

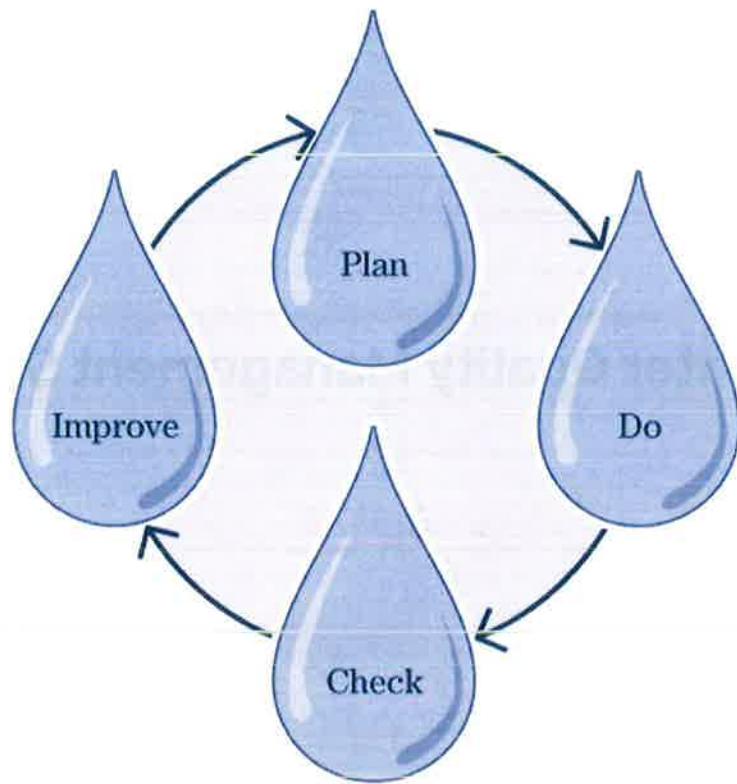


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# **Drinking Water Quality Management Standard**

**Ministry of the Environment, Conservation and Parks**

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A copy of this document can be obtained from:

Client Services & Permissions Branch

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# Introduction

Ontario has established a strong regulatory framework for drinking water systems in the province. This framework under the *Safe Drinking Water Act, 2002* (SDWA or Act) and related regulations focuses on compliance-based results which are verified through the Ministry of the Environment, Conservation and Parks' compliance and abatement programs.

The Drinking Water Quality Management Standard (DWQMS or this Standard) is the Quality Management Standard approved under s. 21 of the SDWA, and complements this legislative and regulatory framework by endorsing a proactive and preventive approach to assuring drinking water quality. This approach includes consideration of elements that are fundamental to ensuring the long-term sustainability of a Drinking Water System including: Management processes employed within the system; the maintenance of infrastructure used to supply drinking water; and, identification of potential risks and risk mitigation strategies for items such as system security, water treatment, and the impacts of climate change.

The 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 DWQMS. Operating Authorities are 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, Conservation and Parks. 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 Directions

The Director's Directions: Minimum Requirements for Operational Plans, issued under s.15 of the SDWA (Director's Directions), 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. The Director's Directions may be amended, revoked or replaced by the Director under s.15(3) of the Act and the amendment, revocation or replacement is effective when notice is given on the Environmental Registry of Ontario in accordance with s.15(6). The current version of the Director's Directions is available at [www.ontario.ca/drinkingwater](http://www.ontario.ca/drinkingwater).

# Guidance Document

Additional information and guidance relating to QMS and DWQMS concepts is available in "Ontario's' Drinking Water Quality Management Standard – Pocket Guide" and other materials available at [www.ontario.ca/drinkingwater](http://www.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

In the DWQMS these terms have the following meaning:

**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** – has the same meaning as "document" defined in s. 2(1) of the Act.

**Director** – means the director appointed for the purposes of s.15 of the Act.

**Distribution System** – has the same meaning as "distribution system" defined in s. 2(1) of the Act.

**Drinking Water Health Hazard** – has the same meaning as "drinking water health hazard" defined in s. 2(1) of the Act.

**Drinking Water Quality Management Standard (DWQMS or this Standard)** – has the same meaning as Quality Management Standard for Drinking Water Systems approved under s. 21 of the Act.

**Drinking Water System** – has the same meaning as "drinking water system" defined in s. 2(1) of the Act.

**Environmental Registry of Ontario** – has the same meaning as "Registry" defined in s.2(1) of the Act.

**Examination Summary Report** – a report summarizing sampling, testing and monitoring information that is created for the purpose of demonstrating compliance with legislated requirements for a given time period.

**Municipal Drinking Water System** – has the same meaning as "municipal drinking water system" defined in s. 2(1) of the Act.

**Municipal Residential Drinking Water System** – has the same meaning as "large municipal residential system" or "small municipal residential system" defined in s. 1(1) of 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 Directions.

**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** – has the same meaning as "owner" defined in s. 2(1) of the Act.

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

**Primary Disinfection** – has the same meaning as "primary disinfection" defined in s. 1(1) of O. Reg. 170/03.

**Public** – Subject System Consumers and stakeholders.

**Quality Management System (QMS)** – a system to:

- a) establish policy and objectives,
- b) achieve established objectives, and
- c) direct and control an organization with regard to quality.

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

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

**Secondary Disinfection** – has the same meaning as "secondary disinfection" defined in s. 1(1) of O. Reg. 170/03.

**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** – has the same meaning as "treatment system" defined in s. 2(1) of the Act.

# 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 Quality Management System Policy.

### 3. Commitment and Endorsement

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

**DO** – The Operational Plan shall contain a written endorsement and 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. a high-level description of the system including all Treatment System processes and Distribution System components, as applicable.
  - iii. if the system includes a Treatment System:
    - A. a Treatment System process flow chart,
    - B. 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.
  - iv. if the system includes a Distribution System:
    - A. 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(ies) 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, Conservation and Parks document titled "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as amended from time to time).
- 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 role and/or job title of the person, persons or group of people within the management structure of the organization responsible for undertaking the Management Review described in Element 20,
- d) identify role and/or job title of 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, including any mandatory licensing, certification or training requirements,
- 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. The procedure shall consider:

- a) periods of routine operation, including weekdays, weekends, and statutory holidays
- b) labour disruptions (i.e., strike or lockout)
- c) emergency situations

**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:

- a) Top Management,
- b) the Owner,
- c) Operating Authority personnel,
- d) External service providers and Suppliers, and
- e) 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.
- d) a procedure for preparing Examination Summary Reports that conforms to the applicable best management practices published or endorsed by the Ministry of the Environment, Conservation and Parks, where the Operating Authority will use Examination Summary Reports to demonstrate compliance with sampling, testing, and monitoring requirements.

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

## 17. Measurement and Recording

### Equipment Calibration, Verification and Maintenance

**PLAN** – The Operational Plan shall document a procedure for the calibration, verification 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 emergency service interruptions that considers the outcomes of the risk assessment documented under Element 8,
- b) processes for emergency response and recovery,
- c) emergency response training requirements,
- d) emergency response testing requirements, including frequency, scope, and post-testing review of the effectiveness of response processes,
- e) Owner and Operating Authority responsibilities during emergency situations,
- f) references to municipal emergency planning measures as appropriate, and
- g) an emergency communication protocol and an up-to-date list of emergency contacts.

**DO** – The Operating Authority shall:

- a) implement and conform to the procedure, and

- b) ensure that emergency response testing is conducted at least once every calendar year.

# 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, and,
- c) considers previous internal and external Audit results

**DO** – The Operating Authority shall implement and conform to the procedure and shall ensure that internal Audits are conducted at least once every 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) the Quality Management System policy,
- b) incidents of regulatory non-compliance,
- c) incidents of adverse drinking water tests,
- d) deviations from Critical Control Limits and response actions,
- e) the effectiveness of the risk assessment process, including any updates to the assumptions used in the risk assessment and/or any updates to the risk assessment outcomes,
- f) internal and third-party Audit results,

- g) results of emergency response testing,
- h) operational performance,
- i) quality and quantity trends associated with raw water supply,
- j) drinking water quality trends,
- k) follow-up on action items from previous management reviews,
- l) the status of management action items identified between reviews,
- m) changes that could impact the Quality Management System, including new or updated policies or legislation,
- n) Consumer feedback,
- o) the resources needed to maintain the Quality Management System,
- p) the results of the infrastructure review,
- q) Operational Plan currency, content and updates, and
- r) 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,
- d) report the results of the management review, the identified deficiencies, decisions and action items to the Owner, and
- e) report relevant outcomes from the management review to Operating Authority personnel.

# 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 any published by the Ministry of the Environment, Conservation and Parks, 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 using an established methodology for root cause analysis,
  - ii. documenting the action(s) that will be taken to react, correct 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 identification and implementation of Preventive Actions to prevent the occurrence of non-conformities in the Quality Management System that includes:
  - i. reviewing processes and procedures 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.