA standards |
| Ontario's Watermain Disinfection Procedure | E- https://www.ontario.ca |
| DWQMS Standard | E - https://www.ontario.ca |
| ANSI/NSF product registration documentation for Chemicals/Materials Used | HC – Right to know station<br>E – S:\UNION\PUBLIC\Union WTP SDS sheets\ANSI & NSF Certificates |
| Applicable federal and provincial legislation and municipal by-laws | E - Online at www.ontario.ca/laws |
| Source Water Protection Plan | E - S:\UNION\PUBLIC\Union WTP Annual reports |
| Essex County Emergency Response Plan | E - Online:https://www.countyofessex.ca/en/emergency-services/resources/Documents/2020-County-of-Essex-Emergency-Response-Plan_PUBLIC-VERSION_.pdf |
| **QEMS Records** | |
| Rounds sheets | HC – Operators Desk<br>E – S:\UNION\PUBLIC\Union Operators Folder\Daily Rounds Sheet |
| Facility Operations Logbook(s) | E – https://ocwa.eriscloud.com/ |
| Visitor's Logbook | HC – Upper Level of Main Plant Entrance<br>E – S:\UNION\PUBLIC\Forms\Plant Sign in Log Sheet |
| Plant Tour Release Form | E – S:\UNION\PUBLIC\Forms |
| Operator training records | HC – Individual Files (PCT Desk) and S:\UNION\SECURED\COMPLIANCE\Employee OJT Entered<br>E - maintained in OCWA's Training Summary Data Base |
| Maintenance records | E - maintained in WMS |
| Internal Calibration records | E - maintained through WMS |
| External Calibration records | Hach portable analyzers:<br>E – Maintained in WMS<br>HC – Hach calibration binder, DWQMS Cabinet<br>Flow Meters:<br>E – Maintained in WMS<br>HC – Self Titled Binder, DWQMS Cabinet<br>Backflow Prevention Certification/Validation Records: HC – Self Titled Binder in DWQMS Cabinet |
| Chain of Custodies | HC – Samplers Desk<br>E – S:\UNION\PUBLIC\Union WTP Chain of Custodies |
| Laboratory analyses | HC – Binders located in the PCT Area, Electronic reports from Laboratory<br>E - maintained through PDM |
| Additional Sampling records | HC – Binders located in the PCT Area<br>E – S:\UNION\PUBLIC\Union Sample Results !!!!!!!!! |
| In-house lab results | HC – Daily Operations Log<br>E - maintained through PDM |
| SCADA Records | E – Stored on Union SCADA server |
| Internal QEMS audit reports | HC – Self Titled Binder in DWQMS Cabinet<br>E – S:\UNION\PUBLIC\Union WTP DWQMS\Internal Audits |
| External audit reports | HC – Self Titled Binder in DWQMS Cabinet<br>E – S:\UNION\PUBLIC\Union WTP DWQMS\External Audits |

## DOCUMENT AND RECORDS CONTROL LOCATIONS

Reviewed by: PCT | Approved by: Senior Operations Manager

| Type of Document/Record | Designated Document Control Location (HC = Hardcopy, E = Electronic) |
|---|---|
| MECP Inspection Reports | E-S:\Union\Public\Union WTP MECP Inspection Reports |
| Management Review documentation | HC—Self Titled Binder in DWQMS Cabinet<br>E – S:\UNION\SECURED\COMPLIANCE\UWSS DWQMS\Management reviews |
| Action Plan Forms | E – Lotus Notes OPEX Database<br>E-- S:\UNION\SECURED\COMPLIANCE\UWSS DWQMS\DWQMS Audits\Action Plans for OFI's & NC's |
| Annual Reports | E – S:\UNION\PUBLIC\Union WTP Annual reports |
| Summary Reports for Municipalities | E – S:\UNION\SECURED\COMPLIANCE\Annual Reports\Union summary reports |
| AWQI Reports | HC – Self Titled Binder in DWQMS Cabinet<br>E – S:\UNION\SECURED\COMPLIANCE\AWQI |
| Infrastructure review (capital/maintenance works recommendations) | HC – Self Titled Binder in DWQMS Cabinet<br>E – S:\UNION\SECURED\COMPLIANCE\UWSS DWQMS\Infrastructure Reviews |
| Community complaint records | HC – Self Titled Binder in DWQMS Cabinet<br>E – OPEX database |
| Internal QEMS Communications | E- S:\Union\Public\Union Monday Morning Minutes<br>E- S:\Union\Secured\COMPLIANCE\OCWA Memo |
| External QEMS Communications (including essential suppliers and service providers) | HC-FEP Binder, DWQMS cabinet<br>E - S:\Union\Public\Union WTP FEP Binder |
| Call In Reports | E - S:\Union\Secured\ADMINISTRATIVE\Call Back Detail reports |
| Summary of CCP Exceedances | HC—Operators desk<br>E-- S:\UNION\PUBLIC\Union WTP DWQMS |
| Results of emergency test exercises/emergency response debriefs | HC – FEP Binder<br>E-S:\Union\Secured\COMPLIANCE\FEP Binder\Contingencies\FEP-01 CP Review Test Summary Form |
| Ministry forms referenced in the Drinking Water Works Permit | HC- DWQMS cabinet<br>E-S:\Union\Secured\COMPLIANCE\MECP Forms |

## Revision History

| Date | Revision # | Reason for Revision | Revised by |
|---|---|---|---|
| 2018-04-19 | 0 | Appendix issued; Table was originally included within the Document and Records Control Procedure (QP-01) (last revision #10 August 23, 2017. | Corporate Compliance |
| 2019-06-27 | 1 | Updated internal QEMS documents as per internal DWQMS audit | Ken Penney |
| 2019-08-28 | 2 | Updated wording for Sampling Calendar | Ken Penney |
| 2020-04-21 | 3 | Updated file path for Electronic files | Sam Wen |
| 2020-09-24 | 4 | Reviewed and updated files locations and Hyperlinks | Sam Wen |
| 2021-03-11 | 5 | Updated File routes | Sam Wen |
| 2021-04-14 | 6 | Added Summary of CCP to QEMS Records | Sam Wen |
| 2022-03-18 | 7 | Added: 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 QEMS Reference Manual and OCWA's intranet (replaced with OCWA's Sharepoint site). | Corporate Compliance/Sam Wen |
| 2022-07-28 | 8 | Updated control location for Call in reports | Sam Wen |

## 1. Purpose

To document the following for the Union Water Supply 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. Description of the Drinking Water System

The Union Water Supply System (UWSS) is owned by the Towns of Kingsville, Town of Essex, Municipality of Lakeshore, and Municipality of Leamington, and is managed by the Union Water Supply System Joint Board of Management whose members are appointed by the municipal owners. The UWSS is operated by the Ontario Clean Water Agency. The treatment plant is situated in the Town of Kingsville on the North Shore of Lake Erie. It is a conventional filtration surface water treatment facility with a design capacity of 124,588 $m^3$ per day. The maximum volume of water that can be taken from Lake Erie is 163,656 $m^3$ /day or 113,650 l/min (PTTW number 0816-9T9SVT).

The water treatment facility consists of three intakes, a low lift pumping system, a treatment system and a high lift pumping system. The system has four elevated water towers servicing the municipalities of Kingsville, Lakeshore, Essex, and Leamington, as well as an in-ground reservoir and a booster pumping station in Cottam.

The waste management system located at the water treatment plant consists of two settling/storage ponds. Clarifier sludge and filter backwash water is treated by settling. The treated supernatant is then discharged by drain to Lake Erie.

### 3.1 Raw Water Source and Characteristics

The water source for the UWSS is the western basin of Lake Erie. The water from Lake Erie is typically very low in turbidity. Temperature fluctuates significantly through the seasons ranging from approximately 0.02ºC in the winter months to as high as 26.25ºC during the summer months. Bacteriological analysis of the raw water indicates a source of good quality. The results of chemical analysis are consistently below the Ontario Drinking Water Quality Standards.

Raw Water Characteristics at Intake (based on 2021 and 2022 data)

| 2021 | Characteristic | Minimum | Maximum | Annual Average |
|---|---|---|---|---|
| | Temperature (ºC) | .02 | 26.25 | 12.22 |
| | Turbidity (NTU) | 0.52 | 234 | 8.20 |
| | pH | 6.7 | 8.92 | 8.32 |
| | *E. coli* (CFU/100 mL) | 2 | >400 | 17.60 |
| | Total Coliforms | 2 | >400 | 71.67 |

| 2022 | Characteristic | Minimum | Maximum | Annual Average |
|---|---|---|---|---|
| | Temperature (ºC) | 0.15 | 25.45 | 11.64 |
| | Turbidity (NTU) | 0.9 | 237 | 10.74 |
| | pH | 7.49 | 9.01 | 8.38 |
| | *E. coli* (CFU/100 mL) | 2 | 20 | 4.54 |
| | Total Coliforms | 4 | 214 | 61.12 |

There are two major event-driven fluctuations in water quality, turbidity and algal blooms. Turbidity is variable and is significantly affected by wind strength and direction, and by storm event runoff. Algal blooms can occur under certain seasonal conditions and can result in significant amounts of organic matter in the raw water which could cause odour and taste problems in the finished water.

The operational challenges posed by the two event-driven fluctuations above are as follows:

*Turbidity:* Increased requirement for clarifier sludge blowdown, reduced filter run times and increased chlorine demand.

*Algal Blooms:* Reduced filter run times, increased chlorine demand and increased requirement for activated carbon.

*Common Fluctuations*

Raw water turbidity increases during spring runoff and significant rainfall events. Jar tests are performed by operators to optimize coagulant and polymer dosages.

Water temperature changes significantly from winter to summer. Warm summer temperatures may result in an increase of taste and odour concerns. PAC is added and chemical dosages are adjusted seasonally in response to taste and odour and temperature changes.

*Threats*

Potential sources of raw water contamination are runoff and contaminant spills on land to the west of the intakes, and spills and discharges from marine vessels traveling near the intakes.

The intake structures could be damaged if hit directly by a boat or ship.

*Operational Challenges*

If there is an algae bloom or a high raw water turbidity event for an extended period of time, the filter run times become reduced and backwash frequencies increased. This reduces filter efficiencies causing an increase in use of process water and therefore, a decrease in water production capacity in a prolonged occurrence.

## 3.2 Treatment System Description

Low Lift & Intake System

Water is drawn into the plant thru two intakes with a total design capacity of 218,208 $m^3$/day. A third shoreline intake is available for emergency use.

Intake #1 consists of a rock-filled timber crib with a coated steel cover, a vertical steel bellmouth and a chlorination solution diffuse ring at the bottom of the bellmouth for zebra mussel control. A 460 m long, 1350 mm dia. pipe of coated corrugated steel is buried in the lake bottom.

Intake #2 consists of a concrete filled corrugated steel intake crib with a steel cover and also has a diffuser ring located at the connection to the intake crib for zebra mussel control. A 1070 m long, 1350mm dia. polyethylene line is buried in the lake bottom.

Intake #3 (Emergency Intake) is located on the shoreline adjacent to the Low Lift pump station and is connected to intake #2 by a valve. It has never been used.

A Zebra Mussel control system pumps sodium hypochlorite solution to intakes 1 and 2. This system is operated seasonally.

The raw water flows through two bar screens and three coarse traveling screens into two pump wells. The raw water is pumped by seven vertical turbine low lift pumps, into two force mains that carry water to the Water Treatment Plant. A 600 kW generator provides backup power, is located in the low lift building.

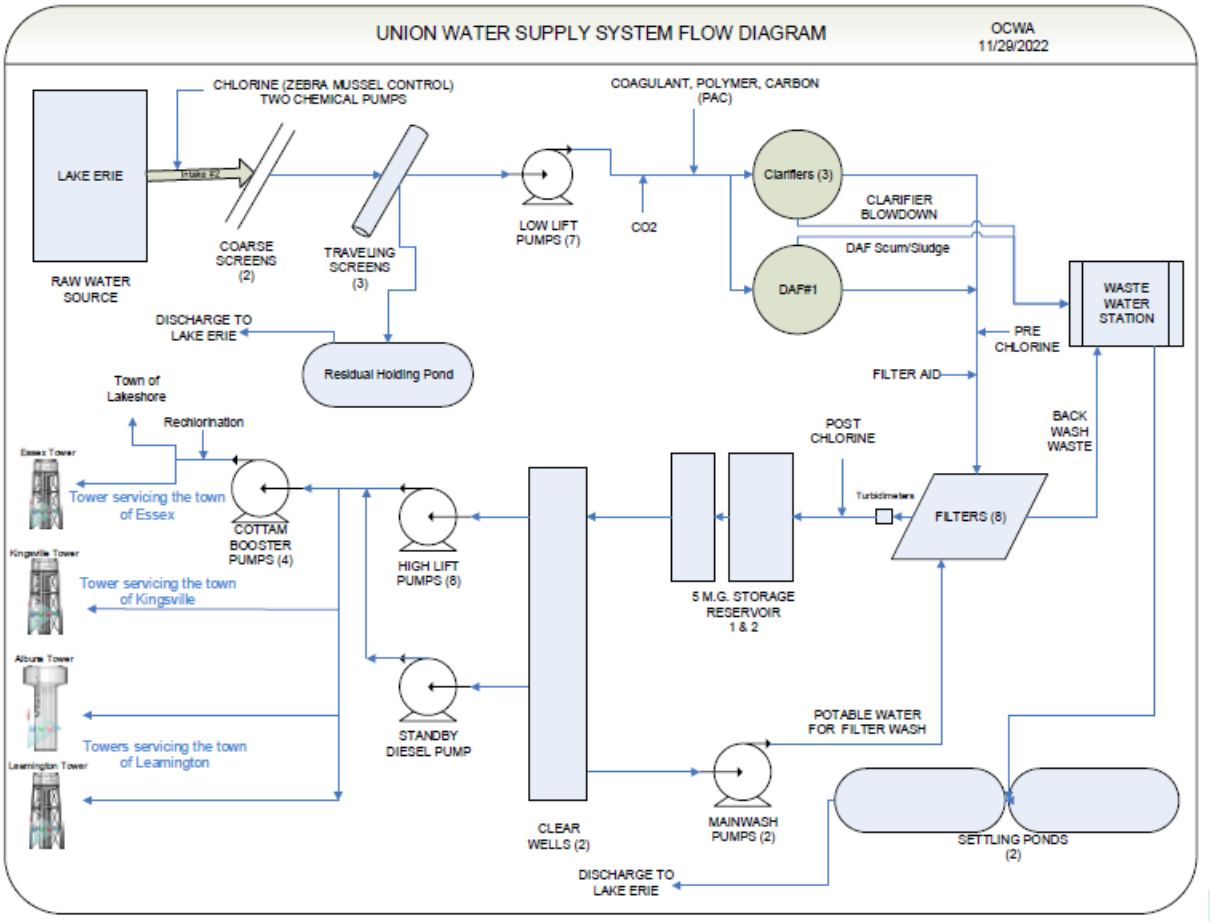
Water Treatment Plant

The water from the two force mains is split as needed to three (3) solid contact upflow clarifiers with domed covers and one (1) Dissolved Air Floatation (DAF) system with domed cover. Before entering the clarifiers and DAF, CO2 is added for Raw pH adjustments. Powder activated carbon is applied to the water for taste and odour control. Coagulant, polymer and PAC are added for coagulation and flocculation in the clarifiers. After clarification, polymer filter aid can be added as needed. Chlorine is injected into the clarifier effluent before the water enters the filters (pre-chlorine disinfection).

There are eight dual media filters. Chlorine for primary disinfection is injected into the filter effluent. The gravity fed filter effluents combine into two in-ground water storage reservoirs which operate in series. Reservoir #1 has a capacity of 10,630$m^3$ and Reservoir #2 has a capacity of 15,725$m^3$. The treated water flows to two clear wells (operated in series) to be pumped by any combination of eight pumps located in the high lift pump area. Six centrifugal pumps (one pump being electric/diesel) and two vertical turbine pumps. Water is pumped into the distribution system, as needed. Two surge tanks are connected to the distribution header piping to prevent water hammer.

The water treatment process and distribution components are controlled by a dedicated SCADA computer system and monitored by certified operators 24 hours a day. Two back up diesel generators rated at 135kW and 750 kW, and one diesel powered pump rated for 272.8 l/s are available to permit continuous treatment in the event of power disruption.

### 3.3 Treatment System Process Flow Chart




## 3.4 Description of the Distribution System Components

The Union Water Supply System (UWSS) supplies water to four municipalities. There are four elevated water storage tanks in the distribution system.

There are two water towers servicing the Municipality of Leamington, the Leamington tower with a capacity of 1,514 $m^3$ and the other Albuna tower with a capacity of 6,819 $m^3$. The Kingsville tower services the Town of Kingsville and has a capacity of 1,137 $m^3$. The Essex tower services the Town of Essex with a capacity of 1,137 $m^3$.

The system has an in-ground reservoir with a storage capacity of 10,091.78 $m^3$ and a booster pumping station located in Cottam, in the Town of Kingsville. This station has four booster pumps that supply the distribution system in the North West service area. Also located at this location is a disinfection system with sodium hypochlorite. A 350kW emergency diesel generator is available in the event the booster station loses power, allowing continuous operation of the station.

The Cottam booster pumping station and all water tower levels are controlled and monitored from the Union Water Supply System via a SCADA system.

| Distribution System | Owner | Operating Authority |
|---|---|---|
| Town of Kingsville<br>works# 220003403 | Town of Kingsville | Town of Kingsville |
| Town of Essex<br>works# 220003680 | Town of Essex | Town of Essex |
| Municipality of Lakeshore<br>works# 260004995 | Municipality of Lakeshore | Municipality of Lakeshore |
| Municipality of Leamington<br>works# 220004992 | Municipality of Leamington | Municipality of Leamington |

A detailed UWSS distribution map can be found on the Shared drive. S:\UNION\PUBLIC\Union Distribution System\Union Water Distribution System Prints\UWSS Map 2018 (Stantec).pdf

## 4. Related Documents

SOP OCWA-C3-20
SOP OCWA-C6-07
SOP OCWA-C6-14
SOP OCWA-C6-15

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-23-2018 | 0 | Procedure issued – Information within OP-06 was originally set out in the Main body of OCWA's Operational Plan (last revision # 17 dated April 23, 2018). |
| 01-07-2020 | 1 | Updated raw water characteristics |
| 05-07-2020 | 2 | Updated PTTW # in Section 3; Updated description of Union processes in Section 3.2 |
| 06-11-2020 | 3 | Updated UWSS flow diagram |
| 01-22-2021 | 4 | Updated Raw Water Characteristics |
| 02-22-2021 | 5 | Updated Town of Lakeshore to Municipality of Lakeshore |
| 01-11-2022 | 6 | Updated Raw Water Characteristics |
| 03-03-2022 | 7 | Replaced SPC Manager with Senior Operations Manager in the header |
| 01-25-2023 | 8 | Updated 3.2 Treatment description and 3.3 process flow chart; Updated Raw water characteristics |

## 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, at least one Operator for the system and at least one member of Operations Management.

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

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

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

3.3.2 For each of the system's activities/process steps, potential hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water are identified. At a minimum, potential hazardous events and associated hazard as identified in the most current version of the Ministry 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).

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

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

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

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

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

| Value | Consequence of Hazardous Event Occurring |
|---|---|

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

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

3.3.7 Hazardous events and rankings are reviewed and any activity/process step is identified as an additional CCP if <u>all</u> of the following criteria are met:

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

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

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

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

## 4. Related Documents

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 |
|---|---|---|
| 04-19-2018 | 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 # 5 April 27, 2017). |
| 04-21-2020 | 1 | Updated name from MOE to MECP |
| 03-09-2021 | 2 | Annual Review without changes |
| 03-03-2022 | 3 | Updated SPC Manager with Senior Operations Manager in the header |
| 05-17-2022 | 4 | Replaced MECP with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Added "(as amended)" directly following any references to Ministry documents to point to the most current version of the document and added the Ministry document "Potential Hazardous Events for Municipal Residential Drinking Water Systems"(as amended) to the list of items that may be considered when performing the annual verification of the currency of the information in the risk assessment. |
| 04-13-2023 | 4 | Reviewed without changes |

## 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 <u>not</u> being identified as a CCP, provide rationale as to why it does not meet the criteria set out in section 3.3.7 of OP-07).

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

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

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

3.4 A summary of the results of the annual 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 |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued – Information within OP-08 was originally set out in the QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes (last revision # 5 April 27, 2017). |
| 05-04-2020 | 1 | Annual Review |
| 03-09-2021 | 2 | Annual review without changes |
| 03-03-2022 | 3 | Updated SPC Manager with Senior Operations Manager in the header |
| 05-17-2022 | 4 | Replaced MECP with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Added "(as amended)" directly following references to the Ministry's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" to point to the most current version of the document. |
| 04-13-2023 | 4 | Reviewed without changes |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

**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 | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| Source | 2,5,6 | Spill of biological or chemical material into Lake Erie | Contamination<br>Loss of water supply | Contingency Plan, CP-05 Unsafe Water | 2 | 5 | 10 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Source | 1,3,4,9 | Adverse weather/seasonal fluctuations | Increased turbidity<br>- Poor coagulation due to cold water<br>- Algae bloom create filter clogging | SOP for High Filter Turbidity OCWA-C8-02<br>- Daily jar tests to monitor chemical solution adequacy | 4 | 2 | 8 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Source | 12 | Algae/Blue-green Algae Bloom | Restricted filter flows<br>Decrease in water to customers<br>Cyanotoxins<br>Microcystin LR | Microcystin Sampling Program SOP No: OCWA-C6-15<br>Harmful Algal Bloom Monitoring, Sampling, and Reporting Plan | 4 | 2 | 8 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Intake | 2,3,4 | Frazil ice | Temporary Loss of source water supply | SOP for Frazil Ice OCWA-C3-08 | 3 | 2 | 6 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Activity/ Process Step | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| Low Lift | 1,2,3,4,6,7,8 | Breakage/blockage | Temporary Loss of source water supply | SOP for main break (raw trunk line) OCWA-C3-16; | 1 | 4 | 4 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Low Lift | 2,6,7,8 | Pump failures | Temporary Loss of source water supply | - Redundancy (4 pumps)<br>- Scheduled maintenance activities<br>- Back-up generator for loss of power situations<br>- Alarms | 3 | 1 | 3 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Low lift | 2,3,6,8 | Loss of Hydro power | Temporary Loss of source water supply | - Standby diesel generator (auto start – auto transfer)<br>- Maintenance of generator by maintenance staff | 4 | 2 | 8 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Zebra mussel control(seasonal) | 6,9,10 | - Feed pump failure<br>- Chemical lines breakage | - Restricted flow<br>- No pre treatment<br>- Clogging of traveling screens | - Maintenance staff to restore operations in reasonable time | 3 | 1 | 3 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Activity/ Process Step | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| Screening | 1,2,3,9 | Blockage or failure of traveling screens | Reduced plant capacity | - Screens operated on a daily basis and continuously in cold temperatures (includes screen wash)<br>- Redundancy (3 screens) monthly work orders<br>Mussels pit checked weekly during season<br>- Maintenance staff to restore operations in reasonable time | 1 | 2 | 2 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Coagulant feed | 10 | - Feed pump failure<br>- Plugged injection point | - Ineffective removal of pathogens (minimum treatment requirements not met) | - Redundancy (1 back-up pump)<br>- Flow loss tested on monthly basis<br>Pump drawdown check<br>- Scheduled annual maintenance on pumps<br>- SCADA alarms<br>- SOP for Coagulant Feed Failure OCWA-C8-03 | 3 | 3 | 9 | ☒ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☐ No |
| Polymer Feed | 10 | - Feed pump failure<br>- Plugged injection point | - Increased turbidity<br>- Ineffective removal of pathogens | - staff would take appropriate response measures<br>-<br>- Scheduled annual maintenance on pumps<br>- SOP for Polymer Feed Failure OCWA-C8-04 | 3 | 3 | 9 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Activity/ Process Step | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| Carbon Feed | 10 | - Feed pump failure<br>- Plugged injection point | Taste and odour | - staff would take appropriate response measures<br>- Scheduled annual maintenance on pumps<br>- Standby spare pump parts | 3 | 2 | 6 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Clarification/DAF | 2,3,4 | Major equipment failure | Process interruption | - SCADA continuous monitoring and alarm<br>- SOP for Clarifier Equipment Failure OCWA-C3-04<br>Standby parts for valve | 1 | 2 | 2 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Clarification/DAF | 2,9,10 | pH adjustments | Overdose CO2 to Clarifier influent cause Low pH | - CO2 injection system control alarms<br>- Low pH alarms | 3 | 3 | 9 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Filtration | 2,9 | High turbidity | - Ineffective removal of pathogens potential for AWQI | - Continuous filter turbidity monitoring, Alarm on high turbidity<br>- Filter to waste control<br>- Regular backwashing<br>- Filter auto to waste on Turbidimeter failure<br>-Scheduled maintenance activities | 3 | 3 | 9 | ☒ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☐ No |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Activity/ Process Step | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| Pre Filter Disinfection | 2 | Chlorinator failure | - Low or no chlorine residual<br>- Inadequate pre disinfection | - SOP OCWA-C8-05,Standby Chlorinator Switch-over<br>- Continuous chlorine level monitoring<br>- Verify chlorinator performance | 3 | 3 | 9 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Filtration | 2 | Backwash pump failure<br>Air blower failure | - Increased turbidity<br>- Ineffective removal of pathogens<br>- Potential for loss of treated water supply | - Redundancy (1 backup main wash pump )<br>- SCADA Alarms<br>- Scheduled annual maintenance activities<br>- staff would take appropriate response measures | 2 | 2 | 4 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Chlorination system | 2,10 | Main Chlorine supply failure | - No disinfection<br>- Inadequate Contact time<br>- Potential bacteria growth<br>- Adverse levels | -SOP for standby chlorinator OCWA-C8-05<br>- Continuous chlorine level monitoring<br>- staff would take appropriate response measures | 1 | 5 | 5 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Activity/ Process Step | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| Reservoir | 2,6 | Biological contamination<br>Vandalism/ Terrorism | - Unsafe drinking water<br>- Contamination of water supply | - Security – locked doors<br>- Fencing around all facility buildings<br>- locked gates<br>Security camera system | 2 | 5 | 10 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Reservoir | 2,7,10 | Reservoir out of service for repair, maintenance | - Inadequate contact time for primary disinfection | - Redundancy (2 reservoirs)<br>- Increase pre chlorine dosage<br>- Increase post chlorine dosage | 1 | 3 | 3 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Primary Disinfection post chlorine injection system | 2,10 | Inadequate Chlorine level to meet proper CT | - Ineffective removal of pathogens | - SCADA alarms<br>- Continually on-line monitoring Chlorine residuals<br>- SCADA CT monitoring | 2 | 5 | 10 | ☒ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☐ No |
| Entire process | 1,2,3,4,11 | Aging infrastructure | - Potential contamination<br>- Reduced flow<br>- potential for AWQI | - Infrastructure maintenance and renewal program<br>- CP-05 unsafe water and SOP C7-07 | 2 | 3 | 6 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Activity/ Process Step | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| Entire process | 2,10 | Alarm failures | - Incorrect readings<br>- Inappropriate action<br>- potential for AWQI | - Operations to respond to alarms<br>- Instrumentation testing, monitoring, troubleshooting<br>-CP-05 unsafe water and SOP C7-07 | 4 | 2 | 8 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Entire process | 2,3,6,7,8,10 | Extended Power failure | - Potential contamination<br>- Reduced flow<br>- potential for AWQI | - SOP for LV Switch Gear transfer during Power outage OCWA-C3-11<br>- Staff to take appropriate action<br>- CP-05 unsafe water and SOP C7-07 | 2 | 4 | 8 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Entire process | 2 | Worker Injury | - Process interruption<br>- Injury | - Contingency plan CP-02<br>- H&S monthly meetings<br>- Staff to take appropriate action | 2 | 1 | 2 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Plant discharge | 2,7,8 | - Backflow prevention failure<br>- Building breach causing leaks into clearwells | - Infiltration<br>- Potential contamination of drinking water<br>- potential for AWQI | - Staff would take appropriate response measures<br>- Annual backflow preventer inspections<br>- CP-05 unsafe water and SOP C7-07 | 1 | 5 | 5 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Activity/ Process Step | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| High Lift | 2,3,6,7,8,11 | Pump failure | None | - Redundancy (multiple pumps)<br>- Scheduled maintenance activities<br>-SCADA alarms | 3 | 2 | 6 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| High Lift | 2,7,11 | Vacuum Primer failure | Unable to start up high lift centrifugal pumps causing low pressure in distribution | - Staff would take appropriate action<br>- Backup Vacuum primer<br>- regular maintenance and testing | 1 | 2 | 2 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Distribution | 8 | Backflow prevention failure | Potential or unsafe drinking water | - Bylaw "backflow prevention", tested and inspected annually by certified company<br>- Documentation<br>- Internal audits<br>- Municipalities oversees backflow prevention program under provincial building code | 2 | 4 | 8 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Distribution | 2,4,7,8 | Low pressure <20 psi | Potential infiltration causing unsafe drinking water | - Monitor customers complaints verify pressure as follow up<br>- Check instrumentation<br>- SOP low distribution system pressure OCWA-C6-14<br>- Hydrant pressure monitoring and alarms | 3 | 3 | 9 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Activity/ Process Step | Ministry's Potential Hazardous Event/Hazard Reference # (see Table 4) | Description of Hazardous Event | Possible Outcome (Hazards) | Existing Control Measures | Likelihood | Consequence | Risk Value | CCP? |
|---|---|---|---|---|---|---|---|---|
| Distribution | 2 | Bacteriological samples exceeds minimum requirements | Potential unsafe water | - Standard operating procedure for proper sampling<br>- Reporting adverse results to MECP and MOH defined by O.Reg 170/03, SOP OCWA-C7-07 | 3 | 3 | 9 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Distribution | 11 | CBS Sodium Hypo system failure | Potential or unsafe drinking water | -SOP for Chlorine Residual Testing (Total and Free) OCWA C8-10<br>- Contact appropriate municipalities | 4 | 2 | 8 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Distribution | 11 | Low residual Trigger 0.20 mg/L | Potential or unsafe drinking water | -SOP for Chlorine Residual Testing (Total and Free) OCWA C8-10<br>- Contact appropriate municipalities | 2 | 3 | 6 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |
| Union Treatment Process SCADA control | 13 | Lost Process SCADA control | Potential or unsafe drinking water | - Computer Fire wall protection;<br>- Password to log in SCADA<br>- Monitoring SCADA log in status<br>- CP-6 for Security Breach<br>- SOP OCWA C7-7<br>- Disconnect SCADA from internet | 2 | 4 | 8 | ☐ Yes – Mandatory CCP<br>☐ Yes – Additional CCP identified for facility<br>☒ No |

**Table 2:** Identified Critical Control Points (CCPs)

| CCP | Critical Control Limits | Monitoring Procedures | Response, Reporting and Recording Procedures |
|---|---|---|---|
| Primary Disinfection in Reservoir Effluent | 1.00 mg/L low low alarm set point | SCADA System continuous monitoring and alarms | Refer to;<br>- SOP OCWA-C8-05 Standby Chlorinator Switch-over<br>- Staff response with appropriate action |
| Coagulant Feed | Loss of coagulant flow | Loss of flow alarm monitored through SCADA | Refer to;<br>- SOP for Coagulant Feed Failure OCWA-C8-03 |
| Filtration | <0.30 NTU 95% of the time<br>0.20 NTU Hi alarm set point<br>0.28 NTU Hi Hi alarm set point | SCADA System continuous monitoring and alarms | Refer to;<br>- SOP for High Filter Effluent Turbidity OCWA-C8-02<br>- SOP for 95% Below 0.30 NTU OCWA-C7-01<br>- SOP for Month End Filter Effluent Turbidity Review OCWA-C3-45 |

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

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

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

| Date of Activity | Type of Activity | Participants | Summary of Results |
|---|---|---|---|
| 2009-02-04 | Initial risk assessment development | | |
| 2010-09-28 | Risks were re-assessed and changes made as an OFI from Internal Audit | | |
| 2010-10-20 | Removed several CCP's and re assessed Risks. | | |
| 2012-04-18 | 36-Month Risk Assessment | Gary Dunmore, Dale Dillen, Deb Thomson, Terry Bender, Dave Jubenville, Brian Labute, Dave Hunt, Jodi Stradeski, Blair Tully, Carl Grimstead, Karen Burgess | |
| 2012-04-26 | Staff review | Dale Dillen, Sal Portugal, Terry Truant, Samuel Wen, Stu Davis, Tyler Strickler, Gary Dunmore, Rodney Bouchard, Khristine Johnson. | Reviewed the revised risk assessment from April 18th session in London. |
| 2013-04-17 | Annual Review | Dale Dillen | Ensured SOP's mentioned in assessment were up to date. |
| 2013-05-14 | Changes made to CCP on Table 2 | Dale Dillen | |
| 2014-09-04 | **Annual** review and re-added Table 3 (Record of Annual Review/36-Month Risk Assessment) | Dan Beaulieu, Dale Dillen, Rodney Bouchard | Re-Added Table 3, added SOP details and changed likelihood of reservoir security beach. 3 year review was completed with the management review. |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: PCT | Approved by: Senior Operations Manager

| | | | |
|---|---|---|---|
| 2014-09-30 | 36-Month Risk Assessment | Dan Beaulieu | Clerical error from revision 4, correction made Aug. 03/2016 (type of activity was incomplete) |
| 2015-11-02 | Annual Review | Dale Dillen, Dan Beaulieu, Rodney Bouchard | Microcystin should be added as a CCP. |
| 2016-12-15 | Annual Review | Ken Penney | Added Microcystin as CCP |
| 2017-12-07 | 36-Month Risk Assessment | Ken Penney | |
| 2018-12-12 | Annual Review | Ken Penney | Removed Microcystin as CCP |
| 2019-09-11 | Annual Review | Ken Penny | Review following DWQMS Re Accreditation Audit - Added coagulant feed and filtration as CCP's |
| 2020-05-04 | Annual Review | Dale Dillen, Ken Penny, Sam Wen and All operational Staff (email) | Ammonia system risks removed; Monitoring and responding procedures updated |
| 2020-09-15 | 36-Month Risk Assessment | Dale Dillen, Ken Penney, Terry Korman, Evan Haines, Shantel Torres, Sam Wen | Reviewed risk assessment process steps and updated procedures, CCP for CBS hypo system added. |
| 2021-02-16 | Annual Review | Sam Wen | Added CT SCADA monitoring and updated CCP Tag names |
| 2021-09-09 | Infrastructure review | Dale Dillen, Ken Penney, Tim Woolner, Jason Hills, Jeremy McHardy, Rodney Bouchard, Khristine Johnson, Sam Wen | Added Flow loss test for Coagulant feed; pH adjustments for Clarification process; |
| 2021-10-26 | Table 2 set points were reviewed | Union operations staff | Updated Filter Effluent Turbidity alarm set points |
| 2022-03-03 | Updated Header | Sam Wen | Replaced SPC Manager with Senior Operations Manager |
| 2022-05-17 | Annual Review | Sam Wen, Ken Penney, Dale Dillen, Jason Hills, Jeremy McHardy, Rodney Bouchard and Khristine Johnston | Updated Table 4; Reviewed and updated Table 1 and 2; |
| 2023-04-13 | 36-Month Risk Assessment | Dale Dillen, Ken Penney, Jason Hills, Sandra Reaume, Sam Wen | Reviewed OP-07 and OP-08; Updated Table 1 in OP-08A; Removed CBS Hypo system and SCADA breach as CCP's |

**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 (e.g., coagulant dosing system, filters, UV system, chlorination system) |
| X | Treatment Systems and Distribution Systems providing secondary disinfection | 11 | Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment) |
| X | Treatment Systems using Surface Water | 12 | Algal blooms |
| X | All Systems | 13 | Cybersecurity threats |

## SUMMARY OF RISK ASSESSMENT OUTCOMES

| Reviewed by: PCT | Approved by: Senior Operations Manager |
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### Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-Feb-09 | 0 | Initial risk assessment conducted |
| 28-Sep-10 | 1 | Risks were reassessed and changes made as an OFI from Internal Audit |
| 20-Oct-10 | 2 | Removed several CCP's and reassessed risks |
| 14-May-14 | 3 | Changes to CCP's |
| 04-Sep-14 | 4 | Reviewed, added SOP details, changed likelihood of reservoir security breach, added 3yr review status |
| 30-Sep-14 | 5 | Added tracking locations for .30 NTU turbidity and chlorine residual sampling |
| 13-Sep-16 | 6 | Removed the word Alum and added coagulant, and updated annual review table |
| 15-Dec-16 | 7 | Added Microcystin as CCP |
| 07-Dec-17 | 8 | 36-Month Risk Assessment |
| 09-Apr-18 | 9 | Summary of Risk Assessment Outcomes assigned document number (OP-08A); added table 4 to reference MOE's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include [hazard]…based on results of 36-month risk assessment that took place on Dec. 07, 2017. |
| 11-Sep-19 | 10 | Review following DWQMS Re Accreditation Audit - Added coagulant feed and filtration as CCP's |
| 04-May-20 | 11 | Processes and procedures updated |
| 15-Sept-20 | 12 | 36-Month risk assessment |
| 16-Feb-21 | 13 | Annual review, added CT SCADA monitoring and updated CCP Tag names |
| 09-Sept-21 | 14 | Added Coagulant flow loss test; pH adjustments for Clarification process |
| 26-Oct-21 | 15 | Updated CCL set points for Filter Eff on Table 2 |
| 03-03-22 | 16 | Updated SPC Manager with Senior Operations manager in the header |
| 05-17-22 | 17 | Added Cybersecurity threats to Table 4 (new Ministry requirement); Replaced MOE with Ministry (Ministry refers to the Ontario government ministry responsible for drinking water and environmental legislation); Updated revision date of Ministry's document "Potential Hazardous Events for Municipal Residential Drinking water Systems" to April 2022 (previously February 2017), Reviewed and Updated Table 1 and Table 2; |
| 04-13-23 | 18 | 36-Month risk assessment |

# ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

| Reviewed by: PCT | Approved by: Senior Operations Manager |
|---|---|

## 1. Purpose

To document the following for the Union Water Supply 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 Union Water Supply System is owned by the towns of Kingsville, Essex, Municipality of Lakeshore, and the municipality of Leamington and is represented by the Union Water Supply System Joint Board of Management (JBM).

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

### 3.2 Top Management

Top Management for the Union water Supply system consists of:

- Operations Management – Essex East South Cluster
- Regional Hub Manager – Essex

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

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

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

3.3 Corporate Oversight

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

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

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

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 Essex Regional Hub**

| Role | Responsibilities and Authorities |
|---|---|
| All Operations Personnel | • Perform duties in compliance with applicable legislative and regulatory requirements<br>• Be familiar with the QEMS Policy and work in accordance with QEMS programs and procedures<br>• Maintain operator certification (as required)<br>• Attend/participate in training relevant to their duties under the QEMS<br>• Document all operational activities<br>• Identify potential hazards at their facility that could affect the environmental and/or public health and report to Operations Management<br>• Report and act on all operational incidents<br>• Recommend changes to improve the QEMS |
| Regional Hub Manager<br>(Top Management) | • Oversee the administration and delivery of contractual water/wastewater services on a Regional Hub level<br>• Fulfill role of Top Management<br>• Ensure corporate QEMS programs and procedures are implemented consistently throughout the Regional Hub<br>• Manages the planning of training programs for Regional Hub<br>• Report to VP of Operations/SLT on the regional performance of the QEMS and any need for Agency-wide improvement |
| Operations Management<br>(Top Management) | • Manage the day-to-day operations and maintenance of his/her assigned facilities and supervise facility operational staff<br>• Fulfill role of Top Management<br>• Ensure corporate and site-specific QEMS programs and procedures are implemented at his/her assigned facilities<br>• Determine necessary action and assign resources in response to operational issues<br>• Report to the Regional Hub Manager on facility operational performance<br>• Ensure operational training is provided for the cluster (in consultation with the SPC Manager as required) |

## ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: PCT | Approved by: Senior Operations Manager

| Role | Responsibilities and Authorities |
|---|---|
| | • Act as Overall Responsible Operator (ORO) when required. Refer to SOP OCWA-C3-01 |
| Safety, Process & Compliance (SPC) Manager<br>(Top Management) | • Supervise facility compliance staff and provide technical and program support to the Regional Hub related to process control and compliant operations<br>• Fulfill role of Top Management<br>• Ensure corporate/regional QEMS programs and procedures are implemented consistently throughout the Regional Hub<br>• Assist in the development of site-specific operational procedures as required<br>• Ensure training on applicable legislative and regulatory requirements and the QEMS is provided for the Regional Hub (in consultation with Operations Management as required)<br>• Monitor and report to the Regional Hub Manager and Operations Management on the compliance status and QEMS performance within his/her Regional Hub and any need for improvement<br>• Act as alternate QEMS Representative (when required) |
| Process & Compliance Technician (PCT)<br>(QEMS Rep.) | • Implement, monitor and support corporate programs relating to environmental compliance and support management by evaluating and implementing process control systems at his/her assigned facilities<br>• Fulfill role of QEMS Representative (OP-04)<br>• Monitor, evaluate and report on compliance/quality status of his/her assigned facilities<br>• Implement facility-specific QEMS programs and procedures consistently at his/her assigned facilities<br>• Participate in audits and inspections and assist in developing, implementing and monitoring action items to respond to findings<br>• Report to the SPC Manager on QEMS implementation and identify the need for additional/improved processes and procedures at the regional/cluster/facility level (in consultation with the Operations Management as required)<br>• Communicates to Owners on facility compliance and DWQMS accreditation as directed<br>• Deliver/participate in/coordinate training including applicable legislative and regulatory requirements and the QEMS<br>• May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required. Refer to SOP OCWA-C3-01 |
| Water Operations Supervisor | • Act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required. Refer to SOP OCWA-C3-01<br>• Perform duties as assigned by Operations Management |

| Role | Responsibilities and Authorities |
|---|---|
| | • Oversee maintenance activities on equipment and process in order to maintain compliance with applicable legislation, regulations, approvals and established operating procedures<br>• Prepare and/or coordinate staff work assignments and follow up to ensure completion<br>• Act for management during vacations or periodic absences.<br>• Develop and provide O&M reports to management and recommend changes in operating procedures/processes to improve facility operations<br>• Assist with facility operations including monitoring facility processes, reviewing process data and trouble-shooting<br>• Assist management in developing annual O&M budgets and provide recommendations relating to potential O&M expenditures |
| Senior Water Operator | • Perform duties as assigned by Operations Management<br>• Prepare and/or coordinate operational staff work assignments and follow up to ensure completion<br>• Assist management in providing recommendations for annual capital forecasts and gathering information for operational reports as required<br>• Assist in the preparation of facility manuals and documenting operating processes and procedures for staff<br>• Act for management during vacations or periodic absences.<br>• Perform duties of Operator/Mechanic as required<br>• May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required. Refer to SOP OCWA-C3-01 |
| Water Operator | • Perform duties as assigned by Operations Management or designate<br>• Monitor, maintain and operate facilities in accordance with applicable regulations, approvals and established operating procedures<br>• Collect samples and perform laboratory tests and equipment calibrations as required<br>• Regularly inspect operating equipment, perform routine preventive maintenance and repairs and prepare and complete work orders as assigned<br>• Participate in facility inspections and audits<br>• May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required. Refer to SOP OCWA-C3-01 |
| Mechanic/Operator | • Perform duties as assigned by Operations Management or designate |

| Role | Responsibilities and Authorities |
|---|---|
| | • Act as lead with other staff on extensive maintenance/repair projects<br>• Schedule and perform maintenance on equipment and processes in accordance with established procedures and record the maintenance data<br>• Regularly inspect operating equipment, perform routine preventive maintenance and repairs<br>• Perform duties of Operator/Mechanic as required<br>• May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required. Refer to SOP OCWA-C3-01 |
| Instrumentation Technician Specialist | • Maintain and provide technical services in regards to water process control and automation systems including preventative maintenance management system, process data collection systems, maintaining and monitoring process control systems facility instrumentation<br>• Discuss and advise on detailed system and programming requirements, modifying existing and new software in response to plant requests, training plant operations and maintenance staff on diagnostic tools and systems, analyzing problems and error conditions and their resolution while resolving any degradation in end-user service, documenting changes and modifications, and configuring, installing and supporting related software, hardware and network for such systems<br>• Assess water facilities in regards to process control instrumentation and automation systems by; conducting facility inspections, identifying and assessing the physical condition of existing equipment, instrumentation and control hardware<br>• Investigate and analyzing water facilities to develop situation-specific recommendations which will address optimization and cost reduction opportunities (electricity) and will include identification of issues and elements requiring further study.<br>• Install and commission new electrical/electronic equipment and automation systems by designing and laying out various electrical/electronic control systems, control loops, panels, electrical wiring and conduit installations; evaluating and planning equipment needs and purchases; modifying equipment to meet operational requirements; testing and verifying the proper operation of all electrical/electronic equipment and automation systems.<br>• Formulate technical plans and proposals for the cost-effective deployment and delivery of water process control and automation systems in support of operational activities; providing input into the agency's information and technology's strategic plan; developing and recommending policies, |

| Role | Responsibilities and Authorities |
|---|---|
| | standards and procedures or process automation hardware, software, operating systems and user interfaces. |
| Utility Plant Instrumentation Technician | • Provide advice and technical expertise on the services required for process control and automation systems<br>• Discuss and advise on detailed system and programming requirements, modify existing and new software in response to plant requests, analyze and resolve problems/error conditions, document changes/modifications and configure, install and support related software, hardware and network for such systems<br>• Conduct inspections of the process control and automation systems to validate that all is operating within established parameters as requested<br>• Install and commission new electrical/electronic equipment and automation systems |
| Operational and Maintenance (O&M) Team Lead | • Perform duties as assigned by Operations Management<br>• Oversee maintenance activities on equipment and process in order to maintain compliance with applicable legislation, regulations, approvals and established operating procedures<br>• Prepare and/or coordinate staff work assignments and follow up to ensure completion<br>• Act for management during vacations or periodic absences.<br>• Develop and provide O&M reports to management and recommend changes in operating procedures/processes to improve facility operations<br>• Assist with facility operations including monitoring facility processes, reviewing process data and trouble-shooting<br>• Assist management in developing annual O&M budgets and provide recommendations relating to potential O&M expenditures<br>• May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required. Refer to SOP OCWA-C3-01 |
| Administrative Assistant/Project Clerk | • Support the administrative functions of the regional hub/cluster/facility including coordinating delivery of training as directed<br>• Assist with entering operational data (including operational training records, process data and maintenance records ) into the appropriate database as directed |

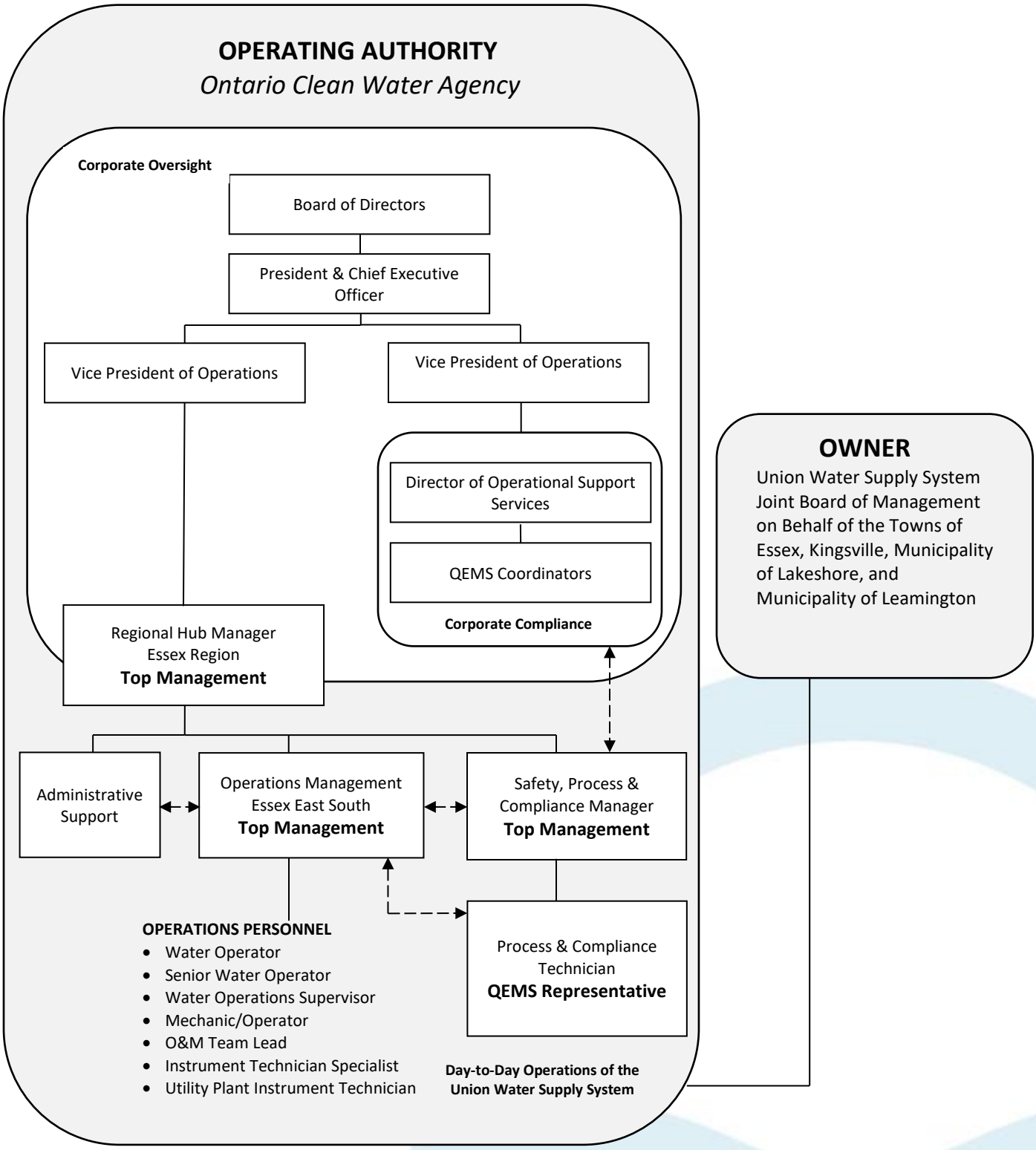
## 4. Related Documents

OP-03 Commitment and Endorsement

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

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued – Information within OP-09 was originally set out in the main body of OCWA's Operational Plan (last revision # 16 dated July 25, 2017). |
| 10-30-2019 | 1 | Added new position as a result of the new contract between OCWA and the Owner |
| 02-22-2021 | 2 | Updated Town of Lakeshore to Municipality of Lakeshore |
| 03-03-2022 | 3 | Removed SPC Manager and Updated the header |
| 05-15-2023 | 4 | Added SPC Manager/Water Operations Supervisor/Updated Operator/Mechanic to Water Operator |


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
Corporate Compliance
Regional Hub Manager Essex Region
Top Management
Administrative Support
Operations Management Essex East South
Top Management
Safety, Process & Compliance Manager
Top Management
OPERATIONS PERSONNEL
Water Operator
Senior Water Operator
Water Operations Supervisor
Mechanic/Operator
O&M Team Lead
Instrument Technician Specialist
Utility Plant Instrument Technician
Process & Compliance Technician
QEMS Representative
Day-to-Day Operations of the Union Water Supply System
OWNER
Union Water Supply System Joint Board of Management on Behalf of the Towns of Essex, Kingsville, Municipality of Lakeshore, and Municipality of Leamington

## Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Appendix issued - Organizational Chart previously contained as Appendix C of the Operational Plan. Moved to a new Appendix (last revision # 9 dated April 27, 2017). |
| 06-15-2020 | 1 | Operations Personnel updated |
| 07-30-2020 | 2 | Revision to reflect change to reporting structure - Corporate Compliance now reports to VP of Operations |
| 02-22-2021 | 3 | Updated Town of Lakeshore to Municipality of Lakeshore |
| 03-03-2022 | 4 | Removed SPC Manager and Updated the header as a result of Regional PCT meeting |
| 05-15-2023 | 5 | Added SPC Manager/Updated Operations Personnel |

## 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.

| Position | Required Minimum Competencies |
|---|---|
| Operations Management | • Valid operator certification; minimum level 3 if required to act as ORO<br>• Experience and/or training in managing/supervising drinking water system operations, maintenance, financial planning and administration<br>• Training and/or experience related to drinking water system processes, principles and technologies<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |

| Position | Required Minimum Competencies |
|---|---|
| Safety, Process & Compliance (SPC) Manager | • Valid operator certification; minimum OIT or minimum level 3 if required to act as OIC and/or ORO<br>• Experience in providing technical support and leading/managing programs related to process control and compliant operations<br>• Experience and/or training in conducting compliance audits, and management system audits<br>• Experience and/or training in preparing and presenting informational and training material<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |
| Senior Water Operator | • Valid operator certification; minimum level 3 if required to act as OIC and/or ORO<br>• Experience leading/directing operations personnel, and providing technical guidance to resolve operational issues<br>• Training and experience in inspecting and monitoring drinking water system processes and performing/planning maintenance activities<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |
| Water Operator | • Valid operator certification; minimum OIT or minimum level 3 if required to act as OIC and/or ORO<br>• Training and/or experience in inspecting and monitoring drinking water system processes and performing/planning maintenance activities<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |
| Mechanic/Operator (MM3) | • Valid operator certification; minimum OIT or minimum level 3 if required to act as OIC and/or ORO<br>• Millwright and/or other trades certificates<br>• Experience in maintaining and repairing equipment and structures and in planning and scheduling maintenance and repair tasks<br>• Training and/or experience related to drinking water system processes<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |
| Mechanic/Operator (MM2) | • Valid Class G driver license<br>• Training on OCWA's Mandatory Minimum training requirements |

| Position | Required Minimum Competencies |
|---|---|
| | • Experience using computers and operational computerized systems |
| Process & Compliance Technician | • Valid operator certification; minimum OIT or minimum level 3 if required to act as OIC and/or ORO<br>• Experience and/or training in resolving/addressing compliance issues for drinking water systems<br>• Experience and/or training in monitoring, assessing and reporting on facility performance against legal requirements and corporate goals<br>• Experience and/or training in preparing and presenting informational and training material<br>• Experience in conducting management system audits or internal auditor education/training<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |
| Utility Plant Instrumentation Technician | • Experience and/or training in monitoring, programming, installing and troubleshooting network, hardware, software and instrumentation<br>• Experience and/or training in drinking water system processes, design, instrumentation, process control and automation systems<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |
| Instrumentation Technician Specialist | • Must be able to maintain and provide technical services in regards to water process control and automation systems including preventative maintenance management system, process data collection systems, maintaining and monitoring process control systems & facility instrumentation<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |
| Water Operations Supervisor | • Valid Water Treatment class IV and Water Distribution class IV certificates; at least a minimum Class 1 WT and WS certificates;<br>• One of: Technologist Diploma; Certified Engineering Technician/Technologist designation, or; a valid Engineering or Environmental Technician diploma<br>• Experience and/or training in managing and planning multiple projects, assessing priorities and effectively coordinating operation and maintenance programs<br>• Training and/or experience related to operations and maintenance of drinking water system processes, principles and technologies |

| Position | Required Minimum Competencies |
|---|---|
| | • Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |
| O&M Team Lead (Maintenance) | • Valid operator certification; minimum OIT or minimum level 3 if required to act as OIC and/or ORO<br>• One of: Electrical/Electronic/Instrumentation Technician or Technologist Diploma; Mechanical Millwright; Certified Engineering Technician/Technologist designation, or; a valid Engineering or Environmental Technician diploma<br>• Experience and/or training in managing and planning multiple projects, assessing priorities and effectively coordinating operation and maintenance programs<br>• Training and/or experience related to operations and maintenance of drinking water system processes, principles and technologies<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• Experience using computers and operational computerized systems |

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

| Position | Required Minimum Competencies |
|---|---|
| Administrative Assistant | • Experience and/or training related to procurement and business administration practices<br>• Training on OCWA's QEMS and the DWQMS<br>• Training on relevant legislation, regulations, codes, policies, guidelines and procedures<br>• 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 within their first year of joining OCWA. The purpose of the EC 101 course is to ensure staff are aware of applicable legislative and regulatory requirements, to promote awareness of OCWA's QEMS and to reinforce their roles and responsibilities under OCWA's QEMS.

3.7 Staff are also required to complete the mandatory environmental and health and safety compliance training listed in OCWA's Mandatory Compliance Training Requirements document, based on their position and/or the duties they perform. This list is available on OCWA's intranet.

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

## 4. Related Documents

OCWA's Training Resources (OCWA Intranet)
OCWA's Mandatory Compliance Training list (OCWA intranet)
Performance Planning and Review Database
OP-5 Document and Records Control
OCWA Training Summary Database

## 5. Revision History

| Date | Rev # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued – Information within OP-10 was originally set out in the main body of OCWA's Operational Plan (last revision # 16 dated July 25, 2017). |
| 10-30-2019 | 1 | Added new position as a result of the new contract between OCWA and the Owner |
| 05-06-2020 | 2 | Annual Review |
| 03-10-2021 | 3 | Annual Review without changes |
| 11-03-2021 | 4 | Added MM2 and O&M Team Lead (Operations) and removed Maintenance Electrician as a result of UWSS Management meeting |
| 03-03-2022 | 5 | Updated header(replace SPC Manager with S. Operations Manager) |
| 08-05-2022 | 6 | Updated Minimum Competencies for Instrumentation Technician Specialist |
| 03-15-2023 | 7 | Updated Minimum competencies for Maintenance Mechanic 2 as a result of Union Staff meeting |
| 05-15-2023 | 8 | Added Operations Supervisor role and updated job titles for Operator/Mechanic and Senior Operator/Mechanic |

# PERSONNEL COVERAGE

Reviewed by: PCT | Approved by: Senior Operations Manager

## 1. Purpose

To describe the procedure for ensuring that sufficient and competent personnel are available for duties that directly affect drinking water quality at the Union Water Supply 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 Union Water Supply System is staffed by OCWA personnel as follows:

The Union Water Supply System is staffed 24/7 by a shift operator from 07:30 to 19:30 and from 19:30 to 07:30 daily. Office and maintenance staff hours may vary from 06:30 to 16:00 Monday to Friday.

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. Refer to SOP OCWA-C3-01 when the ORO is Absent or Unable to Act. The designated OIC for each shift is recorded in the facility logbook.

3.3 Operations Management assigns a qualified on-call operator and on-call maintenance mechanic for the time outside of regular business hours (i.e., evenings, weekends and Statutory Holidays). The on-call schedule is maintained by Operations Management and consists of a 1-week rotation or assigned as required, and is posted at the operator's desk and also stored electronically on the S:\UNION\PUBLIC\Union Operator Schedule.

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

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

3.5 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.

3.6 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 Operations Sheets & Data
Operations On-Call/Shift Schedule
Critical Shortage of Staff Contingency Plan (Facility Emergency Plan)
SOP OCWA-C3-01 – When the ORO is Absent or Unable to Act

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued Information within OP-11 was originally set out in the main body of OCWA's Operational Plan Appendix D (last revision # 5 dated April 27, 2017). |
| 04-21-2020 | 1 | Updated Operator schedule Files path in S 3.3. |
| 03-10-2021 | 2 | Annual Review without changes |
| 03-03-2022 | 3 | Updated header(replace SPC Manager with S. Operations Manager) |

## 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 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. 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 Senior Operations Manager and PCT are responsible for ensuring training is provided for the Regional Hub (in consultation with Operations Management as required) on applicable legislative and regulatory requirements and the QEMS.

3.3.4 The QEMS Representative assists Operations Management in the coordination and/or 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 are informed regarding the compliance/quality status of the facility and QEMS implementation and any need for improved processes/procedures at the facility level.

3.3.9 The Senior Operations 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/PCT assists in the coordination of these meetings and with communicating the updates as directed.

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

3.5 Communications with Essential Suppliers and Service Providers:

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

3.6 Communication with the Public:

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

3.6.2 OCWA's QEMS and QEMS Policy are communicated to the public through OCWA's public website. The QEMS Policy is also posted at the facility hub office. The UWSS QEMS Operational Plan will be posted on UWSS website www.unionwater.ca.

3.6.3 Facility tours of interested parties must be approved in advance by the Operations Management and consented with a release form. A record of any tour is made in the facility logbook.

3.6.4 All complaints, whether received from the consumer, the community or other interested parties, are documented in the OPEX database. 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 PCT 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
Facility Emergency Plan
Emergency Response Plan
OPEX Incident Reports
Plant Tour Release Form
Facility Logbook

## 5. Revision History

## COMMUNICATIONS

| Reviewed by: PCT | Approved by: Senior Operations Manager |
|---|---|

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued, Information within OP-12 was originally set out in the main body of OCWA's Operational Plan Appendix E (last revision # 5 dated April 27, 2017). |
| 05-06-2020 | 1 | Annual Review |
| 03-10-2021 | 2 | Updated OP posted website to unionwater.ca |
| 03-04-2022 | 3 | Updated SPC Manager with Senior Operations Manager |

## 1. Purpose

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

## 2. Definitions

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

## 3. Procedure

3.1 Essential supplies and services for the Union Water Supply System are contained in the Facility Emergency Plan, Emergency Contact/Essential Supplies and Services 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 MECP 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).

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

FEP Emergency Contact/Essential Supplies and Services 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 |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued, Information within OP-13 was originally set out in the main body of OCWA's Operational Plan Appendix F (last revision # 9 dated April 27, 2017). |
| 05-06-2020 | 1 | Updated name of Ministry from MOE to MECP |
| 03-10-2021 | 2 | Annual Review without changes |
| 03-03-2022 | 3 | Updated SPC Manager with Senior Operations Manager |

# REVIEW AND PROVISION OF INFRASTRUCTURE

| Reviewed by: PCT | Approved by: Senior Operations Manager |
|---|---|

## 1. Purpose

To describe OCWA's procedure for reviewing the adequacy of infrastructure necessary to operate and maintain the Union Water Supply 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 in conjunction with operations personnel, O&M Team Lead, PCT conducts a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system. Operations personnel assist with identifying the need for infrastructure repairs, replacements or alterations and with prioritizing each identified item. Documents and records that are reviewed may include:

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

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

3.3 The output of the review is a summary of Capital and Major Maintenance Recommendations Report 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 Capital and Major Maintenance Recommendations Report 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

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

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued, Information within OP-14 was originally set out in the main body of OCWA's Operational Plan Appendix G (last revision # 4 dated April 27, 2017). |
| 05-06-2020 | 1 | Annual Review |
| 03-10-2021 | 2 | Annual Review |
| 03-04-2022 | 3 | Updated SPC Manager with Senior Operations Manager |

# INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL

Reviewed by: PCT | Approved by: Senior Operations Manager

## 1. Purpose

To describe OCWA's infrastructure maintenance, rehabilitation and renewal program for the Union Water Supply 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 include: pump inspection, analyzer calibrations, flow meter calibrations, valve inspection, reservoir inspections, tower inspections, weekly inspections of the facility, etc.

- Inspect, adjust and calibrate process control equipment to ensure proper operation of, pumps, and all other equipment installed at the facility.
- Check of water booster and pumping stations to ensure everything is in order.
- Carry out a routine maintenance program including greasing and oiling as specified in the O&M manual.
- Perform day-to-day maintenance duties to equipment including checking machinery and electrical equipment when required.

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

- Enter detailed asset information;
- Generate and process work orders;
- Access maintenance and inspection procedures;
- Plan preventive maintenance and inspection work;

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

Planned maintenance activities are communicated to the person responsible for completing the task through the issuance of WMS work orders. Work orders are automatically generated on a daily, weekly, monthly, quarterly and annual schedule as determined based on manufacturer's recommendations and site specific operational and maintenance needs and are assigned directly to the appropriate operations personnel. This schedule is set up by the WMS Primary. Work orders are completed and electronically entered into WMS by the person responsible for completing the task. Records of these activities are maintained as per OP-05 Document and Records Control.

The O&M Team Lead maintains the inventory of equipment in WMS and ensures that appropriate maintenance plans are in place. Maintenance plans are developed according to the manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements. Equipment Operation and Maintenance (O&M) manuals are accessible to operations personnel at the locations specified in OP-05 Document and Records Control.

3.1.2 Unplanned Maintenance

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Operations Management. Unplanned maintenance activities are recorded on corrective work orders and are entered into WMS by the person responsible for completing the unplanned maintenance activity.

3.1.3 Rehabilitation and Renewal

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

3.1.4 Program Monitoring and Reporting

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

Additionally, Operations Management and operations personnel (PCT) conduct a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system. (Refer to OP-14 Review and Provision of Infrastructure).

3.2 OCWA's infrastructure maintenance, rehabilitation and renewal program is initially communicated to the Owner through the operating agreement. OCWA's program is communicated to the Owner on an on-going at a minimum of at least once every calendar year through submission of the 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 & Acknowledgement/Approval from the Owner
OP-05 Document and Records Control
OP-14 Review and Provision of Infrastructure

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued – Information within OP-15 was originally set out in the Main body of OCWA's Operational Plan (last revision # 16 dated July 25, 2017). |
| 04-21-2020 | 1 | Updated Section 3.1.1 Maintenance Forman to O&M Team Lead |
| 03-11-2021 | 2 | Annual review without changes |
| 03-30-2022 | 3 | Updated the header |

## 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, the facility's Municipal Drinking Water License (MDWL) as well as sampling/testing and monitoring requirements listed within the operating agreement with the owner.

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

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

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

3.4 Continuous monitoring equipment is used to sample and test for raw water turbidity, filter effluent turbidity, treated water turbidity, treated water free chlorine residual, treated water total chlorine residual, clarifier effluent turbidity. 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;
- Reservoir inlet and effluent chlorine levels;
- Plant effluent pressure;
- Cottam Booster discharge residual

3.5 Adverse water quality incidents are responded to and reported as per SOP OCWA-C7-07, SOP for Reporting Adverse Water Quality (Under SDWA O. Reg. 170/03).

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

| Operational Parameter | Location | Frequency |
|---|---|---|
| Raw Water Turbidity | Raw water tap | Every 2 hours |
| Chlorine Residuals | Raw water tap (seasonal) | twice daily |
| Raw pH | Raw water tap | twice daily |
| Raw Temperature | Raw water tap | twice daily |
| Treated pH | Treated water tap | twice daily |
| Treated Temperature | Treated water tap | twice daily |
| Treated Aluminum Residual | Treated water tap | twice daily |

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

3.7 There are no relevant upstream sampling, testing and monitoring activities that take place at the Union Water Supply System. Additional sampling, testing and monitoring activities related to the facility's most challenging conditions are summarized as follows:

- Sodium Hypochlorite is added when the raw water temperature is above 4 Celsius degrees when zebra mussels are a concern. Chlorine residual testing is done daily to ensure control of zebra mussel proliferation

3.8 Sampling, testing and monitoring results are readily accessible to the Owner at the Union Water Treatment Plant.

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.

## 4. Related Documents

Facility Logbook
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)
Municipal Summary Report (O. Reg. 170 Schedule 22)
Process Data Management System (PDM)
Emergency Contact List and Essential Supplies & Services List
Sampling Calendar
Operational Data Log
SOP for Reporting and Responding to Adverse Results
SOP for Microbiological sampling
SOP for chlorine residual testing (total and free) sampling

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-19-2018 | 0 | Procedure issued – Information within OP-16 was originally set out in the Main body of OCWA's Operational Plan (Appendix H) (last revision # 8 dated April 27, 2017). |
| 04-21-2020 | 1 | Removed the testing requirements for Ammonia system |
| 01-28-2021 | 2 | Reviewed and Updated |
| 03-04-2022 | 3 | Removed Clarifier 1-4 In-house turbidity testing and updated the header |
| 12-08-2022 | 4 | Removed in-house raw & treated pH testing |

# MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE

| Reviewed by: PCT | Approved by: Senior Operations Manager |
|---|---|

## 1. Purpose

To describe the procedure for the calibration and/or verification and maintenance of measurement and recording equipment.

## 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 Utility Plant Instrumentation Technician/Instrumentation Technician Specialist/O & M Team Lead establishes and maintains a list of measurement and recording devices and associated calibration and/or verification schedules using the automated Work Management System (WMS). When a new device is installed, it is added to the WMS system by the Super User. The new device is tagged with a unique identification number and the maintenance schedule is set up. Work orders are then automatically generated as per the schedule (refer to OP-15 Infrastructure Maintenance, Rehabilitation and Renewal).

3.3 Details regarding the results of the calibration and/or verification are recorded within each individual work order generated by the WMS and the monthly Operational Data Log.

3.4 Calibration and maintenance activities are carried out in accordance with procedures specified in the manufacturer's manual, instructions specified in WMS or specific Standard Operating Procedures.

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

3.6 Any measurement device which does not meet its specified performance requirements during calibration and/or verification must be removed from service (if practical) until repaired, replaced or successfully calibrated. The failure must be reported to 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 Operations Management or PCT ensures that any notifications

required by applicable legislation are completed and documented within the specified time period.

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

## 4. Related Documents

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

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-20-2018 | 0 | Procedure issued – Information within OP-17 was originally set out in the Main body of OCWA's Operational Plan (Appendix I) (last revision # 6 dated April 27, 2017). |
| 05-06-2020 | 1 | Annual Review |
| 03-11-2021 | 2 | Updated Maintenance Forman to O&M Team Lead, Instrument Technician to Instrument Technician Specialist and Added Utility Plant Instrument Technician in Section 3.2 |
| 03-29-2022 | 3 | Updated the header |

## 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

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

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

*Operations Management* – refers to the 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 Emergency Response Plan (ERP) 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 Regional Hub Manager.

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

involve intervention from outside organizations (client, emergency responders, Ministry of the Environment, Conservation and Parks, media, etc.). Examples may include:

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

3.3 Potential emergency situations or service interruptions identified for the Union Water Supply 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).

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

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

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

## 4. Related Documents

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

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|

| | | |
|---|---|---|
| 04-20-2018 | 0 | Procedure issued – Information within OP-18 was originally set out in the Main body of OCWA's Operational Plan (Appendix J) (last revision # 6 dated October 14, 2014). |
| 05-06-2020 | 1 | Annual Review |
| 03-11-2021 | 2 | Annual Review without changes |
| 03-29-2022 | 3 | Updated the header |

## 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 Union Water Supply 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:
- Drinking Water Quality Management Standard (DWQMS)
- Current Operational Plan
- QEMS-related documents and records

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

3.2 Audit Frequency

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

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

3.3 Internal Auditor Qualifications

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

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

3.3.3 Internal Auditors must remain objective and, where practical, be independent of the areas/activities being audited.

3.4 Audit Preparation

3.4.1 Together, the QEMS Representative and the Lead Auditor:
- Establish the audit objectives, scope and criteria;
- Confirm the audit logistics (locations, dates, expected time and duration of audit activities, any health and safety considerations, availability of key

personnel, audit team assignments, etc.).

3.4.2 Each Internal Auditor is responsible for:

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

3.5 Conducting the Audit

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

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

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

3.6 Reporting the Results

3.6.1 The Lead Auditor reviews the audit findings and conclusions with the QEMS Representative and Top Management. Other audit participants may also take part in this review as appropriate. This review may take place in person (e.g., during a closing meeting) or through other means (phone call, email, etc.). Any diverging opinions regarding the audit findings and conclusions should be discussed and, if possible, resolved. If not resolved, this should be noted by the Lead Auditor.

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

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

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

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

3.7 Corrective Actions and Opportunities for Improvement (OFIs)

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

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

3.8 Record-Keeping

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

## 4. Related Documents

Internal Audit Protocol
OP-05 Document and Records Control
OP-20 Management Review
OP-21 Continual Improvement
Audit Reports
Action Plans

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-20-2018 | 0 | Procedure issued – Information within OP-19 was originally set out in the Main body of OCWA's Operational Plan (Appendix K) (last revision # 3 dated November 30, 2016). |
| 05-06-2020 | 1 | Annual Review |
| 03-11-2021 | 2 | Annual Review without changes |
| 03-29-2022 | 3 | Updated the header |

# MANAGEMENT REVIEW

| Reviewed by: PCT | Approved by: Senior Operations Manager |
|---|---|

## 1. Purpose

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

## 2. Definitions

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

*Operations Management* – refers to the 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 Union Water Supply System as:

- Operations Management
- Regional Hub Manager
- Safety, Process & Compliance (SPC) Manager

## 3. Procedure

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

Management Reviews for more than one drinking water system may be conducted at the same meeting provided the systems belong to the same owner and the considerations listed in section 3.4 below are taken into account for each individual system and documented in the Management Review meeting minutes.

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

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

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

a) Incidents of regulatory non-compliance;
b) Incidents of adverse drinking water tests;
c) Deviations from critical control limits and response actions;
d) The effectiveness of the risk assessment process;

e) Internal and third-party audit results (including any preventive actions implemented to address Opportunities for Improvement (OFI) or rationale as to why OFIs were not implemented);
f) Results of emergency response testing (including any OFIs identified);
g) Operational performance;
h) Raw water supply and drinking water quality trends;
i) Follow-up on action items from previous Management Reviews;
j) The status of management action items identified between reviews;
k) Changes that could affect the QEMS;
l) Consumer feedback;
m) The resources needed to maintain the QEMS;
n) The results of the infrastructure review;
o) Operational Plan currency, content and updates;
p) Staff suggestions; and
q) Consideration of applicable Best Management Practices (BMPs).

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

3.6 The 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 Joint Board of Management Manager of the Union water Supply System.

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

## 4. Related Documents

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

## 5. Revision History

## MANAGEMENT REVIEW

| Reviewed by: PCT | Approved by: Senior Operations Manager |
|---|---|

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-20-2018 | 0 | Procedure issued – Information within OP-20 was originally set out in the Main body of OCWA's Operational Plan (Appendix L) (last revision # 3 dated November 30, 2016). |
| 05-06-2020 | 1 | Annual Review |
| 03-11-2021 | 2 | Annual Review without changes |
| 03-03-2022 | 3 | Removed SPC Manager from TOP Management and replaced SPC Manager with Senior Operations Manager in the Header as a result of Regional PCT meeting |
| 03-15-2023 | 4 | Added SPC Manager to TOP Management |

## 1. Purpose

To describe the procedure for tracking and measuring continual improvement of the Quality & Environmental Management System (QEMS) for the *Union Water Supply 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) investigates the need for a corrective action to eliminate the root cause(s) so as to prevent the non-conformance from recurring. The investigation may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate.

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

3.2.4 The QEMS Representative ensures corrective actions are documented using an excel spreadsheet. The QEMS Representative monitors the progress of corrective action(s) and provides status updates to Top Management.

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

3.3 Preventive Actions

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

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

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

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

3.3.4 The implementation of preventive actions are tracked by the QEMS Representative using the OPEX database.

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 will review and consider applicable internal and/or external BMPs identified by internal and/or external sources as part of the Management Review (OP-20) and in the corrective and preventive action processes described above.

3.5.2 BMPs may include, but are not limited to:

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

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

## 4. Related Documents

OP-05 Document and Records Control
OP-20 Management Review
Internal Audit Records 3.3
Excel Spreadsheet (Corrective Actions)

## 5. Revision History

| Date | Revision # | Reason for Revision |
|---|---|---|
| 04-20-2018 | 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 # 16 dated July 25, 2017) and in QP-10 Internal Audit procedure (last revision # 3 dated November 30, 2016). |
| 05-06-2020 | 1 | Updated Ministry name to MECP |
| 03-11-2021 | 2 | Annual review without changes |
| 03-29-2022 | 3 | Updated SPC Manager with Senior Operations Manager |