ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

OPERATIONAL PLAN

For the Petrolia Drinking Water 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.

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

QEMS

TABLE OF CONTENTS

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To document OCWA's Quality & Environmental Management System (QEMS). This Operational Plan defines and documents the QEMS for the Petrolia Drinking Water 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 Petrolia Drinking Water System is owned by the Corporation of the Town of Petrolia OCWA is the contracted Operating Authority for the Petrolia Drinking Water System.

3.2 OCWA's Quality & Environmental Management System (QEMS) is structured and documented with the purpose of:
1. Establishing policy and objectives with respect to the effective management and operation of water/wastewater facilities;
2. Understanding and controlling the risks associated with the facility's activities and processes;
3. Achieving continual improvement of the QEMS and the facility's performance.

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

4. Related Documents

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
2018-11-12	0	Procedure issued – Information within OP-01 was originally set out in the Main body of OCWA's Operational Plan (last revision #9 dated 2017-11-03). 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 now aligns with the 21 elements of the DWQMS.
2018-11-30	1	Revised MOECC to MECP

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) POLICY

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

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

2. Definitions

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

3. Procedure

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

OCWA's Policy is to:

- Deliver safe, 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
2018-11-12	0	Information within OP-02 (s. 3) was originally set out in main body of OCWA's Operational Plan template (last revision # 9 dated 2017-11-03). 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..

COMMITMENT AND ENDORSEMENT

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To document the endorsement of the Operational Plan for the Petrolia Drinking Water System by OCWA Top Management and the Corporation of the Town of Petrolia (Owner) and to set out when re-endorsement would be required.

2. Definitions

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

3. Procedure

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

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 significant 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

Date	Revision #	Reason for Revision
2018-11-12	0	Procedure issued – Information within OP-03 was originally set out in the main body of OCWA's Operational Plan (revision 9 dated 2017-11-03). 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 Operational Plan was incorporated into Appendix OP-03A which also includes the Owner and Top Management sign-off section
2019-11-22	1	Clarified that significant changes to the description would warrant re-endorsement as per IA 2019-10-15

QEMS Ontario Clean Water Agency	**OPERATIONAL PLAN** Petrolia Drinking Water System	QEMS Doc: OP-03A Rev Date: 2020-11-04 Rev No: 1 Pages: 1 of 1

SIGNED COMMITMENT AND ENDORSEMENT

This Operational Plan sets out the framework for OCWA' Quality & Environmental Management System (QEMS) that is specific and relevant to your drinking water system(s) and supports the overall goal of OCWA and the Corporation of the Town of Petrolia (Owner) to provide safe, cost-effective drinking water through sustained cooperation. OCWA will be responsible for developing, implementing, maintaining and continually improving its QEMS with respect to the operation and maintenance of the Petrolia Drinking Water System and will do so in a manner that ensures compliance with applicable legislative and regulatory requirements.

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

OCWA Top Management Endorsement

Sam Smith — Nov. 17/20 (Date)
Sam Smith
Senior Operations Manager

Cindy Sigurdson — Nov 16/20 (Date)
Cindy Sigurdson
Safety, Process and Compliance Manager

Owner Endorsement

Brad Loosley — Nov. 17/20 (Date)
Brad Loosley
Mayor

Rick Charlebois — 24 Nov 20 (Date)
Rick Charlebois
CAO – Town of Petrolia

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

Revision History

Date	Revision #	Reason for Revision
2018-11-12	0	Procedure issued – Information within OP-03A was originally set out in the main body of OCWA's Operational Plan (last revision # 9, dated 2017-11-03). Revised as per corporate template and re-endorsed.
2020-11-04	1	Re-endorsed due to upgrades to facility.

QUALITY & ENVIRONMENTAL MANAGEMENT SYSTEM (QEMS) REPRESENTATIVE

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

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

2. Definitions

None

3. Procedure

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

3.2 The QEMS Representative is responsible for:

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

4. Related Documents

None

5. Revision History

Date	Revision #	Reason for Revision
2018-11-12	0	*Procedure issued – Information within OP-04 (s. 3) was originally set out in the main body of OCWA's Operational Plan (revision 9 dated 2017-11-03). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Change to responsibilities: Operations Manager no longer considered QEMS Representative and SPC Manager to act as alternate as required (s. 3.1); added wording to clarify shared responsibilities for Top Management and QEMS Representative to ensure operations personnel are aware of applicable legislative and regulatory requirements (s. 3.2).*

DOCUMENT AND RECORDS CONTROL

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To describe how OCWA's QEMS documents are kept current and how QEMS documents and records are kept legible, readily identifiable, retrievable, stored, protected, retained and disposed of. Applies to QEMS Documents and QEMS records pertaining to the Petrolia Drinking Water System, as identified in this procedure.

2. Definitions

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

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

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

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

Controlled – managed as per the conditions of this procedure

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

3. Procedure

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

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

3.3 Controls for the Operational Plan include the use of authorized approval, alpha-numeric procedure code, issue date, page numbers on every page, revision number and revision history.

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

Review	QEMS Representative
Approval	Operations Management

3.4 The QEMS Representative is responsible for ensuring that current versions of QEMS documents are being used at all times. Current QEMS documents and records are

readily accessible to operations personnel and to internal and external auditors/inspectors at established document control locations. The currency of internal documents is ensured by comparing the date on the document to that of the master hardcopy and/or electronic copy residing in the designated document control location(s) specified in Appendix OP-05A.

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

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

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

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

3.6 Any employee of the drinking water system may request, 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 of the document is promptly removed from its location and forwarded to the QEMS Representative for disposal or retention (as appropriate).

3.8 The authorized method for disposal of hardcopy documents and records after the specified retention requirements have been met is shredding. Electronic copies may be deleted by the QEMS Representative when retention times have been met.

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
DWQMS Operational Plan	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 all the documents/records listed in Table 1)	3 years*if no specified legislative requirement below*	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 Schedule 22 Summary Reports	6 years	O. Reg. 170/03
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)	O. Reg. 170/03
Flow Meter Calibration Records, Analyzer Calibration Reports Maintenance Records/Work Orders	2 years	O. Reg. 170/03

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

4. Related Documents

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

5. Revision History

Date	Revision #	Reason for Revision
2011-03-01	0	Procedure issued
2012-06-01	1	Changes per Corporate template update, hub re-structure and Management Review
2013-02-01	2	Revised per hub restructure
2013-03-15	3	Revision noting hard copy of lab results now kept at hub office
2014-01-31	4	Table 1: Added Internal & External Audit Findings Tracking Spreadsheet, Summary of Capital Works Recommendations, Operational Plan & Procedures Revision Tracking Worksheet; added Senior Operations Manager to 3.0
2014-03-20	5	Added reference to Senior Operations Manager in 5.3 & 5.4; Table 1: replaced Call Out report form with Call In/ Overtime / Work order Form
2015-12-03	6	Revise QP-01 as per OFI IA 2015-03-15; removed documents from table that were no longer used, updated locations of documents, updated table 2, removed Senior Operations Manager
2016-05-17	7	Revise 3.0 Responsibility, re-add Senior Ops Manager, add Regional Hub Manager to 5.3 add 5.9 Electronic copies, remove Operational Plan updates from 5.11, add corporate retention times to 5.10, include Operations/Equipment Manuals to Table 1 and Community Complaint form as per OFIs IA 2016-03-05
2016-09-29	8	Revise name of system as per change to OA, change Bright's Grove WTP to Water Treatment Plant
2017-11-03	9	Changed OCTL to SPC Manager, revised table's as per Management Review

2018-11-12	10	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
2018-11-30	11	Minor edits to 3.5
2019-11-22	12	Added how electronic copies are disposed of as per IA 2019-10-15
2020-11-04	13	Reworded 3.8 to read may be deleted not are deleted.

DOCUMENT AND RECORDS CONTROL LOCATIONS

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

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
Internal QEMS Documents	
CCP Limit Reached Tracking Form	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\Hub Files\Forms/CCP
Chain of Custody Forms	E-\\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\Hub Files\Chain of Custody
Chamber Inspection Forms	E-\\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\Hub Files\Forms
Community Complaint Form	E- \\OCWFILEREG\Public\Southwest\Regional/Forms/Operations
Summary Table of Action Items Spreadsheet	E- \\OCWFILEREG\Public\Southwest\Regional/Forms/Operations
Emergency/Essential Service and Supply Contact List	HC-FEP Binder E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\Hub Files\Contact List
Emergency Response Plan (corporate)	E - OCWA's intranet
Facility Emergency Plans	HC- Petrolia Office E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\8 Facility Emergency Plan
Internal Audit Protocol and Report	E \\torwan\PCT\DWQMS, MDWL and DWWP\DWQMS\Internal Audit Guidance Materials and Templates
On-call Schedule	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\Hub Files/Schedules On Call Rotations
Operational Plan	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\6 Operational Plan
Operations Manual (OCWA)	HC- Petrolia Office E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\7 Operations Manual
QEMS Policy	E - OCWA's intranet and public website; OP-02 HC – Petrolia WTP
Round Sheets	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\Hub Files\Rounds Sheets
External QEMS Documents	
ANSI/NSF product registration documentation for Chemicals/Materials Used	E \\OCWFILEREG\Public\Southwest \Regional\Contractor Safety Program and Qualifications\Qualifications Certifications
Applicable federal and provincial legislation and municipal by-laws	Online at www.e-laws.gov.on.ca
AWWA Standards	E - \\Torwan\PCT\AWWA Standards
Drinking Water Works Permit	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\1 ECA-MDWL-DWWP-PTTW
DWQMS	E - https://www.ontario.ca

DOCUMENT AND RECORDS CONTROL LOCATIONS

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
Engineering schematics/plans/drawings	HC-Petrolia WTP E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\9 Drawings
Maintenance/equipment manuals	HC-Petrolia WTP E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1160\7 Operations Manual
Municipal Drinking Water Licence	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\1 ECA-MDWL-DWWP-PTTW
Operator certificates	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\Hub Files\Operator Certificates
QEMS Records	
Annual Reports	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\Annual Reports
AWQI Reports	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\AWQI-Non Compliance
Call Back Reports	E-WMS Database
CCP Limit Reached Tracking Form	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\5 Yellow Folder
Chain of Custodies	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\5 Yellow Folder
Chamber Inspection Records	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\Infrastructure Review-Capital\Infrastructure Reports\Chamber Inspections
Community complaint records	E – OPEX database
Summary Table of Action Items Spreadsheet	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\Management Review
External audit reports	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\External Audits
External Calibration records	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\Calibrations
Facility Operations Logbook(s)	HC – Petrolia WTP
Infrastructure review (capital/maintenance works recommendations)	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\Infrastructure Review-Capital
Internal and External QEMS Communications	E- email
Internal Calibration records	E - maintained through WMS
Internal QEMS audit reports	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\Internal Audits
Operator training records	E - maintained in OCWA's Training Summary dB
Maintenance records	E - maintained in WMS
Management Review documentation	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West

DOCUMENT AND RECORDS CONTROL LOCATIONS

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, E = Electronic)
	Elgin Cluster\1191\4 Reports-Audits\Management Review
MECP Inspection Reports	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\4 Reports-Audits\MECP Inspections
Operations Reports	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\3 Correspondence\Client
Rounds sheets, in house lab results	HC – Petrolia WTP E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\5 Yellow Folder Process data maintained electronically through PDM
Sampling and Testing Records; Certificate of Analysis (Lab)	E - maintained through PDM E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\5 Yellow Folder
SCADA Reports	E- \\OCWFILEREG\Public\Southwest\Petrolia_Alvinston_SWM_West Elgin Cluster\1191\5 Yellow Folder
Training Records	HC- Admin Office E-e-reports and OCWA's Training Summary dB
Vacation Requests	HC-Administrative Office
Vacation Schedule	HC- Administrative Office E-Outlook

Revision History

Date	Revision #	Reason for Revision
2018-11-12	0	Appendix issued; Table was originally included within the Document and Records Control Procedure (QP-01) (last revision # 9 dated 2017-11-03).
2018-11-30	1	Removed duplicate items, Removed DWQMS Corrective action form for Summary Table of Action Items spreadsheet as per IA 2018-11-28
2019-11-22	2	Revised as per IA 2019-10-15
2020-11-04	3	Revised the location of the summary table of action items spreadsheet
2021-11-26	4	Updated document locations

1. Purpose

To document the following for the Petrolia Drinking Water System:

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

2. Definitions

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

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

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

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

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

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

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

3. Procedure

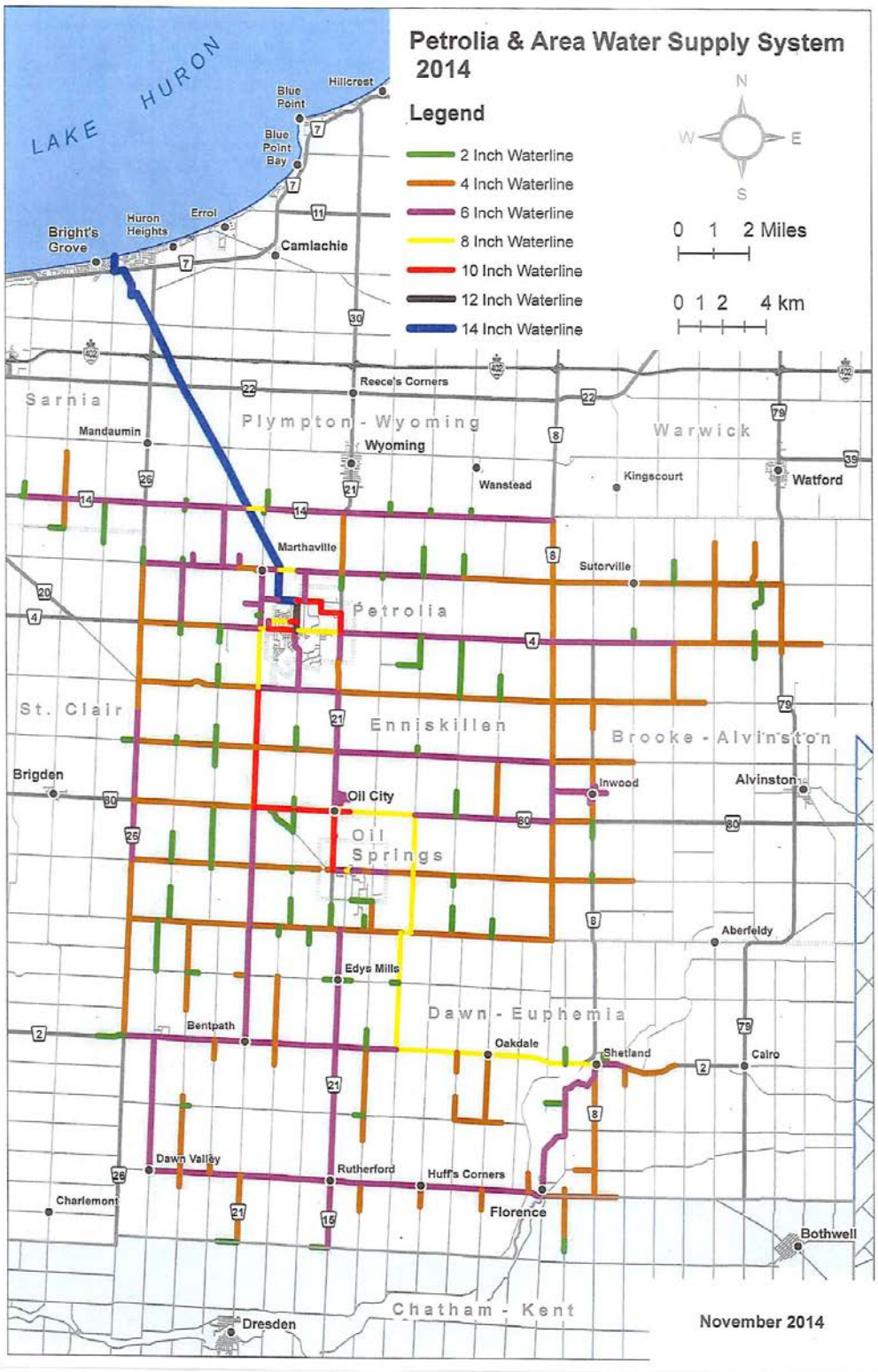
3.1 Drinking Water System Overview

The Petrolia Drinking Water System is owned by the Corporation of the Town of Petrolia and is operated by the Ontario Clean Water Agency (OCWA)- Southwest Region, Petrolia Cluster. The Petrolia Drinking Water System is located at 2701 Old Lakeshore Road, Brights Grove, Ontario and includes the water treatment plant, primary transmission line, Mandaumin

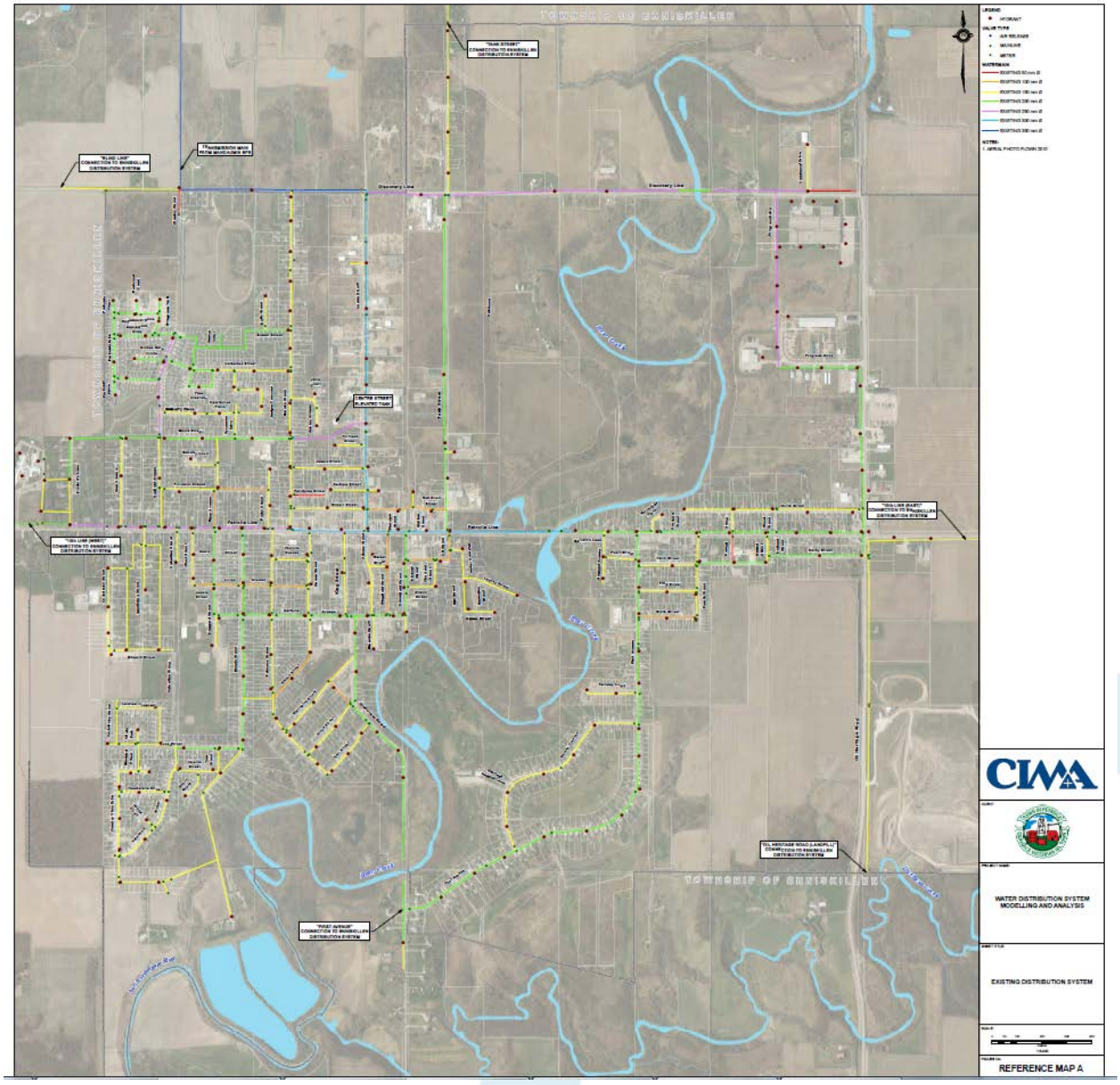
Reservoir, Petrolia elevated storage tank and distribution system network which are all operated by the Ontario Clean Water Agency.

The Petrolia Drinking Water System is connected to the following systems:

Distribution System	Owner	Operating Authority	Relationship
Village of Oil Springs	Village of Oil Springs	Village of Oil Springs	Supplies to
Township of Dawn-Euphemia	Township of Dawn-Euphemia	Township of Dawn-Euphemia	Supplies to
Township of Enniskillen	Township of Enniskillen	Township of Enniskillen	Supplies to
Lambton Area Water Supply System	Lambton Area Water Supply System Joint Board of Management	OCWA-LAWSS	Emergency-Receive/Supply


Petrolia & Area Water Supply System
2014
Legend
2 Inch Waterline
4 Inch Waterline
6 Inch Waterline
8 Inch Waterline
10 Inch Waterline
12 Inch Waterline
14 Inch Waterline
N
W
E
S
0 1 2 Miles
0 1 2 4 km
LAKE HURON
Hillcrest
Blue Point
Blue Point Bay
Bright's Grove
Huron Heights
Errol
Camlachie
Sarnia
Reece's Corners
Plympton - Wyoming
Mandaumin
Wyoming
Wanstead
Kingscourt
Warwick
Watford
Marthaville
Sutorville
Petrolia
St. Clair
Enniskillen
Brooke - Alvinston
Brigden
Oil City
Inwood
Alvinston
Oil Springs
Aberfeldy
Edys Mills
Dawn - Euphemia
Bentpath
Oakdale
Shetland
Cairo
Dawn Valley
Rutherford
Huff's Corners
Charlemont
Florence
Bothwell
Chatham - Kent
Dresden
November 2014

Overview of The Petrolia Distribution System:



The treatment plant is a Class 2 membrane filtration surface water treatment facility with a total design capacity of 12,000 m^3 per day. The water treatment plant consists of an intake system, a low lift pumping system, a treatment system and a distribution pumping system. The

distribution system is a Class 2 distribution system and consists of a reservoir, elevated storage tank, a network of watermains, hydrants and chambers.

Intake

Water is drawn into the plant via a 400mm diameter cast iron screened intake extending out approximately 430 m into Lake Huron. Zebra mussels are controlled by the use of a nickel-copper alloy intake screen (Johnson Screen).

Low Lift Pumping Station

Raw water is pumped from the low lift wet well by 3 vertical turbine pumps. Sodium hyprochlorite is injected at the intake screens for zebra mussel control when required and only when the low lift pumps are in operation.

Treatment Plant

Filtration

The raw water is pre-filtered by two automatic feed strainers on the low lift discharge header to remove fine debris and protect the filter membranes. After the water has been strained it enters the membrane filtration system which removes fine particles, sediment, algae, protozoa and bacteria.

Disinfection

Primary and Secondary disinfection is achieved by the addition of chlorine gas solution at the membrane filtrate header with contact in the contact tanks. Pre- chlorination and post chlorination points are located upstream of the chlorine contact tanks on the inlet header and downstream of the high lift discharge header flowmeter.
Hydrofluosilicic acid solution is injected into the membrane filtrate header, after chlorination and prior to contact in the contact tanks.

Contact Tanks and Clearwells

Two concrete contact tanks cells, each cell is 13 m long and 4.1 m wide with a baffle wall. Each cell water volume of 253.9 m^3. Two clearwell cells, each cell is 19 m long and 4.1 m wide with an interconnecting sluice gate and two high lift pumps in each cell.

Process Drain Water

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

Monitoring and Control

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

Standby Power

A diesel generator is available to permit the treatment plant to remain in operation should a power failure occur.

Distribution

Four high lift pumps at the water treatment plant provide water to customers along the transmission main from the plant to the Mandaumin Reservoir. Secondary disinfection requirements are met prior to the water leaving the plant. Water is pumped from the Mandaumin Reservoir to an Elevated Storage Tank in Petrolia where it is distributed to approximately 5,200 customers. The following are significant features on the distribution system:

Mandaumin Reservoir:

There is two 3,500 m^3 (each) bolted steel water tanks on Confederation Line in the village of Mandaumin. The Mandaumin Reservoir is monitored and controlled from the water treatment plant via SCADA. The Mandaumin Reservoir is equipped with two pumps (one duty and one standby) rated at 90 l/s and 80 l/s, flow meter installed on common outlet pipe, pressure transmitter, chlorine analyzer and turbidimeter. There is also an emergency cross-connection to the Lambton Area Water Supply System which can be manually operated in the event on an emergency. A flow meter is installed on the cross connection.

Petrolia Elevated Tank:

An elevated storage tank with an approximate volume of 2,290 m^3 is located on Centre Street in the Town of Petrolia. The Petrolia Elevated Tank is monitored and controlled from the water treatment plant via SCADA.

Hydrant Locations

Hydrant Number	Location	Hydrant Number	Location
1	Petrolia Line Lakeside Grain	140	Florence Ave @ Egan Ave
2	Petrolia Line Church	141	Florence Ave #4039
3	Oil Heritage Road & Petrolia Line NE (Munchies)	142	Sanway Crt #4048
4	Shell 21	143	Petrolia Line #4046
5	Oil Heritage Rd O.P.P	144	Petrolia Line @ Garfield Ave
6	Oil Heritage Rd A.P.C	145	Petrolia Line # 4018
7	Oil Heritage Rd Pro Auto	146	Petrolia Line @ Gem Ave
8	Oil Heritage Rd Lumberjack	147	Meadowview East side on lawn
9	Progress Dr Lumberjack	148	Meadowview East side of building

10	Progress Dr Hull Bus Lines	149	Meadowview @ blue bins
11	Progress Dr Black Creekwell	150	Meadowview NW corner
12	Progress Dr Waste Management (inside)	151	Meadowview West side South corner
13	Progress Dr Waste Management (outside)	152	Meadowview front of gazebo
14	Progress Dr North end West side	153	Meadowview South end Apartments
15	Progress Dr Penta (inside fence)	154	Gem Ave #377
16	Waterville East side main entrance	155	Gem Ave #364
17	Waterville Parking Lot South side	156	Garfield Ave #373
18	Waterville South end East side	157	Garfield Ave @ Maple Street
19	Waterville South side (inside)	158	Maple St #4049
20	Waterville South side Centre (inside)	159	Maple St across road from #4074 (school)
21	Waterville South side West end (inside)	160	Hawthorne Pl #4047
22	Waterville North side East end	161	Juniper Cr #335
23	Waterville North side Centre (inside)	162	Juniper Cr #4104
24	Waterville side West end (inside)	163	Juniper Cr #326
25	Vanderwal Dr @ Discovery	164	Catherine St #4101
26	Vanderwal Dr North @ building	165	Catherine St @ Pine Cr (East End)
27	Access Rd West of Waterville	166	Pine Cr #4072
28	Access Rd South on Waterville	167	Catherine St @ Pine Cr (West End)
29	Access Rd South in field	168	Mulberry Pl #4047
30	Discovery Line #4439	169	Garfield across from #330
31	Discovery Line O.W.S #4320	170	Garfield Ave @ Catherine St
32	Discovery Line #4290	171	Golden Gate Cr #4014
33	Petrolia Line #4480	172	Garfield Ave @ Applewood Dr
34	Petrolia Line #4460	173	Applewood Dr #4020
35	Petrolia Line #4436	174	Evergreen Trail #295
36	Petrolia Line #4416	175	Evergreen Trail #280
37	Petrolia Line @ Fourth St	176	Redwood Crt @ Rosemount Dr
38	Petrolia Line #4352	177	Redwood #280
39	Petrolia Line @ First Ave #4342	178	Parkside Crt #269
40	Petrolia Line @ England Ave #4328	179	Park Dr @ Applewood Dr
41	Petrolia Line #4310	180	Parkside Pl #303
42	Northridge Pl #384	181	Parkside Pl #323
43	North St @ Hartford St	182	Parkside Dr #330
44	North St @ Kentail St #4416	183	Starts @ Wally Lang's
45	North St #4438		Warren Ave @ Henry St
46	North St #4471	184	Warren Ave @ Lancey St
47	North St @ Car Wash	185	Lancey St #4253 (East)
48	Oil Heritage Rd @ Derby St #4191	186	Emma St #4233
49	Derby St #4476	187	Emma St #4246
50	Third St @ Mutual St	188	Walnut St @ Chestnut St
51	Third St @ Kentail St	189	Chestnut St @ School St
52	Third St @ Fourth St	190	Greenfield St @ Walnut St
53	Third St #4365	191	Greenfield St @ School St
54	Third St @ Fifth St	192	Greenfield St @ Dufferin Ave
55	Fifth St #4361	193	Greenfield St #452
56	Fourth St @ Fifth St	194	Dufferin Ave #4196
57	Sixth St @ #4365	195	Wingfield St @ Walnut St (alley)
58	England Ave @ Pearl St	196	Albany St #412
59	England Ave #417	197	Albany St #423
60	First Ave @ Third St	198	Albany St Community Living (in parking lot)
61	First Ave @ Fifth St	199	Dufferin Ave @ Albany St

62	First Ave @ Sixth St	200	Blanche St #455
63	Fiddick's North Service Rd #437	201	Dufferin Ave @ King St
64	Fiddick's Main Entrance #437	202	King St across from #422
65	Fiddick's South Service Rd #437	203	Victoria Ave Manse
66	First Ave #450	204	Dufferin Ave @ Queen St
67	First Ave #466	205	Queen St @ Lorne Ave (school)
68	Fairway Court (first hydrant)	206	Queen St @ Victoria Ave
69	Fairway Court #4317	207	Victoria Ave #4121
70	First Ave @ Garden Cr #476A	208	Princess St @ Victoria Ave
71	First Ave #482	209	Princess St @ Lorne Ave
72	First Ave #488	210	Dufferin Ave @ Princess St
73	First Ave #494	211	Maude St @ Dufferin Ave
74	First Ave #508	212	Maude St @ Lorne Ave
75	First Ave #524	213	Maude St @ Annie St #410
76	First Ave #534	214	Huggard St @ Annie St
77	First Ave #546	215	Huggard St @ Jennie St
78	First Ave South End	216	Huggard St @ Dufferin Ave
79	Garden Cr #4295	217	Huggard St South end @ arena
80	Garden Cr #4305	218	West St @ Jennie St #424
81	Garden Cr #4317	219	Annie St @ West St
82	Garden Cr #4329	220	Valentina St off Petrolia Line #415
83	Garden Cr #4339	221	Ignatiefna St #424
84	Petrolia Line @ Tank St	222	Oozloffsky St N #415
85	Petrolia Line #4214	223	Oozloffsky St N #421 (church)
86	Petrolia Line @ Fletcher St	224	Oozloffsky St across road from #422
87	Petrolia Line @ Centre St	225	Oozloffsky St @ Edward St
88	Robert St @ Fletcher St	226	Edward St across from #4008
89	Station St #375	227	Edward St #460
90	Rail Road St #4217	228	Joe St @ Cardinal Cr
91	Tank St Union Gas	229	Cardinal Cr #4030
92	Community Centre (driveway)	230	Oozloffsky St S #499
93	Tank St (across from Community Centre)	231	Joe St #4001 (dead end)
94	Tanks St # 309	232	Oriole Pk #506
95	Tank St South Surface	233	Bluebird St #509
96	Tank St #2	234	Bluebird St #497
97	Tank St #3	235	Countryview Dr across from #535
98	Tank St #4 (90)	236	Henderson Dr #4024
99	Discovery Line Soft Surface North Entrance	237	Countryview Dr #552
100	Discovery Line #4070	238	Countryview Dr @ Valentina St
101	Discovery Line @ Stanley Ave	239	Countryview Dr @Englehart Dr
102	Centre St @ North	240	Englehart Dr East end
103	Centre St @ North end of Penta	241	Valentina St #568
104	Centre St #275 @ building	242	Huntre Crt
105	Centre St @ Penta	243	Valentina St #546
106	Centre St #290	244	Charlie St #4042
107	Centre St #320	245	Short St #561
108	Centre St @ Dust Stop	246	Tom St @ Charlie St
109	Centre St @ Weiland Meats	247	Joe St #4047
110	Portland Ave #4153	248	Joe St @ Tom St
111	Centre St #366	249	End of Maude St (sewage plant)
112	Andrew St @ Firehall	250	Maude St S of Joe St across from #534
113	Firehall (inside)	251	Maude St #520
114	Andrew St #4151	252	Maude St #508

115	Centre St @ Robert St	253	Maude St #480
116	Robert St #4144	254	Maude St #458
117	Petrolia Line #4148	255	Princess St #461
118	Petrolia Line CIBC Bank	256	Princess St @ Nelson St
119	Petrolia Line @Eureka St	257	Queen St @ Nelson St
120	Eureka St #379	258	Nelson St #472
121	Eureka St #365	259	Princess St across from #507
122	James St #4153	260	Princess St #524
123	Eureka St @ Maple St	261	Wellington St #524
124	Eureka St #335	262	Wellington St #514
125	Gables St @ Jac's Crt #318	263	Grove St #512
126	Gables St #349	264	Grove St #524
127	Eureka @ Catherine St	265	Princess St #546
128	Eureka St #309A	266	Kerr St #518
129	Eureka St @ Ernest St	267	Kerr St #518
130	Kells St #235	268	Kerr St across from #507
131	Eureka St #267	269	Glenview Rd #4051
132	Eureka St #235	270	Glenview Rd #4075
133	Eureka St #223	271	Glenview Rd #4089
134	Eureka St #211	272	Glenview Rd #4105
135	Eureka St @ Discovery Line #203	273	Glenview Rd across from Legion (park)
136	Kerby St #370	274	Glenview Rd #4150
137	Petrolia Line @ Kerby St	275	Wellington St #1500
138	Petrolia Line #4078	276	Maple St East of school
139	Petrolia Line @ Egan Ave	277	Centre St (Dust stop) between buildings

Sample Locations

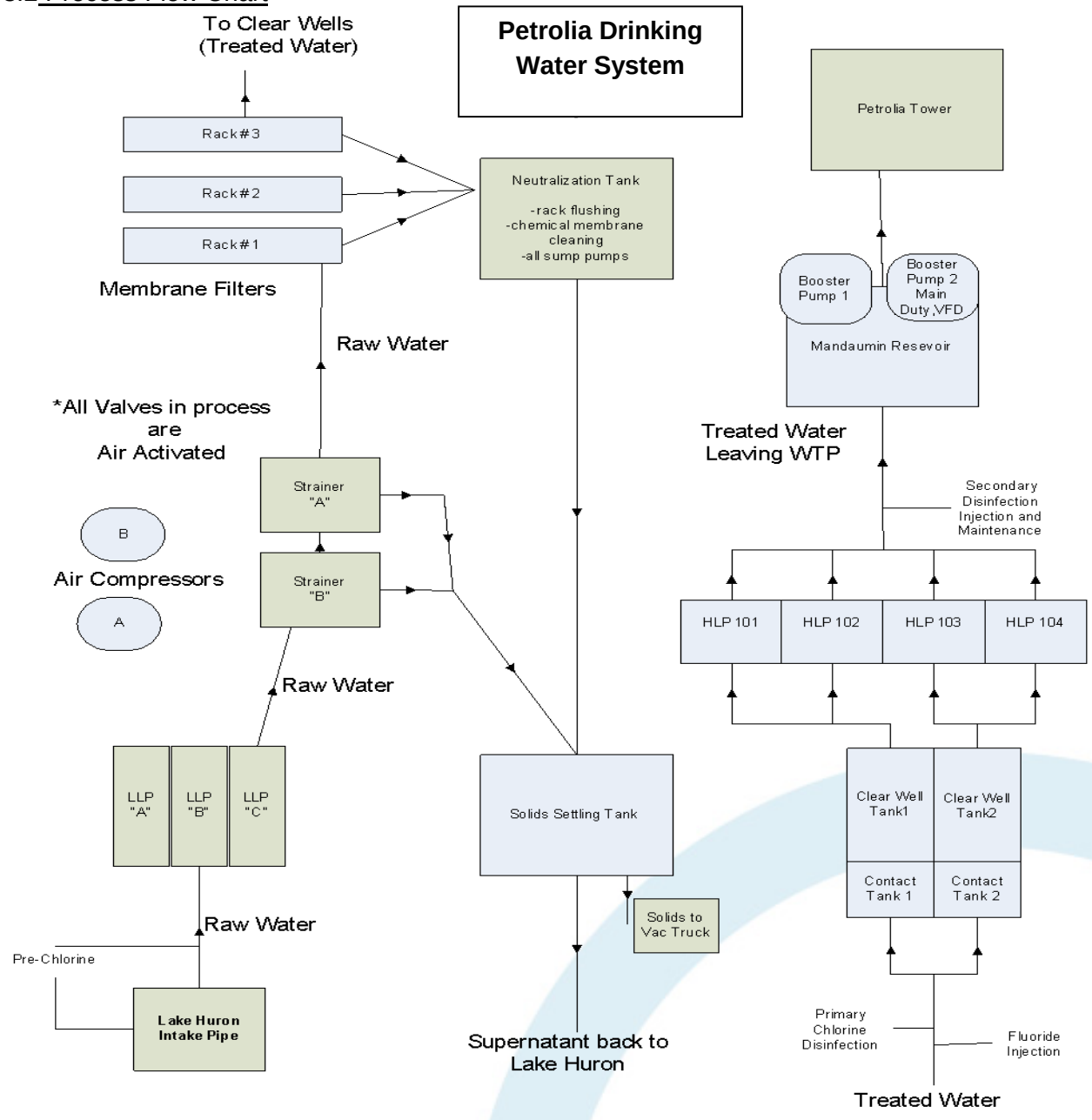
1. Mandumin Booster Station- 3517 Confederation Line
2. Petrolia Tower – 345 Centre Street
3. Town of Petrolia Office- 411 Greenfield Street
4. The Beer Store- 4355 Petrolia Line
5. Heritage Variety – 4495 Petrolia Line

Chamber and Meter Locations

Number	Location	Serial Number	Size
1	Oil Heritage Road (Landfill)	1436742	4" W1000
2	Petrolia Line (East)	1313363	4" W1000
3	Lasalle Line (Kewley)	1180687	4" W1000
4	Discovery Line	415993	4" W1000
5	High School	16268647	4"CPD (D/R)
6	Dusfferin Ave (Hospital)	22028941	4" CPD (TRT)

7	Meadoview (Inside E &H)	E8061916	4” MAG
8	Waterville (north east door)	70058313	4”T/F
9	Waterville (south east door)	70060859	4” T/F
10	90 Tank Street	1695229	4” SRH
11	Churchill Line	1519951	4” W1000
12	Meadoview pit (OMNI)	1893069	6” SRH
13	First Ave (Fiddicks)	22713664	2”T-8
14	First Ave (pit)	1626384	6”SRH
15	360 Tank Street (Community Centre)	65646107	6”SRH

3.2 Process Flow Chart



3.3 Source Water

General Characteristics

The raw water source for the water treatment plant is Lake Huron. The water from Lake Huron is typically low in turbidity, slightly basic and low in conductivity. Temperature fluctuates significantly through the seasons ranging from approximately 4 ºC in the winter to as high as 24 ºC during the summer. Bacteriological analysis of the raw water indicates a source of relatively good quality. The results of chemical analyses are consistently below the Ontario Drinking Water Quality Standards.

Raw Water Characteristics at Intake (based on 2019 data)

Characteristic	Minimum	Maximum	Annual Average
Temperature (ºC)	5.2	16.4	9.9
Turbidity (NTU)	8.5	201.05	16.4
pH	7.34	8.03	7.78
E. coli (CFU/100 mL)	0	10	1.9
Total Coliforms(CFU/100 mL)	0	540	15.5

Common Fluctuations

Raw water quality changes seasonally and during significant storm events. Raw water turbidity increases during spring runoff and significant rainfall events. The pre-membrane filter strainers will reduce turbidity and algae entering the membrane filtration system. Water temperature changes significantly from winter to summer. Filter trans-membrane pressure (TMP) increases with a decrease in water temperature. Additional Enhanced Filter Maintenance (EFM) and Clean-in-Place (CIP) may be required during winter months.

Threats

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

The 400 mm diameter cast iron screened intake extends approximately 430 m off shore at a depth of approximately 3 to 4 meters. Due to the position of the crib, the intake is susceptible to potential accidental damage from marine craft and ice.

3.4 Operational Challenges

Frazil ice poses an operational challenge by restricting the intake. During those occasions a backflush piping system can be used. This backflush piping system is intended to flush the frazil ice from the intake screen to prevent flow restrictions in the screen. Backflush system consists

150mm 316 stainless steel piping, and piping fittings conveying water to the intake pipe, in the basement of the Low Lift Pump room. If that does not work the plant can be operated at a decreased capacity and/or emergency water can be supplied by the Lambton Area Water Supply System.

The distribution systems main challenge is maintaining the free chlorine residual through the large network of watermains, especially during the summer months. Routine sampling and flushing is conducted to monitor and maintain adequate disinfection residuals.

3.5 Upstream and Downstream Critical Processes

Conditions upstream of the Petrolia Drinking Water System at the Water Treatment Plant, in Lake Huron (the raw water source) are monitored through MECP reports, advisories and other operating authorities to ensure the operating effectiveness of the treatment plant to provide safe drinking water.

The Petrolia Drinking Water System relays information to the Municipality's it provides water to (downstream users) should there be any issues with the supply or quality of the drinking water. As well, these downstream users provide information to the Petrolia Drinking Water System in regards to the supply and quality of water.

The Petrolia Drinking Water System relies on the proper installation and working order of backflow preventer on service connections in order to protect the quality of the water in the source watermains.

Refer to the end of Operational Plan for a copy of the Petrolia Drinking Water System Description Form (MECP's Director's Directions *Minimum Requirements for Operational Plans* Schedule "C").

4 Related Documents

SOP-PET-20 – Frazil Ice
SOP-PET-13 – Emergency Water Taking from LAWSS
SOP-PET-30 – Potential Lake Contamination
SOP-PET-22 – Low Distribution System Chlorine

5 Revision History

Date	Revision #	Reason for Revision
2018-11-12	0	Procedure issued – Information within OP-06 was originally set out in the Main body of OCWA's Operational Plan (last revision # 9 dated 2017-11-03). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections
2018-11-30	1	Updates as per IA 2018-11-28, added relationship to connecting systems

2019-11-22	2	Added where secondary disinfection is achieved, added the names of the SOP's in related documents as per IA-2019-10-15
2020-11-04	3	Updated description due to upgrades, updated raw data and drawing
2021-11-26	4	Sample location revised and backflush system added to 3.4

1. Purpose

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

2. Definitions

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

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

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

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

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

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

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

Likelihood – the probability of a hazard or hazardous event occurring

3. Procedure

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

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

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 of the Environment Conservation and Parks (MECP) 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 MECP's "Procedure for Disinfection of Drinking Water in Ontario" 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 all of the following criteria are met:

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

4. Related Documents

OP-08 Risk Assessment Outcomes
OP-20 Management Review
MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"
MECP's "Procedure for Disinfection of Drinking Water in Ontario"
CCP Limit Tracking Form

5. Revision History

Date	Revision #	Reason for Revision
2018-11-12	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 7 dated 2017-11-03). Revised Purpose to reflect element 7 requirements only. Included minimum requirements for the Risk Assessment Team. Clarified role of QEMS Representative in coordinating the risk assessment and maintaining documents and records. Re-worded procedure for performing the risk assessment. Included reference to MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems". Removed requirements for documenting the outcomes of the risk assessment (now covered in OP-08). Changed annual review to at least once every calendar year and included potential considerations when performing the review.
2018-11-30	1	Update to include number's in 3.3.7, revised who should be involved in risk assessment and changed MOECC to MECP as per IA 2018-11-28
2019-11-22	2	Added the CCP Limit Tracking Form as per IA-2019-10-15

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 MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" 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
MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"

5. Revision History

Date	Revision #	Reason for Revision
2018-11-12	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 7 dated 2017-11-3). Clarified role of QEMS Representative in updating the information in OP-08A Summary of Risk Assessment Outcomes. Included requirements for how to document the risk assessment outcomes using the tables in OP-08A. Clarified responsibility of Operations Management to ensure Critical Control Limits are set and related procedures are developed. Included reference to OP-14 Review and Provision of Infrastructure to emphasize the need for Operations Management to review the risk assessment outcomes during the infrastructure review
2020-11-04	1	Changed MOECC to MECP

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Table 1: Risk Assessment Table

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

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
Source/ Intake	Frazil Ice	-Inability to supply water .	-SOP# PET-13, 20,46 -Water Storage at Reservoir & Tower	1	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				3,4	3	2	6	
	Raw water quality issue	-AWQI -Inability to treat water -Aesthetic issues -Taste and odour issues	-Water Storage at Reservoir & Tower -SOP# PET-13, 30, 47 -Online analyzers, routine sampling	1,10, 12	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				3,4,9	3	3	9	
	Breakage/Blockage of Intake Pipe	-Inability to supply water	-Water Storage at Reservoir & Tower -SOP# PET-13, 46 -Intake inspections	6	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
Low Lift	Low Lift Pump Failures	-Inability to supply water	-Equipment Redundancy built in- 3 pumps -Water storage -SOP# PET-13	3,4,6	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
			-pump rentals					
	Biofilm in raw main	-Water quality issue -High chlorine demand	- Treated water storage in the distribution system - SOP# PET-13	1,9	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
Filtration Process	Strainer Failure	-AWQI -Inability to supply water	-Equipment Redundancy: 2 Strainers -Increase backwashing frequency -Automatic Backwashing Cycle -Pressure Alarms -Water Storage at Reservoir & Tower -SCADA Monitoring -SOP# PET-13,47	2,6,12	2	2	4	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				3,9	4	2	8	
	High turbidity on discharge of racks	-AWQI for >1 NTU for 15 minutes	-Equipment Redundancy: 3 separate Filter Trains - SOP# PET-01, 13, 47 --Alarms -Automatic System Shut Down Program -Water Storage at Reservoir & Tower -SCADA monitoring	10	3	4	12	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
	Leak/Break on Rack	-Rack out of service -Inability to supply water	-Rack redundancy: 3 racks -PALL Operations Manual -Operator Inspections -SCADA monitoring	10	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
			-Alarms					
	Failure on rack integrity test	-Rack out of service -Possible high turbidity -Failure to meet disinfection requirements	-Rack redundancy: 3 racks -PALL Operations Manual -SCADA monitoring -Alarms	10	3	2	6	☐ Yes – Mandatory CCP ☒ Yes – Additional CCP identified for facility ☐ No
	Air compressor failure	-Inability to treat water	- Redundancy: 2 air compressors -SCADA monitoring -Maintenance program	10	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
			- Treated water storage in the distribution system -Alarms	3,4	3	3	9	
Clearwells	Miltronics Failure	-Low level -Loss of pump control -AWQI: Failure to meet CT	-Manual operations -SCADA monitoring -Alarms -Back up level control - SOP# PET-13 , 47	3,4,10	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.4)
	Low Level	-AWQI : Failure to meet CT -Inability to supply water	- Treated water storage in the distribution system - SOP# PET-13, 47	2,6	2	3	6	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
				3,4,10	3	3	9	
Disinfection	Gas Injection System Failure	-AWQI -Low chlorine	-Equipment Redundancy : 2 Cylinder System	3,4	3	3	9	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
		-Failure to meet CT	-SCADA monitoring -Alarms - SOP# PET-01, 47, 53 - Treated water storage in the distribution system -Shut down of the low lift	6	2	3	6	identified for facility ☐ No
				11, 10	4	3	12	
Fluoridation	HFS Pump Failure	-AWQI >1.5 mg/L	-Alarms -SCADA monitoring -In house analysis -Flow paced calculated dosages (SCADA) -Automatic shut down -SOP# PET-01, 04, 47	3,4	3	3	9	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☐ No
				6	2	3	6	
High Lift	High lift pump Failures	-Inability to supply water	-Equipment Redundancy – 4 pumps -Scheduled Maintenance Activities -Alarms -Treated water storage in the distribution system - SOP# PET-13	3,4	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	2	4	
SCADA System	SCADA Failure	-Loss of continuous monitoring -Failure to meet regulatory requirements	-Data retrieval -Data storage -SOP#PET-02, 54	3,4,10	3	4	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.4)
				6	2	2	4	

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
	Loss of Communication with Petrolia Tower or Mandaumin Reservoir	-Loss of continuous monitoring -Inability to supply water -Low pressure -AWQI	-Manual operations -Data retrieval -Data storage - SOP#PET-42, 47, 54	3,4	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	2	4	
Power Supply	Power failure	-Inability to treat water -Inability to supply	- Treated water storage in the distribution system - SOP# PET-13 -Generator power (onsite or rental)	3,4	3	4	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	3	6	
	Generator Failure	-Inability to treat water -Inability to supply	-Generator rental - Treated water storage in the distribution system - SOP# PET-13 , 31	3,4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	3	6	
Mandaumin Reservoir	Equipment Failure	-Low pressure -AWQI -Low level -Inability to supply	- Treated water storage in the distribution system - Manual operation of high lifts -Alarms - SOP# PET-13, 23, 32, 35, 45, 47 -By passing Reservoir	3,4	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	2	4	
	Low chlorine	-AWQI: <0.05 ppm -Low chlorine	- Continuous monitoring -Routine sampling -Flushing	1,6,8	2	4	8	☒ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
		residual	- SOP# PET-01,13,16, 23, 32, 47 -By passing Reservoir	3,4,11	3	4	12	☐ No
	Analyzer Failure	-Loss of communication -Loss of continuous monitoring -AWQI	- Routine sampling -Grab samples -Alarms -SOP# PET-47,54, 55 -Routine maintenance	3,4	3	2	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	2	4	
	Power Failure	-AWQI -Loss of pressure -Loss of communication -Loss of continuous monitoring	-Routine maintenance -Generator onsite -Treated water storage in tower - SOP#PET-32, 44, 47	3,4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	3	6	
Petrolia Tower	Low Level	-Low pressure in the system -AWQI	- Manual operation of Mandaumin booster pumps -Alarms -SOP# PET-26,28, 32, 45, 47	2,3,4,7	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	3	3	9	
	Low chlorine	-AWQI: <0.05 ppm	-Routine sampling -Flushing - SOP# PET-16, 22, 47	4,11	2	4	8	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.3)

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
	Power failure	-Loss of communication -Loss of level control	-small generator onsite - Manual pump operation	3,4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	3	6	
Distribution System	Watermain Break	-Loss of pressure -AWQI -Inability to supply water	- System storage -Ability to isolate section -AWWA Standard C651, Watermain Disinfection Procedure -SOP#PET-41,42,45,47	4	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				6	2	3	6	
	Water Quality Issue	-Low chlorine -Biofilm -Taste & odour issues -AWQI	-Routine sampling -SOP#PET-16, 22, 42,47	3,4,6,7,8	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
	Low Chlorine	-AWQI:<0.05 ppm	-Routine sampling -Flushing -SOP#PET-22, 47	3,4,	3	4	12	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.3)
				6,7,8	2	4	8	
	Aging Infrastructure	-AWQI: <0.05 -Failure of equipment (watermain breaks, valve failure)	-Capital replacement projects -Routine maintenance -Flushing -SOP#PET-16, 41,44,47,	1, 6	2	3	6	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
				3,4	3	3	9	
	Illegal Hydrant Use	-AWQI	-SCADA Monitoring	6	3	2	6	☐ Yes – Mandatory CCP

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative | Approved by: Operations Management

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	MECP Potential Hazardous Event/Hazard Reference # (see Table 4)	Likelihood	Consequence	Risk Value	CCP?
		-Low pressure -Watermain Break	- Municipal By Law 17-2014 - SOP# PET-41,45, 47					☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)
	Failure of Backflow Preventers	-AWQI -Water quality issue	-Routine maintenance -Municipal By Law 17-2014 SOP# PET-47	6,7,8	3	3	9	☐ Yes – Mandatory CCP ☐ Yes – Additional CCP identified for facility ☒ Does not meet 3.3.7.1)

Table 2: Identified Critical Control Points (CCPs)

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Filtration Process .	individual rack turbidity 75 mNTU or greater for 300 sec banners on SCADA individual rack turbidity 100 mNTU or greater for 300 sec calls out and shut down low lift and PALL system IT Delta Pressure decay <2.3 kPa	-SCADA Monitoring -continuous monitoring by turbidimeter -alarm banner on SCADA -alarm to dialer	-equipment redundancy: 3 racks -SOP# PET- 01, 13, 21, 32, 47 -Critical Control Point Limit Reached Form -automatic shut down of rack Facility Emergency Plan -Distribution system storage -Alternate source of water
Primary Disinfection -low free chlorine residual	1.30 mg/L or less for 300 sec on AIT 5109, AIT 5110 and AIT 5101 call out alarm and shut down high lift pumps	-SCADA monitoring -continuous chlorine analyzer -Alarm to dialer -pocket colorimeter	- Equipment redundancy: 2 cylinders -SOP# PET-01, 32, 47 -Critical Control Point Limit Reached Form -System storage -automatic shut down -Facility Emergency Pan
Secondary Disinfection -low free chlorine residual	1.00 mg/L on AIT 216 for 300 secs	-SCADA monitoring -continuous chlorine analyzer -Alarm to dialer -pocket colorimeter	- Equipment redundancy: 2 cylinders -SOP# PET-01, 13, 32, 47 -alternate source of water -Critical Control Point Limit Reached Form -System storage -automatic shut down -Facility Emergency Pan
Fluoridation -high fluoride	-1.00 or higher for 300 sec on AIT 5102 call out alarm and shuts off fluoride pump	-SCADA monitoring -continuous fluoride analyzer -Alarm to dialer -grab samples	-SOP# PET-01, 32, 47 - automatic shut down -Facility Emergency Plan
Clearwells 1 & 2	-3.3 m or less for 300 sec on LIT 5110 and 5111 call out and shutdown high lift pumps	- SCADA monitoring -alarm to dialer	- Alternate source of water -SOP# PET-13, 47, 53

-low level			-distribution system storage -automatic shutdown of high lift pumps -Facility emergency plan
Raw -High pH, low Temperature	Max 8.4 pH on AIT 3014 for 300 sec Min 0.5 oC for 300 sec on AIT 3008	SCADA monitoring -alarm to dialer	-SOP# PET- 01, 13, 30, 32, 46, 52, 53 -Critical Control Point Limit Reached Form -automatic shut down -Facility Emergency Plan -Distribution system storage -Alternate source of water
Flow -high filtrate flow -high highlift flow	-max filtrate flow of 140 l/s on FIT 5120 -max highlift flow of 130 L/s on FIT5104	SCADA monitoring -alarm to dialer	-SOP# PET-01, 32, 52, 53 -Critical Control Point Limit Reached Form -automatic shut down

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

Standard Operating Procedures:

SOP# PET-01: CCP Limit Reached
SOP# PET-13: Emergency Water Taking from LAWSS
SOP# PET-20: Frazil Ice
SOP# PET-21: Feed Side Integrity test
SOP# PET-23: Mandaumin By-Pass
SOP# PET-26: Tower Low Level
SOP# PET-28: Tower Isolation
SOP# PET-30: Potential Lake Contamination
SOP# PET-31: Generator Fault
SOP# PET-32: Alarm Testing
SOP# PET-35: Mandaumin Reservoir Low Level
SOP# PET-41: Watermain Repair
SOP# PET-42: Responding to Community Complaints
SOP# PET-45: Low Distribution System Pressure
SOP# PET-46: Provision of an Alternate Water Source
SOP# PET-47: Reporting Adverse Water Quality
SOP# PET-52: Alarm Response
SOP# PET-53: Primary Disinfection

SOP# PET-54: SCADA Reports
SOP# PET-55: Review of Continuous Monitoring Equipment

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
2011-03-01	Initial Risk Assessment		Results captured in Revision 0 of the Summary of Risk Assessment Outcomes
2012-04-18	Annual Review; Risk Assessment re-done during Risk Assessment Workshop	T Bender, Sr Ops Mgr, C Grimstead, Compliance Mgr, K Burgess, RCA, B Tully, Sr Ops Mgr, J Stradeski, PCT, D Hunt Ops Mgr, B Labute Sr Ops Mgr, D Jubenville, PCT, D Dillen Compliance Manager, G Dunmore, Sr Ops Mgr, D Thomson, PCT	Results captured in Draft Revision 1 of the Summary of Risk Assessment Outcomes
2012-06-01	Annual Risk Assessment Review	T Bender, Sr Ops Mgr, D Thomson, PCT, T Simpson, Operator	Results captured in Revision 1 of the Summary of Risk Assessment Outcomes
2013-05-27	Annual Risk Assessment Review	Clive Barry, Operations Manager; Mike Weber, Senior Operator; Troy Simpson, Operator; Deb Thomson, PCT	Results captured in Revision 5 of the Summary of Risk Assessment Outcomes -Risk “plugged strainers”; consequence increased from 1 to 2 -Risk “high lift pump failures”; likelihood increased from 2 to 3

2014-02-27	36 Month Risk Assessment	Clive Barry, Operations Manager, D Thomson, PCT	Results captured in Revision 6 of the Summary of Risk Assessment Outcomes -Column “Possible Causes for Hazardous Event” added -Risk Value decreased associated with risk of; breakage/blockage of intake pipe, algae bloom, low lift pump failures, membrane filtration failure, chlorine analyzer failure, HFS Overdose, high lift pump failures, vandalism -Risk Value increased associate with risk of; Contaminate entry, Gas Injection system failure/low supply of chlorine gas (combined) and Loss of Tower level control -Removed Risk ; Loss of residual in distribution
2015-05-22	Annual Risk Assessment Review	Dale Le Britton, Senior Operations Manager; Dan MacLeod, Team Lead; Deb Thomson, PCT	Results captured in Revision 7 of the Summary of Risk Assessment Outcomes: -Contingency names revised following implementation of new OCWA Facility Emergency Plan Binder an associated contingencies -Table 2 revised alarm set points
2016-05-12	Annual Risk Assessment Review	Dan MacLeod, Cindy Sigurdson and Maegan Garber	-remove possible cause of hazardous event column, condense spill/adverse weather/algae bloom to raw water quality issue, clarify non CCPs, add rain main failure and biofilm to low lift station, add high turbid, leak on racks and compressor fail for filtration process, add hazardous event to clearwell, add SCADA system to activity, revised watermain activity, added Mandaumin, terrorism and vandalism, reviewed revised CCPs in Table 2. Add list of related SOPs
2016-09-27	36 Month Risk Assessment	Maegan Garber, Cindy Sigurdson and Dan MacLeod	-add additional SOPs to control measures, remove raw main failure, add inability to supply water to strainer failure and leak/break on rack, add SCADA monitoring and alarms as a control measure where appropriate, add AWQI to loss of communication, add Equipment Failure and Analyzer failure to reservoir, revise reservoir power failure outcomes and controls, add Petrolia tower activity and low level, low chlorine and power fail events, add Distribution system activity and events, revised SOP list
2017-11-03	Annual Risk Assessment Review	Terri-Lynn Thomson	-Added SOP #13 to strainer failure. Updated CCP’s as per updated CCP form and alarm setpoints

2018-11-12	Annual Risk Assessment Review	Terri-Lynn Thomson	Add MOECC rankings, update CCP reference numbers as per OP-07, added failed integrity test to CCP.
2019-09-20	36 Month Risk Assessment	Terri-Lynn Thomson, Cindy Sigurdson, Sam Smith	Separated out the hazardous events, removed terrorism and vandalism.
2020-11-04	Annual Risk Assessment Review	Terri-Lynn Thomson	*Added 2nd clearwell and 4th highlift, due to upgrades, revised SOP list.*
2021-11-	Annual Risk Assessment Review	Terri-Lynn Thomson, Cindy Sigurdson, Sam Smith	*Revise SOP names*

Table 4: Potential Hazardous Event/Hazard Reference Numbers (based on MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated February 2017)

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)
N/A	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

Revision History

SUMMARY OF RISK ASSESSMENT OUTCOMES

Reviewed by: QEMS Representative	Approved by: Operations Management

Date	Revision #	Reason for Revision
2011-03-01	0	Initial risk assessment conducted
2012-06-01	1	Changes per Corporate Template update, hub re-structure, Risk Assessment Annual Review and Management Review
2012-08-31	2	Column titles added to Table 2
2013-02-01	3	Revised issue date
2013-03-15	4	Revisions made to SOP and Document naming
2013-05-27	5	Revised following Annual Risk Assessment Review
2014-02-27	6	36 Month Risk Assessment conducted
2015-05-22	7	Revised following Annual Risk Assessment Review
2015-12-03	8	Revised SOP numbers and CCP Limit Exceedance Form as per OFI from IA 2015-03-30
2016-05-12	9	Revised following Annual Risk Assessment review
2016-09-27	10	Revise name of system name, add Mandaumin booster station, add Petrolia Tower, add criteria to CCP all following 36 month review as per OA change
2017-11-03	11	Updated as per annual review.
2018-11-12	12	*Summary of Risk Assessment Outcomes assigned document number (OP-08A); added table 4 to reference MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"; Table 1 updated to include hazard.* Update CCP reference numbers as per OP-07
2018-11-30	13	*Update to include risk values for Petrolia tower low Chlorine. Other minor updates*
2019-11-22	14	*Updated as per the 36 month risk assessment*
2020-11-04	15	*Added 2nd clearwell and 4th highlift, due to upgrades, revised SOP list. Completed annual review*
2020-12-16	16	*SOP #53updated. CCP's updated to match with system upgrades*
2021-11-26	17	*Revise as per annual review – SOP names*

ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

To document the following for the Petrolia Drinking Water System:

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

2. Definitions

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

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

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

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

3. Procedure

3.1 Organizational Structure

The Petrolia Drinking Water System is owned by the Corporation of the Town of Petrolia and is represented by, Mayor and CAO.

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

3.2 Top Management

Top Management for the Petrolia Drinking Water System consists of:

- Operations Management – Petrolia Cluster
- Regional Hub Manager – Southwest Region
- Safety, Process & Compliance Manager – Southwest Region

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

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

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

3.3 Corporate Oversight

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

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

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

3.4 Regional Hub Roles, Responsibilities and Authorities

QEMS roles, responsibilities and authorities of 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 Petrolia Cluster.

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

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

Role	Responsibilities and Authorities
	• Collect samples and perform laboratory tests and equipment calibrations as required • Regularly inspect operating equipment, perform routine preventive maintenance and repairs and prepare and complete work orders as assigned • Participate in facility inspections and audits • May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.
Operational and Maintenance (O&M) Team Lead	• Perform duties as assigned by Operations Management • Oversee maintenance activities on equipment and process in order to maintain compliance with applicable legislation, regulations, approvals and established operating procedures • Prepare and/or coordinate staff work assignments and follow up to ensure completion • Act for management during vacations or periodic absences. • Develop and provide O&M reports to management and recommend changes in operating procedures/processes to improve facility operations • Assist with facility operations including monitoring facility processes, reviewing process data and trouble-shooting • Assist management in developing annual O&M budgets and provide recommendations relating to potential O&M expenditures • May act as Operator-in-Charge (OIC) and/or Overall Responsible Operator (ORO) when required.
Administrative Assistant	• Support the administrative functions of the regional hub/cluster/facility including coordinating delivery of training as directed • Assist with entering operational data (including operational training records, process data and maintenance records) into the appropriate database as directed

4. Related Documents

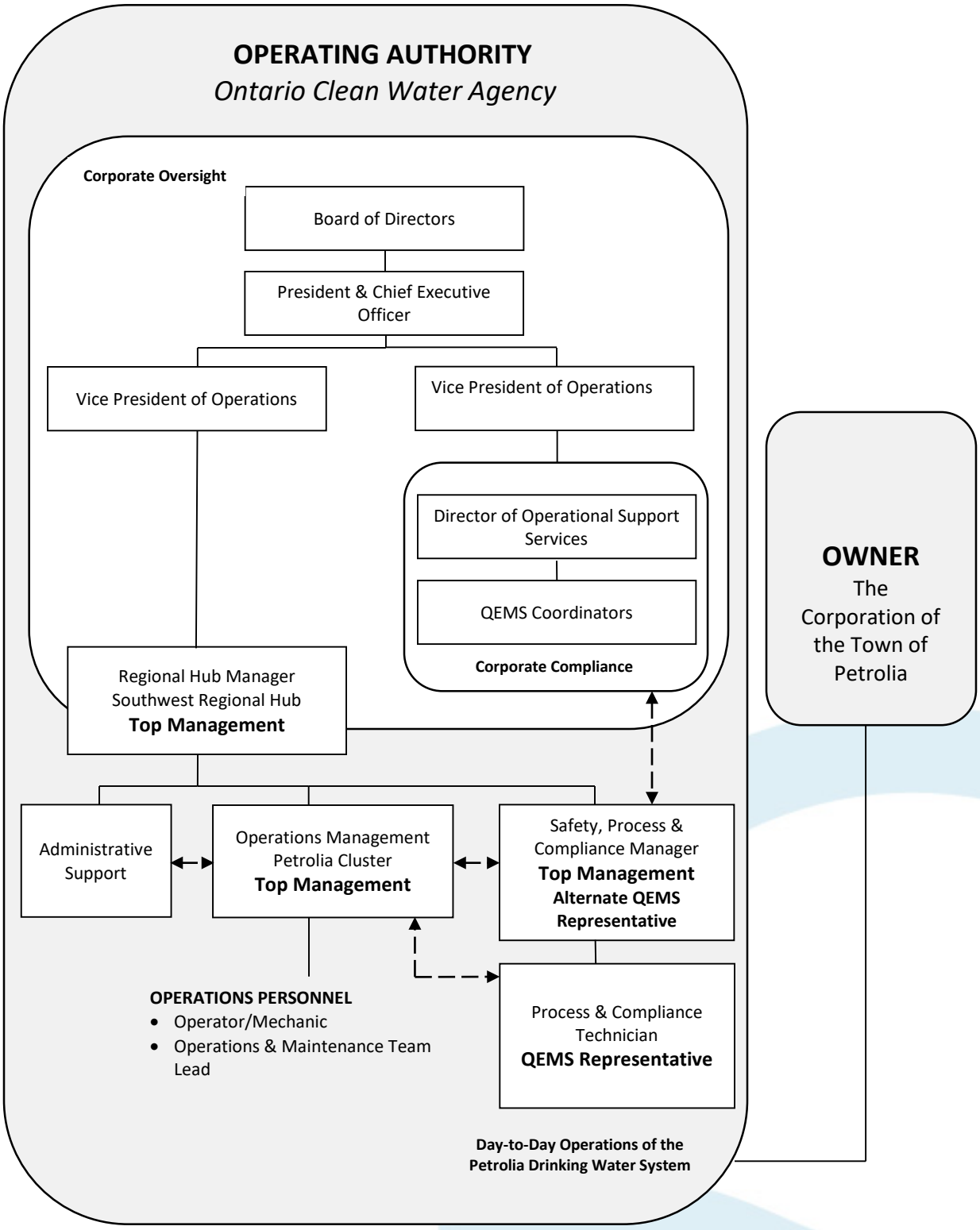
OP-03 Commitment and Endorsement
OP-04 QEMS Representative
OP-05 Document and Records Control
OP-09A Organizational Structure
OP-12 Communications
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
2018-11-12	0	P Procedure issued – Information within OP-09 was originally set out in the main body of OCWA's Operational Plan (Revision 9, 2017-11-03) New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added definitions for Operations Management and Operations Personnel and throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'.
2018-11-30	1	Added Water system name under s 1.
2020-11-04	2	Changed MOECC to MECP

ORGANIZATIONAL STRUCTURE

Reviewed by: QEMS Representative	Approved by: Operations Management



Revision History

Date	Revision #	Reason for Revision
2018-11-12	10	Appendix issued - Organizational Chart previously contained as Appendix C of the Operational Plan. Moved to a new Appendix. Revision history previously maintained within the operations plan revision 9 dated 2017-11-03. Removed two levels of Top Management (e.g. Facility Level and Corporate level), instead Top Management is only at the facility level and corporate has been moved to Corporate oversight. Added Administrative Support.
2018-11-30	11	Removed Operations and compliance team lead under QEMS Representative
2020-11-04	12	Revision to reflect change to reporting structure - Corporate Compliance now reports to VP of Operations.

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 WT2 and WD2 if required to act as ORO • Experience and/or training in managing/supervising drinking water system operations, maintenance, financial planning and administration • Training and/or experience related to drinking water system processes, principles and technologies • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems

COMPETENCIES

Reviewed by: QEMS Representative | Approved by: Operations Management

Position	Required Minimum Competencies
Safety, Process & Compliance (SPC) Manager	• Valid operator certification; minimum OIT or minimum level 1 WT if required to act as OIC and minimum WT2 and WD2 to act as ORO. • Experience in providing technical support and leading/managing programs related to process control and compliant operations • Experience and/or training in conducting compliance audits, and management system audits • Experience and/or training in preparing and presenting informational and training material • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Process & Compliance Technician	• Valid operator certification; minimum OIT or minimum level 1 WT if required to act as OIC and minimum WT2 and WD2 to act as ORO. • Experience and/or training in resolving/addressing compliance issues for drinking water systems • Experience and/or training in monitoring, assessing and reporting on facility performance against legal requirements and corporate goals • Experience and/or training in preparing and presenting informational and training material • Experience in conducting management system audits or internal auditor education/training • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
Operator/Mechanic	• Valid operator certification; minimum OIT or minimum level 1 WT if required to act as OIC and minimum WT2 and WD2 to act as ORO. • Training and/or experience in inspecting and monitoring drinking water system processes and performing/planning maintenance activities • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers and operational computerized systems
O&M Team Lead	• Valid operator certification; minimum OIT or minimum level 1 WT if required to act as OIC and minimum WT2 and WD2 to act as ORO. • Experience and/or training in managing and planning multiple projects, assessing priorities and effectively coordinating operation and maintenance programs • Training and/or experience related to operations and maintenance of drinking water system processes, principles and technologies • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures

Position	Required Minimum Competencies
	• 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 • Training on OCWA's QEMS and the DWQMS • Training on relevant legislation, regulations, codes, policies, guidelines and procedures • Experience using computers

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

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

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

3.6 Awareness of OCWA's QEMS is promoted during the orientation of new staff, at facility/cluster/regional hub level training sessions and meetings and through OCWA's Environmental Compliance 101 (EC 101) course. All new staff are required to complete the EC 101 course within their first year of joining OCWA, upon scheduling and availability. The EC 101 refresher course is required by all staff every 3 years. The purpose of the EC 101 course is to ensure staff are aware of applicable legislative and regulatory requirements, to promote awareness of OCWA's QEMS and to reinforce their roles and responsibilities under OCWA's QEMS.

3.7 Staff are also required to complete the 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 licence (required to hold at a minimum a Class G license which is initially verified upon hire) and/or the validity of any other required certificates/qualifications.

3.12 Individual OCWA employee training records are maintained and tracked using a computerized system, the Training Summary database, which is administrated by OCWA's 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-05 Document and Records Control
OCWA Training Summary Database

5. Revision History

Date	Revision #	Reason for Revision
2018-11-12	0	Procedure issued – Information within OP-10 was originally set out in the main body of OCWA's Operational Plan (last revision 9 dated 2017-11-03) New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added definitions for Operations Management and Operations Personnel and throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Modified table in procedure (s. 3.1 and s. 3.2): removed/revised non-measurable competencies, added the word 'minimum' to competencies; removed 'Valid Class G Driver's License' listed under individual positions and referenced in s. 3.11; added competencies for Admin Assistants and merged competencies for Senior Operations Manager and Operations Manager under Operations Management. Updated training sections (s. 3.4 to s. 3.7) to reference new Environmental 101 course, Mandatory Compliance Training list and removed specific references to Orientation Training Program. Added s. 3.11 related to ensuring operators make Operations Management aware of changes to operator certification and other certificates/licenses. Other minor changes to wording.
2018-11-30	1	Revised order of personal in chart. Added scheduling and availability to s 3.6 as per IA -2018-11-28.
2019-11-22	2	Added certification type as per IA 2019-10-15
2020-11-04	3	Added min cert type in table, added EC101 refresher in 3.6

PERSONNEL COVERAGE

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

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

2. Definitions

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

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

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

(*Crown Employees Collective Bargaining Act*, 1993)

3. Procedure

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

3.2 The Petrolia Drinking Water System is staffed by OCWA personnel as follows:

- 7:30- 16:00 5 days a week Monday to Friday.
- Staff on call after hours

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

An Overall Responsible Operator (ORO) is assigned with a minimum WD 2, WT 2 to fulfill the duties. The ORO is communicated with all staff and is documented in the facility logbook.

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

3.4 Operations Management assigns an on-call operator for the time that the facility is un-staffed (i.e., evenings, weekends and Statutory Holidays). The on-call shift change is the start of the business day on Monday and follows a weekly rotation of staff. A schedule of on call operators is prepared and is available as per OP-05.

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

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

3.6 The SCADA system is programmed to call the operator whenever there is an alarm condition. The SCADA contacts the on-call operator through a designated on-call cell phone. The on-call operator acknowledges and obtains the details of the alarm from the phone call to determine the appropriate response. If the nature of the alarm requires additional staff, the on-call operator contacts the ORO to request assistance of other certified operators. The on-call operator records details of the call in the facility logbook and a call out report is created in WMS (Maximo) and reports sent to all operators, Operations Management and Admin.

3.7 Each manager (e.g. Operations Management/SPC Manager) 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. The Operations Management is responsible for ensuring facilities are appropriately staffed when an operator is away due to illness, training or emergency.

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

3.9 A contingency plan for Critical Shortage of Staff is included in the Facility Emergency Plan. This plan provides direction in the event that there is a severe shortage of operations personnel due to sickness (e.g., pandemic flu) or other unusual situations.

4. Related Documents

OP-10 Competencies
Facility Logbook
Daily Round Sheets
On-Call Schedule
WMS
Vacation Schedule
Critical Shortage of Staff Contingency Plan (Facility Emergency Plan)

5. Revision History

Date	Revision #	Reason for Revision
2011-03-01	0	Procedure issued
2012-06-01	1	Changes per Corporate Template update, hub re-structure and Management Review
2013-02-01	2	Revised per hub re-structure
2013-03-15	3	Revised 5.4 & Related Documents
2014-01-31	4	Revised 3.0,5.1 & 5.2 per hub re-structure
2014-03-20	5	Revised 3.0,5.1, 5.2,5.4 &5.5 per hub re-structure
2015-12-03	6	Revise 5.1, 5.2 and 5.3 as per OFI's IA 2015-03-30, remove Senior Operations Manager and reference to Lambton East Office
2016-05-24	7	Re-add Senior Ops Manager, revise 5.2 to clarify Operator coverage, revise 5.3 to include Regional Hub Manager and ORO schedule, revise 5.5 to clarify coverage on holidays, and add 5.8 to address responsibility of coverage as per OFIs IA 2016-03-05
2016-09-29	8	Revise system name as per change of OA, revise name of Bright's Grove Water Treatment Plant to Water Treatment Plant
2017-11-03	9	Removed weekend work from 5.5
2018-11-12	10	QP-03 procedure renamed OP-11. Removed Scope and Responsibilities sections. Other minor edits in wording
2018-11-30	11	Revised call in report to WMS in s3.6 and related documents.
2019-11-22	12	Removed ORO schedule in 3.3 as per IA 2019-10-15
2021-11-26	13	Revised procedure for call outs in 3.6.

COMMUNICATIONS

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

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

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

2. Definitions

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

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

3. Procedure

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

3.2 Internal and external communication responsibilities and reporting requirements for emergency situations are set out under OCWA's 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 followed by the EC 101 refresher every three years, upon scheduling and availability. The objective of the EC 101 course is to ensure that staff are aware of applicable legislative and regulatory requirements and of OCWA's QEMS and to reinforce their roles and responsibilities under OCWA's QEMS.

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

orientation process and on an on-going basis as required.

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

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

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

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

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

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

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

3.4 Communication with the Owner:

3.4.1 Operations Management ensures that the Owner is provided with QEMS updates along with new and proposed legislation (communicated to Operations Management by Corporate Compliance) and that they are kept informed of the status of the facility's operational and compliance performance during regularly scheduled meetings and/or through electronic and/or verbal communications. The QEMS Representative assists in the coordination of these meetings and with communicating the updates as directed.

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

3.5 Communications with Essential Suppliers and Service Providers:

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

3.6 Communication with the Public:

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

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

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

4. Related Documents

Facility logbook
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

5. Revision History

Date	Revision #	Reason for Revision
2011-03-01	0	Procedure issued
2012-06-01	1	Changes per Corporate Template Update, hub re-structure and Management Review

2013-02-01	2	Revised per hub restructure
2013-03-15	3	Revision to 5.3
2014-01-31	4	Revised 3.0, 5.1 and Related Documents
2014-03-20	5	Revised header & 5.5 referencing Senior Operator position
2015-12-29	6	Remove Senior Operations Manager
2016-05-24	7	re-add Senior Ops Manager, add OCTL to 3.0, revise 5.2 to clarify Envi.Compl. course, revise 6.0 to include Community Complaint Form as per OFIs IA 2015-03-05
2016-09-29	8	Revise name of system as per change in OA, change name of Brights Grove Water Treatment Plant to Water Treatment Plant
2017-11-03	9	Changed OCTL to SPC Manager and Senior Operator/Mechanic to OMTL
2018-11-12	10	QP-04 procedure renamed OP-12. Removed Scope and Responsibilities sections. Added definitions for Operations Management and Operations Personnel. Reordered and created separate sections to clarify communications to each of the 4 parties. Clarified suppliers were those listed as essential as per Element 13 (as per DWQMS v. 2.0) and replaced references to Senior Operations Manager with 'Operations Management'. Updated training sections for OCWA personnel (s. 3.3.1 to s. 3.3.4) to reference new Environmental Compliance 101 course completed within first year of hire and to outline how training is coordinated between SPC Manager/Operations Management, and QEMS Representative. Included sections on R&Rs for performance reporting within OCWA (s. 3.3.7 to s. 3.3.9) and to Client (3.4.1). Replaced identification of media spokesperson (s. 3.6.1) with 'as identified in Facility Emergency Plan'. Added reference to site-specific records/documents used for recording tours (s. 3.6.3). Other minor edits.
2018-11-30	11	Added upon scheduling and availability in 3.3.1 as per IA 2018-11-28
2020-11-04	12	Added the EC101 refresher course in 3.3.1
2021-11-26	13	Add new and proposed legislation to 3.4.1

ESSENTIAL SUPPLIES AND SERVICES

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

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

2. Definitions

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

3. Procedure

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

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

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

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

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

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

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

3.5 All third-party drinking water testing services are provided by accredited and licensed laboratories. The Ministry of the Environment, Conservation and Parks (MECP) has agreement with The Canadian Association for Laboratory Accreditation (CALA) for accreditation of laboratories testing drinking water. The QEMS Representative is

responsible for notifying the 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. Components are verified by the operator when received and before use to ensure they meet applicable requirements.

4. Related Documents

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

5. Revision History

Date	Revision #	Reason for Revision
2011-03-01	0	Procedure issued
2012-06-01	1	Revised per Corporate Template update, hub re-structure and Management Review
2013-02-01	2	Revised per hub restructure
2014-01-31	3	Senior Operations Manager added to 3.0
2014-03-20	4	Revised Approved by header section

2015-12-03	5	Revised name of contact list as per OFI IA 2015-12-02,Remove Senior Operations Manager
2016-05-24	6	Re-add Senior Operations Manager, revise 3.0 to include RHM & OCTL, add AWWA Standards to 6.0 as per OFIs IA 2016-03-05
2016-09-29	7	Revise system name as per change in OA, change name of Brights Grove Water Treatment Plant to Water Treatment Plant
2017-11-03	8	Changed OCTL to SPC Manager and Senior Operator to OMTL
2018-11-12	9	QP-05 procedure renamed OP-13. Removed Scope and Responsibilities sections. Changes to wording to provide clarification on ensuring quality of essential supplies and services (s. 3.5, 3.6, 3.7 and 3.9).
2018-11-30	10	Changed MOECC to MECP
2021-11-26	11	Revised 3.10 to stat how components are verified

REVIEW AND PROVISION OF INFRASTRUCTURE

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

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

2. Definitions

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

3. Procedure

3.1 At least once every calendar year, Operations Management in conjunction with operations 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:

- Water Treatment Plant
- Mandaumin Reservoir
- Maintenance records
- Call-in reports
- Adverse Water Quality Incidents (AWQIs) or other incidents
- Health & Safety Inspections
- MECP Inspection Reports
- Hydrant and Valve inspection records
- Distribution System Chamber Inspections Reports
- Watermain Repair Forms

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 6 year rolling Recommended Capital / Major Maintenance 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

Recommended Capital / Major Maintenance Report
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
2011-03-01	0	Procedure issued
2012-06-01	1	Changes per Corporate Template Update, hub re-structure and Management Review
2013-02-01	2	Revised per hub restructure
2013-03-15	3	Revised 5.2; corrected grammar error
2014-01-31	4	Revised 3.0 per hub re-structure, 5.1 to add clarity
2014-03-20	5	Addition of position Senior Operator to 5.1 & 5.3 of procedure
2015-12-03	6	Revise 5.2 as per OFI IA 2015-03-30, remove Senior Operations Manager
2016-05-24	7	Re-add Senior Ops Manager, revise 5.1 to include areas covered, as per OFIs IA 2016-03-05
2016-09-29	8	Revise name of system as per OA change, add distribution to 5.1,change Brights Grove Water Treatment Plant to Water Treatment Plant
2018-11-12	9	QP-06 procedure renamed OP-14. Removed Scope and Responsibilities sections. Replaced ‘once every 12 months’ with ‘once every calendar year’ (s. 3.1) to reflect wording in DWQMS v. 2.0. Added s. 3.2 to consider the outcomes of the risk assessment under Element 8 during the review to reflect wording in DWQMS v. 2.0. Changes to wording to provide clarification on who is required to attend the review and what documents and records may be considered during the review (s. 3.1). Linked the procedure with OP-15 in terms of documenting a long-term forecast (s. 3.3 and s. 3.4).

1. Purpose

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

2. Definitions

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

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

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

3. Procedure

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

3.1.1 Planned Maintenance

Routine planned maintenance activities are completed as per the preventative maintenance plan for all equipment at the Petrolia Drinking Water System.

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

- Enter detailed asset information;
- Generate and process work orders;
- Access maintenance and inspection procedures;
- Plan 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 annualy 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 Operations Management. Work orders are completed and electronically entered into WMS

by the person responsible for completing the task. Records of these activities are maintained as per OP-05 Document and Records Control.

An inventory of equipment in WMS ensures that appropriate maintenance plans are in place. Maintenance plans are developed according to the manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements. 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 or designate. Unplanned maintenance activities are recorded into WMS by the person responsible for completing the unplanned maintenance activity.

3.1.3 Rehabilitation and Renewal

Rehabilitation and renewal activities including capital upgrades (major infrastructure maintenance) are determined at least once every calendar year in consultation with Operations Management and the Owner A list of required replacement or desired new equipment is compiled and prioritized by Operations Management in conjunction with operations personnel and is presented to the Owner for review and comment. All major expenditures require the approval of the Owner. In addition to the short-term facility needs (i.e. current year), the Recommended Capital/Major Maintenance Report also provides a long-term (rolling 6-year) list of major maintenance recommendations. (Refer to OP-14 Review and Provision of Infrastructure).

3.1.4 Program Monitoring and Reporting

Maintenance needs for the facility are determined through review of manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements and are communicated by means of work orders. Additionally, Operations Management and operations personnel Operations Management conducts a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system. (Refer to OP-14 Review and Provision of Infrastructure).

To assist in monitoring the effectiveness of the program Operations Management review work order backlogs to ensure completion of workorders for each facility.

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

3.2 OCWA's infrastructure maintenance, rehabilitation and renewal program is initially communicated to the Owner through the operating agreement. OCWA's program is communicated to the Owner on a quarterly basis through the Operations Report and at a minimum of at least once every calendar year through submission of the Recommended Capital / Major Maintenance Report and through the results of the Management Review.

4. Related Documents

Minutes of Management Review
Recommended Capital/Major Maintenance Report
OP-05 Document and Records Control
OP-14 Review and Provision of Infrastructure

5. Revision History

Date	Revision #	Reason for Revision
2018-11-12	0	Procedure issued – Information within OP-15 (s. 3) was originally set out in main body of OCWA's Operational Plan (last revised on Rev 9 2017-11-03). New Purpose, Definitions, Procedure, Related Documents and separate Revision History sections. Added the requirement to ensure the long term forecast is reviewed at once every calendar year and to document a long term forecast (s. 3.1.3) to reflect in DWQMS v. 2.0. Minor wording updates to reflect OCWA's current WMS
2018-11-30	1	Added how work orders are reviewed for completion in 3.1.4. Corrected typo
2019-11-22	2	Revised how O&M is updated with the owner.

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).

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

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

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

3.4 Continuous monitoring equipment is used to sample and test for turbidity(Raw, membranes, treated), temperature (raw), free chlorine (raw, membrane, clearwell, highlift, manadaumin), pH(raw and treated), Fluoride (treated).

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

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

- Membrane run times
- System pressures
- Filter run times

- Membrane TMP
- System pressures
- Clearwell Level

3.6 Adverse water quality incidents are responded to and reported as per SOP#-PET-47, Reporting Adverse Water Quality.

3.7 In-house process control activities are conducted on a regular basis by the certified operator(s). In-house samples are analyzed following approved laboratory procedures. The results of these activities are recorded on the round sheet. Any adjustments made to process parameters are recorded in the facility log book.

3.8 All sampling, testing and monitoring activities related to the facility's most challenging conditions are maintained. The facilities challenging condition is frazil ice. Frazil ice can be monitored by temperature of the lake and ice cover. Follow the SOP #PET-20 for Frazil Ice. The distribution systems operational challenge is maintaining free chlorine residuals. This is done by flushing, see SOP#-PET-16.

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

3.10 Sampling, testing and monitoring results are readily accessible to the owner by request.

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

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

4. Related Documents

Facility Logbook
OP-05 Document and Records Control
OP-06 Drinking Water System
OP-20 Management Review
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)
SOP-PET-47 Reporting Adverse Water Quality
SOP-PET-20 Frazil Ice

SOP#-PET-16 – Hydrant Flushing and Dead End Flushing
Operational Round Sheets
Sampling Schedule
SCADA Records
Essential/Emergency Service and Supply Contact List
FEP Binder
Flushing records

5. Revision History

Date	Revision #	Reason for Revision
2011-03-01	0	Procedure issued
2012-06-01	1	Changes per Corporate template update, hub re-structure and Management Review
2013-02-01	2	Revise pre hub restructure
2013-03-15	3	Revised 5.2
2014-01-31	4	Addition of Senior Operations Manager to 3.0
2014-03-20	5	Revised 5.2 & 5.5 to address March 2014 Internal Audit OFI's
2015-12-03	6	Remove PDC reference, add WIKSI, add round sheets to 5.3 as per OFI IA 2015-03-30, remove Senior Operations Manager
2016-05-24	7	Re-add Senior Operations Manager, revise 3.0 to include OCTL, revise 5.1 to include additional sampling; remove table, revise 5.5 to include frazil ice conditions and 5.6 to include upstream sampling, revise 6.0 as per OFIs IA 2016-03-05
2016-09-29	8	Revise system name as per change in OA
2017-11-03	9	Changed OCTL to SPC Manager, Senior Operator to OMTL. Reworded 5.3 for types of continuous monitoring.
2018-11-12	10	QP-07 procedure renamed OP-16. Removed Scope and Responsibilities sections. Expanded information related to accredited and licensed laboratories (s. 3.3). Reordered some sections and other minor edits.
2018-11-30	11	Added in the operations challenge of distribution residuals in 3.8 as per IA 2018-11-29

MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

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

2. Definitions

None

3. Procedure

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

3.2 The Operations Management or designate establishes and maintains a list of measurement and recording devices and associated calibration and/or verification schedules using the automated Work Management System (WMS). When a new device is installed, it is added to the WMS system. 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.

3.4 Calibration and maintenance activities are carried out in accordance with procedures specified in the manufacturer's manual and/or instructions specified in WMS. The calibration schedule is as follows:

Type of Instrumentation		WMS ID	Frequency
Flow Meters	FIT 3007 (Raw)	0000227949	Annually
	FIT 5120 (filtrate)	0000248480	Annually
	FIT 5104 (highlift)	0000248487	Annually
	FIT 213 (Mandaumin discharge)	0000227882	Annually
	FIT 218 (LAWSS)	0000229048	Annually
Pressure Transmitters	PT 212 (Mandaumin)	0000227884	Annually

	PT1021-1 (rack 1)	0000227943	Annually
	PT 1021-2 (rack 2)	0000227940	Annually
	PT 1021-3 (rack 3)	0000227938	Annually
	PIT 5103 (clearwell)	0000248492	Annually
Turbidity Meters	AIT 1019- R1 (rack 1)	0000056821	Quarterly
	AIT 1019- R2 (rack 2)	0000056823	Quarterly
	AIT 1019- R3 (rack 3)	0000056825	Quarterly
	AIT 5105 (clearwell)	0000248489	Quarterly
	AIT 219 (Mandaumin)	0000227890	Quarterly
Chlorine Analyzers	AIT 5109 (contact tank 1)	0000248483	Monthly
	AIT 5110 (contact tank 2)	0000248485	Monthly
	AIT 5101 (clearwell discharge)	0000248491	Monthly
	AIT 216 (Mandaumin)	0000227892	Monthly
Portable Chlorine Kit	Pocket Colorimeter	0000056435	Monthly
	Pocket Colorimeter	0000209687	Monthly

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

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

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

4. Related Documents

Facility Logbook

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

5. Revision History

Date	Revision #	Reason for Revision
2011-03-21	0	Procedure issued
2012-06-01	1	Changes per Corporate Template Update, hub re-structure and Management Review
2013-02-01	2	Revised per hub restructure
2014-01-31	3	Addition of Senior Operations Manager to 3.0
2014-03-20	4	Procedure Approved by revised to Senior Operations Manager position
2015-12-29	5	Remove Senior Operations Manager
2016-05-24	6	Re-add Senior Operations Manager, add table, revise 3.0 as per OFIs IA 2016-03-05
2016-09-29	7	Revise name of system as per change in OA
2017-11-03	8	Changed Senior Operator to OMTL. Added details to Analyzers AIT 219 and AIT 216
2018-11-12	9	QP-08 procedure renamed OP-17. Removed Scope and Responsibilities sections. Added s. 3.3 to clarify how calibration and/or verification activities are documented. Other minor edits.
2018-11-30	10	Added the portable chlorine analyzers under 3.4 as per IA 2018-11-30
2020-12-11	11	Revised portable chlorine analyzer numbers, Updated assets as some decommissioned and some added with upgrades, added location to assets.

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 Operations Management.

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

involve intervention from outside organizations (client, emergency responders, Ministry of the Environment and Climate Change, 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 Petrolia Drinking Water System include:

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

3.4 The processes for responding to and recovering from each potential emergency situation/service disruption are documented within a site-specific contingency plan (CP). The CPs and related standard operating procedures (SOPs) are contained within the FEP.

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

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

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

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

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

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

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)
Essential/Emergency Service and Supply Contact List (Contacts section of FEP)
OP-20 Management Review

5. Revision History

Date	Revision #	Reason for Revision
2011-03-01	0	Procedure issued
2012-06-01	1	Changes per Corporate Template Update, hub re-structure and Management Review
2013-02-01	2	Changes per hub restructure
2014-01-31	3	Addition of Senior Operations Manager to 3.0
2014-03-20	4	Revised procedure Approved by to Senior Operations Manager position
2015-12-03	5	Revised as per corporate review and OFI IA 2015-03-30, remove Senior Operations Manager
2016-05-24	6	Re-add Senior Operations Manager, update procedure with new corporate template as per OFI IA 2016-03-05
2016-09-29	7	Revise system name as per change in OA
2018-11-12	8	QP-09 procedure renamed OP-18. Removed Scope and Responsibilities sections and reordered some sections. Added definition 'Operations Management'. Throughout procedure replaced 'Senior Operations Manager' references with 'Operations Management'. Removed references to *'OCWA's Approach to Facility Emergency Planning'* document throughout procedure and referenced FEP instead. Aligned wording for level 1, 2 & 3 events (s. 3.2) with wording in '*OCWA's Emergency Response Plan*'. Updated training section to include role of SPC Manager (s. 3.5) and expanded testing/review section specifically to clarify how an actual test is documented (s. 3.6). Other minor edits

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 Petrolia Drinking Water Syetem 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 are also 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
Audit Reports
Summary Table of Action Items
Management Review Minutes
OP-05 Document and Records Control
OP-20 Management Review
OP-21 Continual Improvement

5. Revision History

Date	Revision #	Reason for Revision
2011-03-01	0	Procedure issued
2012-06-01	1	Changes per Corporate Template update, hub re-structure and Management Review
2013-02-01	2	Revised per hub restructure
2014-01-31	3	Addition of Senior Operations Manager to 3.0
2014-03-20	4	Additional reference to Senior Operations Manager position
2015-12-29	5	Revise procedure using corporate template, add QP-11 to 6.0, remove Senior Operations Manager
2016-05-24	6	Re-add Senior Operations Manager, add OCTL, Regional Hub Manager to 3.0 as per OFIs IA 2016-03-05
2016-09-29	7	Revise system name as per change in OA
2017-11-03	8	Changed OCTL to SPC Manager
2018-11-12	9	QP-10 procedure renamed OP-19. Removed Scope and Responsibilities sections and moved scope wording to purpose section. Added definition ‘Objective Evidence’ and modified ‘non-conformance’ definition. Replaced ‘audit evidence’ with ‘objective evidence’, and ‘conformity’ with ‘conformance’ throughout procedure. Replaced ‘once every 12 months’ with ‘once every calendar year’ (s. 3.2.1, s. 3.2.3 and s. 3.4.1) to reflect wording in DWQMS v. 2.0. Added s. 3.2.3 (and modified s. 3.4.1) to describe the frequency for auditing all DWSs covered in multi-facility Operational Plans. Changed s. 3.4.2 to include preventive actions, the results of the management review and the status/consideration of OFIs. Included wording ‘for each element’, and ‘identified referencing the requirement that was not met’ to s. 3.6.2. Moved description of process for corrective actions from QP-10 s. 5.7 and OFIs from QP-10 s. 5.8 to OP-21. Added s. 3.7 to refer to OP-21
2018-11-30	10	Re-worded 3.1.4.
2019-11-22	11	Removed “to be” in s3.1.4, changed the DWQMS Corrective Action Reports to the Summary Table of Action Items Spreadsheet as per IA 2019-10-15

MANAGEMENT REVIEW

Reviewed by: QEMS Representative	Approved by: Operations Management

1. Purpose

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

2. Definitions

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

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

Top Management – a person, persons or group of people at the highest management level within an operating authority that makes decisions respecting the QMS and recommendations to the owner respecting the subject system or subject systems. OCWA has defined Top Management for the Petrolia Drinking Water System as:

- Operations Management – Petrolia Cluster
- Regional Hub Manager – Southwest Regional Hub
- Safety, Process & Compliance (SPC) Manager – Southwest Regional Hub

3. Procedure

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

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

3.2 At a minimum, the QEMS Representative and Operations 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 representative(s) of the owner and/ or the municipality.

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
Summary Table of Action Items Spreadsheet

5. Revision History

Date	Revision #	Reason for Revision
2011-03-01	0	Procedure issued
2012-06-01	1	Changes per Corporate Template update, hub re-structure and Management Review
2013-02-01	2	Revised per hub restructure
2014-01-31	3	Addition of Senior Operations Manager to 3.0
2014-03-20	4	Addition of Senior Operations Manager made to 5.0 and Approved by
2015-12-29	5	Remove Senior Operations Manager
2016-05-24	6	Revise 5.2, add Senior Operator & OCTL to 3.0, revise Operator to Operator/Mechanic in 3.0 and remove Regional Compliance Advisor as per IA 2016-03-05
2016-09-29	7	Revise system name as per change in OA
2017-11-03	8	Changed OCTL to SPC Manager. Added endorsement currency to 5.2 as per internal audit January 9, 2017.
2018-11-12	9	Removed Scope and Responsibilities sections. Added definitions for Top Management and Operations Management. Revisions based on new requirements of the Standard; at least once every 12 months changed to once every calendar year (s. 3.1) and efficacy changed to effectiveness (s. 3.4). Added s. 3.2 and s. 3.3 to describe who is participating in the Management Review process. Added clarification on including any preventive actions implemented to address Opportunities for Improvement (OFI) or rationale as to why OFIs were not implemented when reviewing audit results (s. 3.4.e). Added Best Management Practices (BMPs) as a standing agenda item (s. 3.4.q). Added s. 3.5 to include consideration of BMPs and link OP-20 to OP-21 Continual Improvement.
2018-11-30	10	Changed wording to confirm who should attend meeting in 3.2 as per IA 2018-11-28
2019-11-22	11	Added the Summary Table of Action Items Spreadsheet to related documents

1. Purpose

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

2. Definitions

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

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

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

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

3. Procedure

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

3.2 Corrective Actions

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

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

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

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

3.2.4 The QEMS Representative ensures corrective actions are documented using Summary Table of Action Items 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 and/or the SPC Manager) considers whether a preventive action is necessary. The review may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate.

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

3.3.4 The implementation of preventive actions are tracked by the QEMS Representative using the Summary Table of Action Items Spreadsheet.

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

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

subsequent Management Review meetings.

3.5 Best Management Practices (BMPs)

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

3.5.2 BMPs may include, but are not limited to:

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

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

4. Related Documents

OP-05 Document and Records Control
OP-20 Management Review
Internal Audit Records
Summary Table of Action Items Spreadsheet

5. Revision History

Date	Revision #	Reason for Revision
2018-11-12	0	Procedure issued – The original information within the main body of OCWA's Operational Plan (Revision 9 dated 2017-11-03) was not used in OP-21 as it did meet the requirements of the new DWQMS v. 2.0. Information from QP-10 Internal Audit (s. 5.7 and s. 5.8) was incorporated into s. 3.2 and s. 3.3 of OP-21 but was modified to address non-conformances identified from additional inputs other than internal audits and preventive actions resulting from means other than OFIs from internal audits. In addition R&Rs were revised to include the SPC Manager, and to clarify the role of the QEMS Representative in investigating and determining corrective and preventive actions needed. A section on Best Management Practices (s. 3.5) was added to meet the new requirements of DWQMS v. 2.0.
2019-11-22	1	Replaced DWQMS Corrective Action Report with Summary Table of Action Items Spreadsheet as per IA 2019-10-15