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Introduction

The Safe Drinking Water Act, 2002 (SDWA) requires Owners and Operating Authorities of municipal residential drinking water systems to have an accredited Operating Authority. In order to become accredited, an Operating Authority must establish and maintain a Quality Management System (QMS). Minimum requirements for the QMS are specified in this Standard, the Drinking Water Quality Management Standard (DWQMS). Operating Authorities will be accredited by a third party Accreditation Body against the requirements of this Standard.

Operational Plan

The DWQMS requires an Operating Authority to document a Quality Management System for each ‘Subject System’ that it operates in an Operational Plan which must be accepted by the Ministry of the Environment and Climate Change. The term Subject System is used in the DWQMS to refer to either a municipal residential drinking water system or an Operational Subsystem, as applicable in the circumstances.

Where an Operating Authority is operating multiple Subject Systems for a single Owner, the Operating Authority may choose to develop QMS components that are common for all drinking water systems. The Operational Plan for the Subject System would contain these common components or would reference separate documents that would be available to users of the Operational Plan. The common QMS components would need to be implemented both at the Subject System level and at the corporate level, and corporate roles, responsibilities and authorities would need to be documented for each level.

Roles, Responsibilities and Authorities

The DWQMS requires that roles, responsibilities and authorities be defined. Where the Owner and Operating Authority are the same entity, the Operational Plan should identify a specific person, persons or group of people within the entity and their respective Owner and/or Operating Authority roles, responsibilities and authorities. If the same person, persons or group of people are assigned both Owner and Operating Authority roles, responsibilities and authorities, then the requirement to communicate the QMS
between Top Management and the Owner is met by the person, persons or group of people in possession of the information to be communicated.

In cases where the Owner has not assigned Operating Authority roles, responsibilities and authorities to a specific person, persons or group of people within the entity, the Owner will assume all of the roles, responsibilities and authorities of the Operating Authority. If the Owner is not the same entity as the Operating Authority, s. 14 of the SDWA specifies that the Owner and the Operating Authority shall enter into an agreement that identifies, among other things, their respective responsibilities. Section 11 of the SDWA provides further information on the Duties of Owners and Operating Authorities.

**Director’s Direction**

The Director’s Directions: Minimum Requirements for Operational Plans, issued under the authority of the SDWA, provides further direction respecting the minimum content of Operational Plans as well as rules respecting document retention, public disclosure of information and other requirements that the Director considers necessary for the purposes of the Act and its Regulations.

**Guidance Document**

The Ministry of the Environment and Climate Change has prepared a comprehensive guidance document entitled ‘Implementing Quality Management: a Guide for Ontario’s Drinking Water Systems’ that outlines QMS and DWQMS concepts and provides guidance on the development, implementation, maintenance and continual improvement of a Quality Management System. A copy of this document and additional guidance material is available at [ontario.ca/drinkingwater](http://ontario.ca/drinkingwater).
Drinking Water Quality Management Standard

Scope

This Standard specifies minimum requirements for the Quality Management System of an Operating Authority for a Subject System:

a) to facilitate the Operating Authority’s ability to consistently produce and/or deliver drinking water that meets applicable legislative, regulatory and Owner requirements, and

b) to enhance Consumer protection through the effective application and continual improvement of the Quality Management System.

Terms and Definitions

Applicable Legislative and Regulatory Requirements – the Safe Drinking Water Act, 2002, the Ontario Water Resources Act, and all regulations and instruments issued under these Acts which are associated with drinking water.

Audit – a systematic and documented verification process that involves objectively obtaining and evaluating documents and processes to determine whether a Quality Management System conforms to the requirements of this Standard.

Calendar Year – A period of one year beginning and ending with the dates conventionally accepted as marking the beginning and end of a year (January 1st to December 31st).

Consumer – the drinking water end user.

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

Critical Control Limit – the point at which a Critical Control Point response procedure is initiated.
Critical Control Point – 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 to reduce it to an acceptable level.

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.

Distribution System - 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.

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

a) a condition of the system or a condition associated with the systems’ 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


Drinking Water System – means a system of works, excluding plumbing, that is established for the purposes of providing users of the system with drinking water and that includes,

a) any thing used for the collection, production, treatment, storage, supply or distribution of water,

b) any thing that relates to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the Treatment System, and

c) a well or intake that serves as the source or entry point of raw water supply for the system
Municipal Drinking Water System – means a drinking water system or part of a drinking water system,

   a) that is owned by a municipality or by a municipal service board established under section 195 of the Municipal Act, 2001,
   b) that is owned by a corporation established under section 203 of the Municipal Act, 2001,
   c) from which a municipality obtains or will obtain water under the terms of a contract between the municipality and the Owner of the system, or
   d) that is in a prescribed class.

Municipal Residential Drinking Water System – a large municipal residential system or a small municipal residential system as defined in O. Reg. 170/03.

Operating Authority - means, in respect of a Subject System, the person or entity that is given responsibility by the Owner for the operation, management, maintenance or alteration of the Subject System.

Operational Plan - means, in respect of a Subject System, the Operational Plan required by the Director’s Direction.

Operational Subsystem – means a part of a Municipal Residential Drinking Water System operated by a single Operating Authority and designated by the Owner as being an Operational Subsystem.

Owner – includes, in respect of a Drinking Water System, every person who is a legal or beneficial owner of all or part of the system, but does not include the Ontario Clean Water Agency or any of its predecessors where the Agency or predecessor is registered on title as the Owner of the system.

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

Public – Subject System Consumers and stakeholders.

Quality Management System (QMS) – a system to:

   a) establish policy and objectives, and to achieve those objectives, and
   b) direct and control an organization with regard to quality.
**Record** – a document stating results achieved or providing proof of activities performed.

**Secondary Disinfection** – 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, and
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).

**Subject System** – means:

a) a Municipal Residential Drinking Water System where the system is operated by one Operating Authority, or
b) an Operational Subsystem where two or more parts of a Municipal Residential Drinking Water System are operated by different Operating Authorities.

**Supplier** – an organization or person that provides a product or service that affects 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.

**Treatment System** - 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.
PLAN and DO elements of the Quality Management Standard

1. Quality Management System

**PLAN** – The Operational Plan shall document a Quality Management System that meets the requirements of this Standard.

**DO** – The Operating Authority shall establish and maintain the Quality Management System in accordance with the requirements of this Standard and the policies and procedures documented in the Operational Plan.

2. Quality Management System Policy

**PLAN** – The Operational Plan shall document a Quality Management System Policy that provides the foundation for the Quality Management System, and:

a) includes a commitment to the maintenance and continual improvement of the Quality Management System,

b) includes a commitment to the Consumer to provide safe drinking water,

c) includes a commitment to comply with applicable legislation and regulations, and

d) is in a form that can be communicated to all Operating Authority personnel, the Owner and the Public.

**DO** – The Operating Authority shall establish and maintain a Quality Management System that is consistent with the Policy.
3. **Commitment and Endorsement**

**PLAN** – The Operational Plan shall contain a written endorsement of its contents by Top Management and the Owner.

**DO** – Top Management shall provide evidence of its commitment to an effective Quality Management System by:

   a) ensuring that a Quality Management System is in place that meets the requirements of this Standard,

   b) ensuring that the Operating Authority is aware of all applicable legislative and regulatory requirements,

   c) communicating the Quality Management System according to the procedure for communications,

   d) determining, obtaining or providing the resources needed to maintain and continually improve the Quality Management System.

4. **Quality Management System Representative**

**PLAN** – The Operational Plan shall identify a Quality Management System representative.

**DO** – Top Management shall appoint and authorize a Quality Management System representative who, irrespective of other responsibilities, shall:

   a) administer the Quality Management System by ensuring that processes and procedures needed for the Quality Management System are established and maintained,

   b) report to Top Management on the performance of the Quality Management System and any need for improvement,

   c) ensure that current versions of documents required by the Quality Management System are being used at all times,

   d) ensure that personnel are aware of all Applicable Legislative and Regulatory Requirements that pertain to their duties for the operation of the Subject System, and

   e) promote awareness of the Quality Management System throughout the Operating Authority.
5. **Document and Records Control**

**PLAN** – The Operational Plan shall document a procedure for Document and Records control that describes how:

a) Documents required by the Quality Management System are:
   i. kept current, legible and readily identifiable
   ii. retrievable
   iii. stored, protected, retained and disposed of, and

b) Records required by the Quality Management System are:
   i. kept legible, and readily identifiable
   ii. retrievable
   iii. stored, protected, retained and disposed of.

**DO** – The Operating Authority shall implement and conform to the procedure for Document and Records control and shall ensure that the Quality Management System documentation for the Subject System includes:

a) the Operational Plan and its associated policies and procedures,

b) Documents and Records determined by the Operating Authority as being needed to ensure the effective planning, operation and control of its operations, and

c) the results of internal and external Audits and management reviews.
6. Drinking Water System

PLAN – The Operational Plan shall document, as applicable:

a) for the Subject System:
   
i. the name of the Owner and Operating Authority,
   
ii. if the system includes equipment that provides Primary and/or Secondary Disinfection:
      
A. a description of the system including all applicable Treatment System processes and Distribution System components,
      
B. a Treatment System process flow chart,
      
C. a description of the water source, including:
         
   I. general characteristics of the raw water supply,
   
   II. common event-driven fluctuations, and
   
   III. any resulting operational challenges and threats.

iii. if the system does not include equipment that provides Primary or Secondary Disinfection:
      
A. a description of the system including all Distribution System components, and
      
B. a description of any procedures that are in place to maintain disinfection residuals.

b) if the Subject System is an Operational Subsystem, a summary description of the Municipal Residential Drinking Water System it is a part of including the name of the Operating Authority for the other Operational Subsystems.

c) if the Subject System is connected to one or more other Drinking Water Systems owned by different Owners, a summary description of those systems which:
   
i. indicates whether the Subject System obtains water from or supplies water to those systems,
   
ii. names the Owner and Operating Authority(ies) of those systems, and
   
iii. identifies which, if any, of those systems that the Subject System obtains water from are relied upon to ensure the provision of safe drinking water.

DO – The Operating Authority shall ensure that the description of the Drinking Water System is kept current.
7. **Risk Assessment**

**PLAN** – The Operational Plan shall document a risk assessment process that:

a) Considers potential hazardous events and associated hazards, as identified in the Ministry of the Environment and Climate Change document titled Potential Hazardous Events for Municipal Residential Drinking Water Systems.

b) Identifies additional potential hazardous events and associated hazards,

c) Assesses the risks associated with the occurrence of hazardous events,

d) Ranks the hazardous events according to the associated risk,

e) Identifies control measures to address the potential hazards and hazardous events,

f) Identifies Critical Control Points,

g) Identifies a method to verify, at least once every calendar year, the currency of the information and the validity of the assumptions used in the risk assessment,

h) Ensures that the risks are assessed at least once every thirty-six months, and

i) Considers the reliability and redundancy of equipment.

**DO** – The Operating Authority shall perform a risk assessment consistent with the documented process.
8. **Risk Assessment Outcomes**

**PLAN** – The Operational Plan shall document:

- a) the identified potential hazardous events and associated hazards,
- b) the assessed risks associated with the occurrence of hazardous events,
- c) the ranked hazardous events,
- d) the identified control measures to address the potential hazards and hazardous events,
- e) the identified Critical Control Points and their respective Critical Control Limits,
- f) procedures and/or processes to monitor the Critical Control Limits,
- g) procedures to respond to deviations from the Critical Control Limits, and
- h) procedures for reporting and recording deviations from the Critical Control Limits.

**DO** – The Operating Authority shall implement and conform to the procedures.

9. **Organizational Structure, Roles, Responsibilities and Authorities**

**PLAN** – The Operational Plan shall:

- a) describe the organizational structure of the Operating Authority including respective roles, responsibilities and authorities,
- b) delineate corporate oversight roles, responsibilities and authorities in the case where the Operating Authority operates multiple Subject Systems,
- c) identify the person, persons or group of people within the management structure of the organization responsible for undertaking the Management Review,
- d) identify the person, persons or group of people, having Top Management responsibilities required by this Standard, along with their responsibilities, and
- e) identify the Owner of the Subject System.

**DO** – The Operating Authority shall keep current the description of the organizational structure including respective roles, responsibilities and authorities, and shall communicate this information to Operating Authority personnel and the Owner.
10. Competencies

PLAN – The Operational Plan shall document:

a) competencies required for personnel performing duties directly affecting drinking water quality,

b) activities to develop and/or maintain competencies for personnel performing duties directly affecting drinking water quality, and

c) activities to ensure that personnel are aware of the relevance of their duties and how they affect safe drinking water.

DO – The Operating Authority shall undertake activities to:

a) meet and maintain competencies for personnel directly affecting drinking water quality and shall maintain records of these activities, and

b) ensure that personnel are aware of the relevance of their duties and how they affect safe drinking water, and shall maintain records of these activities.

11. Personnel Coverage

PLAN – The Operational Plan shall document a procedure to ensure that sufficient personnel meeting identified competencies are available for duties that directly affect drinking water quality.

DO – The Operating Authority shall implement and conform to the procedure.

12. Communications

PLAN – The Operational Plan shall document a procedure for communications that describes how the relevant aspects of the Quality Management System are communicated between Top Management and:

a) the Owner,

b) Operating Authority personnel,

c) Suppliers that have been identified as essential under Plan (a) of Element 13 of this Standard, and

d) the Public.

DO – The Operating Authority shall implement and conform to the procedure.
13. Essential Supplies and Services

**PLAN** – The Operational Plan shall:

a) identify all supplies and services essential for the delivery of safe drinking water and shall state, for each supply or service, the means to ensure its procurement, and

b) include a procedure by which the Operating Authority ensures the quality of essential supplies and services, in as much as they may affect drinking water quality.

**DO** – The Operating Authority shall implement and conform to the procedure.

14. Review and Provision of Infrastructure

**PLAN** – The Operational Plan shall document a procedure for reviewing the adequacy of the infrastructure necessary to operate and maintain the Subject System that:

a) Considers the outcomes of the risk assessment documented under Element 8, and

b) Ensures that the adequacy of the infrastructure necessary to operate and maintain the Subject System is reviewed at least once every Calendar Year.

**DO** – The Operating Authority shall implement and conform to the procedure and communicate the findings of the review to the Owner.
15. Infrastructure Maintenance, Rehabilitation and Renewal

**PLAN** – The Operational Plan shall document:

a) a summary of the Operating Authority’s infrastructure maintenance, rehabilitation and renewal programs for the Subject System, and

b) a long term forecast of major infrastructure maintenance, rehabilitation and renewal activities.

**DO** – The Operating Authority shall:

a) keep the summary of the infrastructure maintenance, rehabilitation and renewal programs current,

b) ensure that the long term forecast is reviewed at least once every Calendar Year,

c) communicate the programs to the Owner, and

d) monitor the effectiveness of the maintenance program.

16. Sampling, Testing and Monitoring

**PLAN** – The Operational Plan shall document:

a) a sampling, testing and monitoring procedure for process control and finished drinking water quality including requirements for sampling, testing and monitoring at the conditions most challenging to the Subject System,

b) a description of relevant sampling, testing or monitoring activities, if any, that take place upstream of the Subject System, and

c) a procedure that describes how sampling, testing and monitoring results are recorded and shared between the Operating Authority and the Owner, where applicable.

**DO** – The Operating Authority shall implement and conform to the procedures.
17. Measurement and Recording Equipment Calibration and Maintenance

**PLAN** – The Operational Plan shall document a procedure for the calibration and maintenance of measurement and recording equipment.

**DO** – The Operating Authority shall implement and conform to the procedure.

18. Emergency Management

**PLAN** – The Operational Plan shall document a procedure to maintain a state of emergency preparedness that includes:

a) a list of potential emergency situations or service interruptions,

b) processes for emergency response and recovery,

c) emergency response training and testing requirements,

d) Owner and Operating Authority responsibilities during emergency situations,

e) references to municipal emergency planning measures as appropriate, and

f) an emergency communication protocol and an up-to-date list of emergency contacts.

**DO** – The Operating Authority shall implement and conform to the procedure.
CHECK elements of the Quality Management Standard

19. Internal Audits

**PLAN** – The Operational Plan shall document a procedure for internal Audits that:

a) evaluates conformity of the Quality Management System with the requirements of this Standard,

b) identifies internal Audit criteria, frequency, scope, methodology and record-keeping requirements,

c) considers previous internal and external Audit results, and

d) describes how Quality Management System Corrective Actions are identified and initiated.

**DO** – The Operating Authority shall implement and conform to the procedure and shall ensure that internal Audits are conducted at least once per Calendar Year.
20. Management Review

**PLAN** – The Operational Plan shall document a procedure for management review that evaluates the continuing suitability, adequacy and effectiveness of the Quality Management System and that includes consideration of:

- a) incidents of regulatory non-compliance,
- b) incidents of adverse drinking water tests,
- c) deviations from Critical Control Point limits and response actions,
- d) the effectiveness of the risk assessment process,
- e) internal and third-party Audit results,
- f) results of emergency response testing,
- g) operational performance,
- h) raw water supply and drinking water quality trends,
- i) follow-up on action items from previous management reviews,
- j) the status of management action items identified between reviews,
- k) changes that could affect the Quality Management System,
- l) Consumer feedback,
- m) the resources needed to maintain the Quality Management System,
- n) the results of the infrastructure review,
- o) Operational Plan currency, content and updates, and
- p) staff suggestions.

**DO** – Top Management shall implement and conform to the procedure and shall:

- a) ensure that a management review is conducted at least once every Calendar Year,
- b) consider the results of the management review and identify deficiencies and actions items to address the deficiencies,
- c) provide a record of any decisions and action items related to the management review including the personnel responsible for delivering the action items and the proposed timelines for their implementation, and
- d) report the results of the management review, the identified deficiencies, decisions and action items to the Owner.
IMPROVE element of the Quality Management Standard

21. Continual Improvement

**PLAN** – The Operating Authority shall develop a procedure for tracking and measuring continual improvement of its Quality Management System by:

a) reviewing and considering applicable best management practices, including those published by the Ministry of the Environment and Climate Change, at least once every thirty-six months;

b) documenting a process for identification and management of Quality Management System Corrective Actions that includes:

i. investigating the cause(s) of an identified non-conformity,

ii. documenting the action(s) that will be taken to correct the non-conformity and prevent the non-conformity from re-occurring, and

iii. reviewing the action(s) taken to correct the non-conformity, verifying that they are implemented and are effective in correcting and preventing the re-occurrence of the non-conformity.

c) documenting a process for identifying and implementing preventive actions to eliminate the cause of potential non-conformities in the Quality Management System that includes:

i. reviewing potential non-conformities that are identified to determine if preventive actions may be necessary,

ii. documenting the outcome of the review, including the action(s), if any, that will be taken to prevent a non-conformity from occurring, and

iii. reviewing the action(s) taken to prevent a non-conformity, verifying that they are implemented and are effective in preventing the occurrence of the non-conformity.

**DO** – The Operating Authority shall strive to continually improve the effectiveness of its Quality Management System by implementing and conforming to the procedure