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# ONTARIO'S DRINKING WATER QUALITY MANAGEMENT STANDARD

POCKET GUIDE

PIBS 6278e

*Protecting our environment.*



The Drinking Water Quality Management Standard (DWQMS) was developed in partnership between the Ministry of the Environment and Ontario's water sector.

The version of the DWQMS referenced in this pocket guide is the final version posted on Ontario's Environmental Registry on October 29, 2006.

Remember, this is only a summary. To be clear about your specific legal requirements, you should refer to the *Safe Drinking Water Act, 2002, (SDWA)* and the regulations and other instruments made under that Act. For more information, please access the *Drinking Water Ontario* portal at <http://www.ontario.ca/drinkingwater> or call the ministry's Public Information Centre at 1-800-565-4923.

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## Introduction

Justice Dennis O'Connor, in Part Two of the Report of the Walkerton Inquiry, recommended the adoption of quality management for municipal drinking water systems. It was also recommended that a quality management standard specifically designed for drinking water systems be developed and implemented in Ontario, thus leading to the creation of the Drinking Water Quality Management Standard (DWQMS or the Standard).

The adoption of quality management systems (QMS) is not new to the drinking water community in Ontario; however the requirement to implement the DWQMS is now mandated through the SDWA.

## The Pocket Guide

This guide was developed to:

- Provide an overview of the ministry's Municipal Drinking Water Licensing Program including an explanation of what drinking water system owners will need to do in order to obtain a municipal drinking water licence for their system(s),
- Provide relevant terms and definitions,
- List all of the elements of the DWQMS and provide a plain language summary of what they mean, and
- Tell the reader where to find further information about each element of the DWQMS in *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## The Municipal Drinking Water Licensing Program

The Licensing Program is a new approvals framework for municipal residential drinking water systems. In order to be issued a licence, the ministry will require an owner to have the following:

### A Drinking Water Works Permit (DWWP)

- a permit to establish or alter a drinking water system (together with a licence, this will replace the certificates of approval)

### A Permit To Take Water (PTTW)

- a valid PTTW is required to be in place

### An Accepted Operational Plan

- the plan will be based on the DWQMS
- the plan will document an operating authority's QMS

### An Accredited Operating Authority

- a third-party audit of an operating authority's QMS will be the basis for accreditation

### A Financial Plan

- as required under the Financial Plans Regulation (O. Reg. 453/07)

## Licensing of Municipal Drinking-Water Systems Regulation

The Licensing of Municipal Drinking-Water Systems Regulation (O. Reg. 188/07) specifies dates on or before which owners of municipal residential drinking water systems must submit to the ministry their

operational plans, applications for drinking water works permits and applications for municipal drinking water licences. Subsequent submissions of operational plans and applications for licence renewals will be required through conditions placed on licences.

### **Quality Management Systems**

A QMS is a system to:

- establish policy and objectives and achieve those objectives, and
- direct and control an organization with regard to quality.

Quality management for Ontario's municipal drinking water systems will occur through the development and implementation of a QMS for each system based upon the DWQMS.

### **The Drinking Water Quality Management Standard**

The DWQMS sets out a framework for the operating authority and the owner of a drinking water system to develop a QMS that is relevant and appropriate for the system.

The DWQMS contains elements of both the ISO 9001 standard with respect to management systems and the Hazard Analysis and Critical Control Points (HACCP) standard with respect to product safety. The DWQMS also incorporates the HACCP approach to risk assessment and reflects the multi-barrier approach for drinking water safety.

The DWQMS approach emphasizes the importance of:

- proactive and preventative rather than strictly reactive management strategies to identify and manage risks to public health,
- the establishment and documentation of management procedures,
- meeting the management procedures, and
- continuous improvement of your management system.

### **Director's Directions – Minimum Requirements for Operational Plans – Municipal Drinking-Water Systems**

The Director's Direction, 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 SDWA and its regulations.

### **The Operational Plan**

Operational plans are the written documentation of the operating authority's QMS developed for a 'subject system' to meet the requirements of the DWQMS.

### **Accreditation**

In the context of the Licensing Program, accreditation is the verification by a third-party accreditation body that an operating authority has a QMS in place for a specific drinking water system that meets the requirements of the DWQMS. Accreditation will be given to the operating authority.

## Accreditation Protocol

The accreditation processes for the establishment and administration of an accreditation program by an accreditation body have been outlined in a document entitled **Accreditation Protocol – Operating Authorities – Municipal Drinking-Water Systems – July 2007**.

The protocol provides instructions to the accreditation body including matters relating to:

- Options for accreditation,
- Assignment of auditors,
- Public notification of audit results,
- Audit cycles, and
- Appeals.

## 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.

When it is proclaimed (currently anticipated in 2013), section 14 of the SDWA will require that where the owner is not the same entity as the operating authority, 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.

## Terms and Definitions

**Applicable Legislative and Regulatory Requirements** – the *Safe Drinking Water Act, 2002*, the *Ontario Water Resources Act, 1990* 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 the DWQMS.

**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.

**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 Quality Management Standard (DWQMS)** – the Standard and its collective requirements for a quality management system.

**Drinking Water System** – means a system of works, excluding plumbing, that is established for the purpose 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.

**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.

**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.

## Steps for Implementing the DWQMS

The following is a summary of the recommended steps to follow in order to implement the DWQMS:

- Pick the QMS implementation lead (may be the same person as the QMS representative)
- Set up the QMS implementation team
- Ensure that the team members are adequately trained on the DWQMS and quality management
- Ensure that the implementation team members are aware of their roles in the development of the QMS as well as those of the other members
- Identify top management and the QMS representative
- Develop the QMS policy
- Obtain commitment and endorsement of the QMS from top management and the owner
- Conduct a gap analysis to determine what elements of the DWQMS you currently have or do not have in place at your drinking water system(s)
- Create an implementation action plan
- Implement the DWQMS through the preparation of the operational plan
- Perform an internal audit of your QMS (usually done after the QMS has been in place for several months)
- Conduct a management review of the QMS

Follow up the management review by ensuring all corrective actions or changes to the QMS identified during the review are implemented.

## PLAN and DO Elements of the DWQMS

### DWQMS Element 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.

#### What does it mean?

Element 1 requires that you develop and document a QMS that meets the requirements of the DWQMS. The PLAN elements of the DWQMS outline what must be documented in the operational plan. By completing each of the PLAN sections you will end up with a description of what you have in place for all of the elements in the DWQMS and the majority of your operational plan will be developed.

The DO requirement of this element requires that you establish and maintain the QMS according to what you have written in your operational plan, and according to the requirements of the DWQMS.

The operational plan is a document or series of documents that outlines the processes and procedures for the overall quality management of the drinking water system. For smaller systems, these may all be contained in one document. For medium and larger-sized systems, the operational plan may be one main document which outlines key points, then refers to other documents, which are located throughout the water system. It is not a requirement that all documents in the operational plan be collated, but they should be thorough, complete, and easy to follow.

Further information about Element 1 can be found in **Chapter 5** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## DWQMS Element 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) is appropriate for the size and type of the subject system,
- b) includes a commitment to the maintenance and continual improvement of the Quality Management System,
- c) includes a commitment to the consumer to provide safe drinking water,
- d) includes a commitment to comply with applicable legislation and regulations, and
- e) is in a form that provides for ready communication 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.

### What does it mean?

Element 2 of the DWQMS requires the development of a QMS policy. A policy is the driver for the quality management system – firm documented commitments to demonstrate the operating authority's assurance that quality management is important in their management and operation of the drinking water system. The PLAN component outlines three main commitments that must be in the policy: to maintain and continually improve the QMS, to comply with applicable legislation and regulations, and to provide safe drinking water to the consumer. In this manner, the organization's commitment to drinking water quality is documented. The PLAN component of this element also requires that the policy be in a form that can be easily communicated.

The DO component requires that the operating authority ensures the QMS is consistent with the commitments made in the QMS policy.

The policy statement can include additional commitments beyond the ones listed above. Keep in mind that if additional commitments are made in the policy statement, the external auditor will seek proof that they are being met. As these additional commitments are not a required part of the DWQMS, they do not have to be documented in the operational plan; however some organizations may choose to do so.

Examples of additional commitments are:

- Promoting resource stewardship, including conservation,
- Being a quality leader in the water sector, and
- Conducting business in an environmentally responsible manner.

Further information about Element 2 can be found in **Chapter 6** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

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

#### What does it mean?

This is a critical element to put into place early on in the implementation. The PLAN component of Element 3 requires that the operational plan is endorsed, in writing, by top management and the owner. The DO component of Element 3 requires that top management is able to **prove** its commitment to the QMS. Top management must be aware of the QMS, and provide direction and resources. If top management is not the owner then it must work with them to obtain the resources required to implement the QMS. There are broad responsibilities for top management outlined in the DO component of Element 3. Documents and records that will be created as a result of implementing the QMS will help provide proof of management commitment.

Top management commitment is a crucial part of a successful QMS implementation. Without the authority, direction and support of top management, it would be very difficult to plan the implementation and to create a QMS. The QMS must be adopted as an integral part of your organization and necessary resources must be provided, from now and into the future. The lack of top management commitment can be a major reason for the failure of management systems.

The DWQMS definition for top management requires that your top management must be people that meet the following criteria:

- They work within the operating authority,
- They will make decisions about your QMS,
- They will make recommendations to the owner about the subject system or subject systems, and
- They are at the highest level of management within the operating authority making these decisions and recommendations.

Top management does not have to be a single person. The intent is, however, that top management includes all levels of management, including the highest corporate level if appropriate. Some examples of top management are provided below.

**Small private operating authority overseeing a small number of drinking water systems in part of Ontario** – Top management could consist of the President and the Board Members of the operating authority.

**Large private operating authority overseeing several drinking water systems across the province**

– Top management could consist of the Chief Executive Officer (CEO) and Board Members of the operating authority. In addition, district managers responsible for certain parts of the province would also be part of top management.

**Small municipal operating authority** – For municipalities that operate only one or two small drinking water systems, top management could consist of the Water System manager and the Water Committee Chair (usually a member of council that liaises between drinking water system staff and the mayor and council).

**Large municipal operating authority** – For municipalities that operate several systems, top management could consist of two levels – corporate and operational. Corporate top management could consist of the Commissioner of Public Works and the Director of Water Supply. Operational top management could consist of the system managers and supervisors.

Keep in mind that the DWQMS is not intended to be prescriptive – you make the decision on who is top management based on your particular organizational structure.

Further information about Element 3 can be found in **Chapter 7** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## DWQMS Element 4 – QMS 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.

### What does it mean?

Element 4 describes specific requirements for a special role in the QMS – the Quality Management System Representative – who is appointed by top management. Element 4 requires that the operational plan identifies a QMS representative. The responsibilities and authorities for that specific role are prescribed in parts a) to e) of the DO component. The QMS representative is generally responsible for the QMS, and channels important QMS information to top management. The QMS representative may be, but is not required to be, from top management. The QMS representative can also be the same person as your QMS Implementation Lead.

Further information about Element 4 can be found in **Chapter 8** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## DWQMS Element 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.

### What does it mean?

Element 5 requires that you establish a process to manage and control the documents and records needed by the QMS, and that you need a procedure to describe this process. A document and records control process is necessary to ensure that documents are kept up-to-date with changes in your operations and changes in applicable legislation and regulations, and that documents and records are legible, and can be easily located and identified. The procedure must also describe how documents and records are stored (so that they are protected from damage or loss), define record retention times, and outline methods for disposal afterwards.

The DO component of this Element requires that you follow the procedure. It also details what documentation constitutes the documented QMS. The creation and management of these documents and records are implicitly covered by following the procedure.

It may not be necessary to create a new document or records management system if you have one currently in place. However, you should review your document and records management system and determine if changes are necessary to meet the requirements of the DWQMS.

Further information about Element 5 can be found in **Chapter 9** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. A template for a Document and Records Control Table can also be found in **Appendix C** of the guide.

## DWQMS Element 6 – Drinking-Water System

PLAN – The Operational Plan shall document, as applicable:

- a) for the subject system:
  - i) a description of the system including all treatment processes and distribution system components
  - ii) the name of the Owner and Operating Authority
  - iii) a process flow chart
  - iv) 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
  - v) a description of any critical upstream or downstream processes relied upon to ensure the provision of safe drinking water.
- b) if the subject system is an operational subsystem, a summary description of the municipal residential drinking-water system it is a part of.
- 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, and
  - ii) names the Owner and Operating Authority of those systems.

DO – The Operating Authority shall ensure that the description of the drinking-water system is kept current.

### What does it mean?

The purpose of Element 6 of the DWQMS is to provide a broad overview and foster a basic understanding of your drinking water system and its water source. **The outcome of this task is a process description and flow chart.** Your drinking water system should be described including key treatment processes such as primary and secondary disinfection. Major components of your distribution system should also be described.

The name of the owner and operating authority should be documented. If your system is part of a larger drinking water system, the larger system must be described and the owner and operating authority should also be named. Although not required by the DWQMS, a general description of both the owner and operating authority, and the relationship between the two, can be useful and very informative.

The water source should be identified and described. This description may possibly be obtained from your First Engineer's Report. The water source should be characterized in terms of both general characteristics of the raw water supply, and common event driven fluctuations due to changes of seasons, storms, spring run-off, algae blooms, lake turnover, etc. Key operational challenges and threats should also be identified.

You must also show important processes beyond the system boundaries upon which you rely. For example, if your system consists of a distribution system only, a critical upstream process relied upon is the supply of safe drinking water and the operation of the drinking water system that supplies your water.

Finally, the DO component of Element 6 requires that you keep all of this information current.

Further information about Element 6 can be found in **Chapter 10** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## DWQMS Elements 7 and 8 – Risk Assessment and Risk Assessment Outcomes

### DWQMS Element 7 – Risk Assessment

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

- a) identifies potential hazardous events and associated hazards,
- b) assesses the risks associated with the occurrence of hazardous events,
- c) ranks the hazardous events according to the associated risk,
- d) identifies control measures to address the potential hazards and hazardous events,
- e) identifies critical control points,
- f) identifies a method to verify at least once a year, the currency of the information and the validity of the assumptions used in the risk assessment,
- g) ensures that a risk assessment is conducted at least once every thirty-six months, and
- h) considers the reliability and redundancy of equipment.

DO – The Operating Authority shall perform a risk assessment consistent with the documented process.

### DWQMS Element 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.

### What do they mean?

Elements 7 and 8 of the DWQMS require that you complete a risk assessment for your drinking water system, then implement and document the means by which you manage those risks. All potential hazards and hazardous events are identified, and for each, the level of risk is assessed. A structured approach is important to ensure nothing is overlooked and that the areas of highest risk are identified.

This task includes the following steps:

- Identifying potential hazardous events and hazards that could affect drinking water safety;
- Assessing the risk associated with the occurrence of a hazardous event;
- Ranking the hazardous events according to the associated risk;
- Identifying control measures that you have in place to address the hazards and hazardous events;
- Identifying critical control points;
- Establishing critical control limits for each critical control point;
- Ensuring that the risk assessment is kept current; and,
- Documenting the risk assessment process and outcomes.

The risk assessment will be facilitated by developing a Risk Assessment Table. As you conduct this assessment, you will need to document the results of each step and the risk assessment procedure. The risk assessment process is an ongoing activity. Once a year the currency of the information and the validity of the information used in the risk assessment must be verified. The risk assessment must be redone every three years at a minimum, unless changing conditions indicate that it should be done more frequently.

Further information about Elements 7 and 8 can be found in **Chapter 11** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. A template for a Risk Assessment Table can also be found in **Appendix D** of the guide.

## DWQMS Element 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.

### What does it mean?

Element 9 requires that you describe the organizational structure of the operating authority including respective roles, responsibilities and authorities. If the operating authority operates more than one drinking water system, the operational plan must also describe corporate oversight roles, responsibilities and authorities.

The person, persons, or group of people with top management responsibilities must also be identified, as must those who are responsible for undertaking Management Reviews.

The DO component of Element 9 requires that all of the information from Element 9 is kept current and is communicated to operating authority personnel and to the owner.

Further information about Element 9 can be found in **Chapter 12** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. A template for a Responsibilities Table can also be found in **Appendix E** of the guide.

## DWQMS Element 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 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.

### What does it mean?

Element 10 of the DWQMS requires that you document in your operational plan, the knowledge, skills and abilities that personnel whose jobs affect drinking water quality must have, and the activities necessary to ensure that competency requirements are met.

The DO component of Element 10 requires that you ensure that competency requirements identified in the operational plan are met. Also, you must ensure that personnel are particularly aware of the relevance and importance of their duties and how they affect the provision of safe drinking water.

The DO component of Element 10 also requires that you maintain records of the activities undertaken to ensure that competency requirements are met.

Further information about Element 10 can be found in **Chapter 13** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. Templates for a Competency Table and a Training Matrix can also be found in **Appendix F** and **Appendix G**, respectively in the guide.

## DWQMS Element 11 – Personnel Coverage

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

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

### What does it mean?

Element 11 of the DWQMS requires that you have a procedure in place to describe how enough personnel who meet the identified competencies are available for duties that directly affect drinking water quality.

The DO component of Element 11 requires that you ensure competent personnel are available to perform their duties. Their availability should follow your coverage plans.

Further information about Element 11 can be found in **Chapter 13** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

**DWQMS Element 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, and
- d) the public.

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

**What does it mean?**

Element 12 requires you to have a documented procedure that describes how the QMS is communicated to others. Specifically, the procedures must address how QMS information is communicated from top management to the owner, operating authority personnel, suppliers, the public and vice versa.

The DO component of Element 12 requires that the operating authority implement and conform to the procedure.

Further information about Element 12 can be found in **Chapter 14** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## DWQMS Element 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.

### What does it mean?

This element of the DWQMS is about managing essential supplies and services. Supplies and services, both goods and people coming in from outside of the drinking water system, can introduce risks. Although you may not have control over their internal processes, you must be aware of which supplies and services are essential to be able to ensure that you have the means to procure those essential supplies and services at all times, and have methods in place to ensure their quality.

By documenting what quality you expect, and by continuing to assess whether or not supplies and services consistently meet your requirements after they have been selected, you help to minimize the risks to drinking water quality.

Finally, you must make sure that your expectations for essential supplies and services are met on a continuous basis.

It should be noted that it is not required that your suppliers be accredited against the requirements of the DWQMS.

Further information about Element 13 can be found in **Chapter 15** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. A template for a Supplies and Services Table can also be found in **Appendix H** of the guide.

**DWQMS Element 14 – Review and Provision of Infrastructure**

PLAN – The Operational Plan shall document a procedure for the annual review of the adequacy of the infrastructure necessary to operate and maintain the subject system.

DO – The Operating Authority shall implement and conform to the procedure and communicate the findings of the review to the Owner.

**What does it mean?**

Element 14 of the DWQMS requires a procedure for the annual review of drinking water system infrastructure. The purpose is to review what infrastructure is necessary to operate and maintain the subject system, and to determine if that infrastructure is in place as needed. This review helps to ensure that adequate infrastructure is available and is part of the organization's plans.

The DO component of Element 14 requires that the operating authority carry out the review procedure, and report what is found to the owner. This ensures that the owner is regularly informed of infrastructure needs so that the owner can plan accordingly.

Further information about Element 14 can be found in **Chapter 16** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## DWQMS Element 15 – Infrastructure Maintenance, Rehabilitation and Renewal

PLAN – The Operational Plan shall document a summary of the Operating Authority's infrastructure maintenance, rehabilitation and renewal programs for the subject system.

DO – The Operating Authority shall:

- a) keep the summary current,
- b) communicate the programs to the Owner, and
- c) monitor the effectiveness of the maintenance program.

### What does it mean?

Continuing from Element 14, Element 15 is about documenting a summary of the maintenance, rehabilitation and renewal programs for your infrastructure. Your operational plan must include a summary of the programs you have in place to maintain, rehabilitate and renew the infrastructure of the drinking water system. These summaries must be updated as changes occur, and must be communicated to the owner. It is important to note that this element of the standard only applies to the operating authority's programs and not the owner's programs.

You must also monitor the effectiveness of the maintenance program. This means that you must periodically review the maintenance program to check how well the program is working.

Further information about Element 15 can be found in **Chapter 16** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## DWQMS Element 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 any relevant sampling, testing or monitoring activities 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.

### What does it mean?

The focus of Element 16 is measuring your system to monitor what is happening, your level of control, and the quality of treated drinking water. Specifically, Element 16 requires that you establish and implement procedures describing how you sample, test and monitor for process control and finished drinking water quality.

The procedures must include details about the sampling, testing and monitoring that is performed on the conditions most challenging to your drinking water system. You must also describe relevant sampling, testing and monitoring activities that you perform upstream – before water enters your drinking water system. If this sampling, testing or monitoring is not performed by you, but is provided to you, you must also describe it. You must describe how the owner and operating authority share the sampling, testing and monitoring results.

Further information about Element 16 can be found in **Chapter 17** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. A template for a Sampling and Monitoring Table can also be found in **Appendix I** of the guide.

## DWQMS Element 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.

### What does it mean?

Element 17 is linked to Element 16 in this chapter since it deals with the equipment used to perform some of the sampling, testing and monitoring activities. Element 17 specifically requires that you document a procedure to calibrate and maintain this measurement and recording equipment.

The DO component of Element 17 requires that you implement and conform to the calibration and maintenance procedure.

Further information about Element 17 can be found in **Chapter 17** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## DWQMS Element 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.

### What does it mean?

This element of the DWQMS is all about being prepared for emergency situations that could result in the loss of your ability to maintain the supply of safe drinking water to consumers. Emergency preparedness means identifying what could happen in your system to cause an emergency, and having processes and procedures in place to prepare for and respond to those emergencies. The DWQMS requires that your operational plan includes emergency procedures and contact information, which includes information about:

- Communication, response and recovery procedures,
- Emergency response training,
- Testing your procedures to make sure they make sense,
- Responsibilities of personnel, the owner, and the operating authority,
- Municipal emergency planning measures, and
- Up-to-date lists of who to call in an emergency.

The DO component of this element requires that you implement and conform to these procedures.

Further information about Element 18 can be found in **Chapter 18** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. Templates for Emergency Procedures can also be found in **Appendix J** of the guide.

## CHECK Elements of the DWQMS

### DWQMS Element 19 - Internal Audits

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

- a) evaluates conformity of the QMS 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 every twelve months.

#### What does it mean?

Element 19 of the DWQMS requires that you have a documented procedure for conducting internal audits of your QMS, and to verify conformity of the QMS with the requirements of the DWQMS.

Specifically, the procedure must describe what you are auditing against, how often you do so, what in your QMS is being audited, how it is audited, and what records are created. The audit procedures must also show how the planned audits are influenced by the previous audit results.

When something is found that does not conform to the requirements of the DWQMS, the procedure must also describe how you identify what needs to be corrected, and how the correction is initiated.

The DO component of Element 19 requires that audits be performed as described in your operational plan, and performed in entirety at least once every 12 months.

Further information about Element 19 and Internal Audits can be found in **Chapter 19** and **Chapter 22** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. Templates for an Internal Audit Schedule, Internal Audit Procedure and Internal Audit Checklist can also be found in **Appendix K**, **Appendix L** and **Appendix M**, respectively in the guide.

## DWQMS Element 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 efficacy 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 twelve months,
- 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) reports the results of the management review, the identified deficiencies, decisions and action items to the Owner.

**What does this mean?**

The PLAN component of Element 20 requires you to have a procedure for an annual management review, and lists the topics which the management review must cover. A review of these topics, which include compliance, consumer feedback, operational performance, audit information, etc., involves management in the QMS cycle.

The DO component of Element 20 requires implementation of and conformance to the procedure. It specifies a maximum 12 month frequency for reviews, and requires that top management ensure the review is performed, deficiencies are identified, and the results are reported to the owner. Remember that as a requirement of Element 9 – Organizational Structure, Roles, Responsibilities and Authorities, the person, persons or group of people within the management structure of the organization responsible for undertaking management reviews must be identified.

Further information about Element 20, Management Review can be found in **Chapter 20** and **Chapter 23** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*.

## IMPROVE Element of the DWQMS

### DWQMS Element 21 – Continual Improvement

DO – The Operating Authority shall strive to continually improve the effectiveness of its Quality Management System through the use of corrective actions.

#### What does this mean?

Element 21, the final element of the DWQMS, requires that you follow the QMS cycle – striving to make improvements to your QMS. Specifically, the DWQMS requires that you use corrective actions. A corrective action process helps to identify, document and make these improvements.

Further information about Element 21 can be found in **Chapter 24** of the ministry document *Implementing Quality Management: A Guide for Ontario's Drinking Water Systems*. A template for a Corrective Action Form can also be found in **Appendix O** of the guide.

## Implementation Action Plan Checklist

The following questions are provided to assist you in the implementation of your QMS. Please note that the questions are for information purposes only and may not necessarily be comprehensive for your system. Also, it may not be necessary for you to undertake all of the listed activities to implement your QMS.

### Setting Up the QMS Team

- Is a QMS Implementation Lead assigned?
- Have QMS team members been set up if appropriate?
- Have training needs been identified for the lead, team members, and management?
- Has training been arranged for/provided?
- Have the new roles of QMS lead and the QMS team, and their responsibilities, been communicated?

### Gap Analysis and Implementation Action Plan

- Have preparations for a gap analysis been completed?
- Has a document review been performed?
- Was a review of methods and procedures performed?
- Was the gap analysis checklist completed?
- What gaps were identified?
- Were the gap analysis findings discussed with key personnel?
- Was an implementation action plan created?
- Does the implementation action plan include tasks and target dates, and were people assigned to complete the tasks?
- Was the implementation action plan issued to key personnel?
- Have key personnel been invited to the kick-off management meeting?
- Has an agenda been prepared?
- Was a kick-off management meeting held?
- Were minutes of the meeting recorded?
- Was the implementation action plan reviewed?
- Was the timeline for implementation confirmed?
- Will the implementation action plan be updated following changes or delays?

### The Quality Management System

- Has top management been identified?

### The Quality Management System Policy

- Has the QMS policy been created?
- Have all of the checkpoints on the checklist for creating the QMS policy been completed?
- Has the QMS policy been approved?
- Does the operational plan include the QMS policy?

### Obtaining Commitment and Endorsement

- Has top management commitment been obtained?

**The QMS Representative**

- Has a QMS Representative been appointed?
- Does the QMS Representative have the authority to carry out the listed responsibilities?
- Does the operational plan identify the QMS Representative?

**Document and Records Control**

- Did you complete the quiz to test your understanding of document and records control?
- Are documents and records retrievable?
- Can documents be edited only by authorized personnel?
- Is a method in place to keep documents current?
- Has a consistent format for documents and records been established?
- Are all "Ready for the Audit" points in this chapter's margins in place?
- Is a method in place for reviewing and approving documents?
- Is a method in place for issuing updated documents and removing obsolete ones?
- Are documents and records protected?
- Have retention times for records been determined?
- Have disposal methods for records been determined?
- Is the document and record control table complete?
- Is the document and record control procedure written and approved?
- Has the document and record control procedure been added to the operational plan?

**Drinking Water System**

- Has a description of the drinking water system including all treatment processes and distribution system components, been prepared?
- Were general characteristics of the raw water supply included in that description?
- Were common event-driven fluctuations included in that description?
- Were resulting operational challenges included in the description?
- Is a process flow chart available?
- Have critical upstream or downstream processes been described?
- If the subject drinking water system is part of a larger drinking water system, has a summary description of the larger system been prepared?
- If the subject drinking water system is part of a larger drinking water system, has the name of each owner and operating authority been included?

**Risk Assessment and Risk Assessment Outcomes**

- Have you set up a team to perform the risk assessment?
- Have you identified hazards and hazardous events?
- Have you identified available monitoring control measures for each hazard?
- Have you evaluated risks using a consistent method?
- Have you ranked risks?
- Have you identified your critical control points (CCPs)?
- Have you included the minimum CCPs?
- Have you established critical control limits for the CCPs?

- Have you identified monitoring processes for CCPs?
- Have you established response procedures for CCPs?
- Have you completed the risk assessment table?
- Have you created a procedure that describes how you performed this risk assessment?
- Does the risk assessment procedure cover everything in Element 7?
- Is all of the documentation created in this chapter reviewed and approved?
- Has the documentation gone to relevant personnel?
- Does the operational plan have all of the required documents from Elements 7 and 8?

### **Organizational Structure, Roles, Responsibilities and Authorities**

- Has a QMS Representative been identified?
- Have you completed the responsibilities table, including roles, responsibilities and authorities for the operating authority?
- Have you included roles, responsibilities and authorities for the operating authority when operating more than one drinking water system?
- Have you identified the owner of the drinking water system?
- Have you charted the organizational structure for the operating authority?
- Have you arranged for top management to appoint a QMS Representative?
- Have you ensured the QMS Representative was made aware of his or her responsibilities?
- Is the QMS Representative included in the responsibilities table?
- Is the QMS Representative included in the organizational chart?
- Have you communicated the information in the responsibilities table and in the organizational chart throughout the operating authority?

### **Competencies and Personnel Coverage**

- Have required competencies been identified?
- Has a training matrix, or some means of describing how competencies are met, been prepared?
- Have training methods been described?
- Have the competency requirements that you have described been met?
- Have personnel coverage procedures been prepared?

### **Communications**

- Has a communication procedure been documented?
- Does the procedure include a description of how the QMS is communicated to the owner?
- Does the procedure include a description of how the QMS is communicated to personnel?
- Does the procedure include a description of how the QMS is communicated to suppliers?
- Does the procedure include a description of how the QMS is communicated to the public?

### **Essential Supplies and Services**

- Have you created a list of essential supplies and services?
- Have the means to ensure the procurement of the essential supplies and services been described?
- Have you documented what quality requirements you have for all of the essential services and supplies?

- Have you communicated these requirements to the purchasing department, to be used as selection criteria for new vendors?
- Have you communicated these requirements to relevant staff?
- Have you communicated these requirements to suppliers and service providers?
- Do you have a process to monitor if supplies and services are meeting your requirements?

### **Infrastructure**

- Has a procedure for reviewing the adequacy of the infrastructure needed to operate and maintain the drinking water system been created?
- Has the adequacy of the infrastructure needed to operate the drinking water system been reviewed?
- Have the findings of the review been communicated to the owner?
- Have summaries of the maintenance, rehabilitation and renewal programs for the infrastructure been created in the operational plan?
- Have the programs been communicated to the owner?
- Was this communication documented?
- Is a process in place to keep these summaries current?
- Is a process in place to monitor the effectiveness of the maintenance program?
- Is the maintenance program being monitored for effectiveness?
- Are documents being created to show this monitoring?
- Are the results of this monitoring being communicated to the owner?

### **Sampling and Monitoring**

- Have you listed the sampling, testing and monitoring parameters for your drinking water system?
- Have you included targets, or acceptable ranges, for those parameters?
- Have you included methods for responding when those targets or acceptable ranges are exceeded?
- Have you included any upstream sampling and monitoring?
- Have you described sampling, testing and monitoring under challenging conditions?
- Have you described how sampling, testing and monitoring results are recorded?
- Have you listed the measurement and recording equipment?
- Have you described the calibration of this equipment, including method, frequency, planning and results?
- Have you described how the results are shared between owners and operating authorities?
- Is your calibration of sampling and monitoring equipment up-to-date?

### **Emergency Preparedness and Response**

- Have all potential emergencies been identified?
- Have emergency procedures been documented?
- Do the procedures describe responsibilities?
- Do the procedures describe communication during an emergency?
- Do the procedures describe what sampling is required for response and recovery?
- Do the procedures describe response teams you will utilize?
- Do the procedures refer to municipal planning measures?
- Do the procedures include specific response actions that must be taken?
- Do the procedures include recovery instructions?

- Do the procedures include your requirements for documenting the emergency, and any follow-up reporting required?
- Are contact lists included in the procedures?
- Is a communication protocol included?
- Are training requirements for emergency procedures documented?
- Has the required training in emergency procedures been completed?
- Has testing of emergency plans been planned and documented?
- Have emergency procedures been reviewed, approved and distributed?

### **Plan for Internal Audit**

- Has an internal audit procedure been documented and approved?
- Does the procedure include a description of who will perform internal audits, including the person's training and experience requirements?
- Does the procedure include a description of audit frequency and scope and how it is planned?
- Has an audit schedule been created?
- Does the procedure include a description of audit team member selection in preparation for an audit?
- Does the procedure include a description of how audit team members review information in preparation for an audit?
- Does the procedure include a description of how audit checklists are prepared?
- Does the procedure include a description of how the audit is conducted?
- Does the procedure include a description of how the audit is reported?
- Does the procedure include a description of how the audit is followed up?

### **Plan for Management Review**

- Have you designated who will perform the management review, and how?
- Does the management review procedure require items a) to p) in the plan component of Element 20 to be considered?
- Has the management review procedure been documented and approved?

### **Completing the QMS Cycle**

- Are personnel aware of the QMS requirements that are applicable to their roles and responsibilities?
- Are personnel using the information in the operational plan and the QMS procedures?
- Have records been generated to show that procedures are being followed?
- Is the operational plan complete?
- Has the operational plan been endorsed by top management and by the owner?
- Is DWQMS required documentation in place?
- Are the "Ready for the Audit" margin points for this chapter in place?

### **Performing an Internal Audit**

- Was an internal audit completed?
- Was the internal audit procedure followed, including resources, audit preparation, conducting the audit, reporting, and follow-up?
- Was an audit report prepared?
- Were results of the internal audit communicated to key personnel?

- Are management review records scheduled to be reviewed after the management review is complete?
- Has the audit schedule been updated?
- Were corrective actions made to address non-conformances?
- Were corrective actions checked for effectiveness?
- Were corrective actions documented?

**Performing a Management Review**

- Was a management review completed?
- Was the management review procedure followed?
- Do inputs to the management review include all of those listed in Element 20 of the DWQMS?
- Was the review, including action items and decisions, documented?
- Did action items and decisions include assignment of personnel and timeframes for completion of those tasks?
- Are action items being carried out?



