The Corporation of the Municipality of Morris-Turnberry / Veolia Water Canada

Drinking Water Quality Management System

Operational Plan / QMS Manual

MUNICIPALITY of MORRIS-TURNBERRY
BELGRAVE DRINKING WATER SYSTEM

The Corporation of the Municipality of Morris-Turnberry
41342 Morris Road, RR #4
Brussels, Ontario
N0G 1H0

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Note: To be reviewed annually or when a QMS change occurs.

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Note: To be reviewed annually or when a QMS change occurs.

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# Operational Plan Change History Summary

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| HAVE ALL PERSONNEL AFFECTED BY THIS CHANGE BEEN ADVISED? | Employees to sign and date here as advised: yes |
| APPROVED BY: | DC Scott / John Graham |

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Glossary of Terms

**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

**Authority** – official permission or approval to carry out a responsibility or task

**Competence** – a combination of observable and measurable knowledge, skills and abilities which are required for a person to carry out assigned responsibilities.

**Compliance** – the fulfillment of a regulatory requirement

**Conformance** – the fulfillment of a DWQMS requirement

**Consumer** – the drinking water end user

**Contingency Plan** – Operating Authority’s procedures to mitigate or control emergency situations beyond the Standard Operating Procedures.

**Control Measure** – includes any processes, physical steps, or other contingencies that have been put in place to prevent or reduce a hazard before it occurs.

**Contact Time (CT)** - This value is called “Chlorine Contact Time” or CT. To calculate CT, multiply the free chlorine residual concentration (C), in mg/l, by the contact time (T), in minutes. CT measures the effectiveness of a disinfection process.

**Critical Control Limit (CCL)** – the point at which a critical control point response procedure is initiated.

**Critical Control Point (CCP)** – an essential step or point in the subject system at which control can be applied by the operating authority to prevent or eliminate a drinking water health hazard or 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 system’s waters, including any thing found in the waters that adversely affects, or is likely to adversely affect, the health of the users of the system, that deters or hinders, or is likely to deter or hinder, the prevention or suppression of disease, or 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) – means the quality management standard approved by the Minister in accordance with section 21 of the SDWA.

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

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

   b) any thing related to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the treatment system, and

   c) a well or intake that serves as the source or entry point of raw water supply for the system.

Emergency – a potential situation or service interruption that may result in the loss of the ability to maintain a supply of safe drinking water to consumers

Emergency Response – the effort to mitigate the impact of an emergency on consumers

Emergency Response Plan (ERP) – Municipal Plan or documentation of emergency response procedures

Gap Analysis – the process of determining and evaluating the variance between the requirements of the DWQMS, and the methods and documents in place in your drinking water system

Hazard – a source of danger or a property that may cause drinking water to be unsafe for human consumption; hazard may be biological, chemical, physical or radiological in nature.
Hazardous Events – an incident or situation that can lead to the presence of a hazard

Implementation Action Plan – the product of a gap analysis which identifies the tasks required for implementing a QMS. The implementation action plan should include tasks, target dates, and people assigned to task duties.

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

Monitoring – includes any checks or systems that are available to detect hazards or the potential for hazards.

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 – means a large municipal residential system or a small municipal residential system as defined in O. Reg. 170/03.

Non-Compliance – a failure under the Safe Drinking Water Act, 2002, the Ontario Water Resources Act, or any regulations or instruments under these Acts which are associated with drinking water.

Non-Conformance – the non-fulfillment of a DWQMS requirement

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.

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.

PLC - Programmable Logic Controller or Programmable Controller is a digital computer used for automation of electromechanical processes, such as control of equipment

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.

Resources – tangible inputs that are required to deliver safe drinking water

Responsibility – a charge, trust, or duty for which one is responsible

Retrievable – For documents, “retrievable” means the documents must be readily available for personnel to refer to, especially in emergency situations, or in areas where operational procedures would need to be promptly referenced. For example, sampling procedures should be available for reference where sampling activities are performed. For records, “retrievable” is a slightly more flexible term. Usually, a record is considered to be retrievable if it can be produced on request by the end of the business day. This definition stems from audits and inspections – if a record can be provided by the end of the audit, it is usually considered to be retrievable.

Risk – the probability of identified hazards causing harm, including the magnitude of that harm or its consequences.

Risk Assessment – an orderly methodology of identifying hazards or hazardous events that may affect the safety of drinking water and evaluating their significance
SCADA - the abbreviation for Supervisory Control And Data Acquisition. It generally refers to an industrial control system: a computer system monitoring and controlling a process.

Standard Operating Procedures (SOP) – standardized operating procedures compiled in an Operations Manual

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 about the QMS and makes recommendations to the owner about the subject system or subject systems

Water Treatment Plant (WTP) – Operating Authority’s treatment system location

Glossary of Terms

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Contact Time (CT) - This value is called "Chlorine Contact Time" or CT. The CT Value is numerical value of (Chlorine Residual) x (Chlorine Contact Time) (mg/l-minutes).

CT disinfection is a measure of the effectiveness of disinfection or pathogen inactivation while the disinfectant (free chlorine) and water are in contact. If the CT value is not met, there is the the potential for chemical or biological contamination and an adverse water quality situation.

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Non-Compliance – a failure under the Safe Drinking Water Act, 2002, the Ontario Water Resources Act, or any regulations or instruments under these Acts which are associated with drinking water.

Non-Conformance – the non-fulfillment of a DWQMS requirement

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.

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.

Public – subject system consumers and stakeholders

Quality Management System (QMS) – a system to:
  c) establish policy and objectives, and to achieve those objectives, and
  d) direct and control an organization with regard to quality.
Record – a document stating results achieved or providing proof of activities performed.

Resources – tangible inputs that are required to deliver safe drinking water

Responsibility – a charge, trust, or duty for which one is responsible

Retrievable – For documents, “retrievable” means the documents must be readily available for personnel to refer to, especially in emergency situations, or in areas where operational procedures would need to be promptly referenced. For example, sampling procedures should be available for reference where sampling activities are performed. For records, “retrievable” is a slightly more flexible term. Usually, a record is considered to be retrievable if it can be produced on request by the end of the business day. This definition stems from audits and inspections – if a record can be provided by the end of the audit, it is usually considered to be retrievable.

Risk – the probability of identified hazards causing harm, including the magnitude of that harm or its consequences.

Risk Assessment – an orderly methodology of identifying hazards or hazardous events that may affect the safety of drinking water and evaluating their significance

Risk Priority Number (RPN) – in the risk assessment hazards or hazardous event are assigned a numeric value ranging from 1 to 5 in three different categories: likelihood, severity or consequence, and detectability then added to determine the overall risk value or Risk Priority Number (RPN).

SCADA - the abbreviation for Supervisory Control And Data Acquisition. It generally refers to an industrial control system: a computer system monitoring and controlling a process.

Standard Operating Procedures (SOP) – standardized operating procedures compiled in an Operations Manual

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 about the QMS and makes recommendations to the owner about the subject system or subject systems

Water Treatment Plant (WTP) – Operating Authority’s treatment system location
1. **Quality Management System**

The Drinking Water Quality Management Standard (DWQMS) requires an Operating Authority to establish a Quality Management System (QMS) for each system that it operates.

A QMS is a system to establish policies and objectives, achieve those objectives, and assist in the direction and control of the organization with regard to quality.

An Operational Plan is a document or series of documents that outlines the policies, processes and procedures for the overall quality management of the drinking water system, and is the documentation of the QMS.

The QMS is documented in this Operational Plan as part of the effort to ensure clean, safe, and reliable drinking water is supplied to all customers served.

The QMS shall be reviewed annually to ensure that the procedures are correct and current. The review will include the QMS Representative, Owner, Operating Authority and Operators of the system.
2. Quality Management System Policy

The Municipality of Morris-Turnberry (Owner) utilizes the services of Veolia Water Canada to operate and maintain the water supply and distribution system.

Together the Municipality of Morris-Turnberry and Veolia are committed to:

- Providing the consumer with a consistent supply of clean, safe drinking water
- Complying with all applicable legislative and regulatory requirements
- Managing and operating the water supply system in a responsible manner in accordance with documented Quality Management System (QMS) policies and procedures
- Maintaining and continually improving its Quality Management System (QMS)

Municipality of Morris-Turnberry – Owner

Veolia Water Canada – Operating Authority

Owner Representative
Date: Feb 16, 2010
Administrator Clerk - Treasurer

Operating Authority
Date: Feb 11, 2010
Representative
Area Manager - Veolia Water Canada
3. Commitment and Endorsement

The system owner, the Municipality of Morris-Turnberry, and the Operating Authority, Veolia Water Canada, support the implementation, maintenance, and continual improvement of a drinking water Quality Management System (QMS) for the Municipality of Morris-Turnberry's Water Supply System, as documented in the Operational Plan.

Endorsement by the Owner (represented by the Municipality of Morris-Turnberry Administrator Clerk-Treasurer) and the Operating Authority (represented by Project Manager Veolia Water Canada Inc.), acknowledges the need for, and supports the provision of sufficient resources to implement, maintain, and continually improve the Quality Management System (QMS).

Endorsed by:

Owner Representative
Municipality of Morris-Turnberry
Mayor

Operating Authority
Representative
Area Manager- Veolia Water Canada

Owner Representative
Municipality of Morris-Turnberry
Administrator Clerk -Treasurer

Operating Authority
Representative
Project Manager-Veolia Water Canada

Operating Authority
Representative
QMS Representative-Veolia Water Canada

Page 1 of 1

File: C:\DWQMS\Municipality of Morris-Turnberry - 3 - Commitment and Endorsement


Note: To be reviewed annually or when a QMS change occurs.

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4. **QMS Representative**

The QMS Representative, in conjunction with the Project Manager / Overall Responsible Operator, will establish, implement, and maintain the policies, processes, and procedures required for the QMS. In addition the QMS Representative will report on the performance of the QMS and any need for improvement to Top Management.

The responsibilities of the QMS Representative are listed in the Responsibilities Table in Appendix E, as part of Element 9, Organizational Structure, Roles, Responsibilities, and Authorities.
5. **Document and Records Control**

A process is in place for the control and management of the documents and records required by the Quality Management System (QMS).

This process is to ensure that documents are kept up to date with applicable legislation and regulations, and changes in operations. The process also ensures that documents and records are legible, are properly stored, and can be easily located and identified. Retention times and disposal methods are listed in the Document and Records Control Table.

The procedure for Document and Records control can be found in Appendix A.

**Appendix A**

APPENDIX A1: Procedure for Document and Records Control

APPENDIX A2: Document and Records Control Table

APPENDIX A3: Document Approval – Change Form
6. Drinking Water System

Belgrave Water System Description:

6.1 General

6.1.1 The Belgrave water system is characterized as a ground water system and is classified as a large municipal residential water system. The system consists of two wells, with a maximum capacity of 501 m³/day. The treatment building houses the controls for the system, chlorination and iron removal treatment, in-ground storage reservoirs and pressure system including pumps for the distribution system.

One production well is located at 32 Hamilton Street, and the other at 23 McCrea Street, with both wells connected to the treatment plant at 28 McCrea Street via dedicated raw water mains. The distribution system serves the community of Belgrave with a connection to the Humphrey Subdivision (North Huron).

The system serves a population of approximately 300 residents, with approximately 113 customer services in use (and 223 service connections total).

6.1.2 The system consists of a Class 2 Treatment and Class 1 Distribution and Supply, which is owned by the Municipality of Morris-Turnberry and operated by Veolia Water Canada, the Operating Authority.

6.1.3 The Hamilton Street well (also known as the Jane St. well) is 42.4 metres deep, equipped with a submersible pump with a rated capacity of 1.6 l/s, with instrumentation and control equipment, and discharges to a combined header.

The McCrea Street Well is 38.1 metres deep equipped with a submersible pump with a rated capacity of 4.2 Litres/second, with instrumentation and control equipment and discharges to a combined header.

Flow from each well is combined in a common filter influent header at the treatment plant where the flow is then split equally through three green sand filters, treated with sodium hypochlorite and then to an in-ground reservoir and a high lift pumping station.
The Hamilton (Jane) Street well was drilled in October 1983 and The McCrea Street Well drilled in June 1976. Modifications and updates were made to the Hamilton (Jane) Street and McCrea Street well systems in 2007 to form the new Belgrave Water Treatment System with a new treatment building.

6.1.4 Raw water is pumped from each well. Potassium permanganate is injected as part of the iron removal system. The filtered water is treated with sodium hypochlorite and then flows to an in-ground two cell storage and chlorine contact reservoir located below the treatment building. The treatment building has three (3) high lift submersible pumps and six (6) hydropneumatic pressure tanks that supply and maintain the water pressure to the distribution system. The system is monitored and controlled by an on site Programmable Logic Controller (PLC).

6.1.5 Back-up power is supplied by one 60 KW diesel standby generator with an automatic transfer switch located in the pumphouse.

6.1.6 There is no elevated storage tank. The system pressure is maintained using pressure tanks and the high lift pumps.

6.1.7 The system has no hydrants and capacity for fire protection is not provided.

6.2 Description of Water Source

6.2.1 The current water source is from two secure deep bed rock wells. Land use in the vicinity of the wells is a mixture of residential and institutional. There is no Municipal sanitary sewer system so the area is served by individual septic systems.

6.2.2 A First Engineer's Report was completed in 2001 for the Jane, McCrea and Humphrey systems. Subsequently in 2002/03 a Hydrogeological study was completed and determined that the Jane and McCrea wells were secure ground water sources, not under the influence of surface water.
6.2.3 An additional Raw Water Assessment was carried out for the Belgrave Drinking Water System in Feb 22, 2010, as part of the application for the Municipal Drinking Water Licence. This information is available from the Municipality and an overview of the data does not indicate any significant changes in source water quality.

6.2.4 There also does not appear to be any event driven fluctuations or resulting operational challenges or threats to the water source. There also does not appear to be any upstream or downstream processes that the Municipality controls that are critical for the provision of water other than the Humphrey Chlorine Sampling Station that is used for monitoring only.

6.3 Disinfection System

6.3.1 Disinfection is achieved on the Belgrave well supply through the use of 12 % sodium hypochlorite. This chemical is injected prior to the water entering the chlorine contact reservoir at a sufficient dosage to achieve both primary and secondary disinfection objectives.

The primary disinfection system consists of two 200 L solution tanks, with one duty and one standby chemical metering pump with automatic switch-over capability. An on-line free chlorine residual analyzer ensures continuous disinfection with high and low level parameter set points and alarms.

Primary disinfection is provided via Chlorine Contact Time within the reservoir. The Chlorine Contact provided is based on the provision of a minimum regulatory CT of 4.0, to provide 99% (2-log) inactivation of viruses. The design Chlorine Contact Time is based on 2-log inactivation of viruses at a minimum free chlorine residual of 0.2 mg/L (after contact time), raw water pH of 6-9 and a minimum water temperature of 5°C.

6.3.2 The chlorine dosage range varies with the chlorine demand of the raw water. The free chlorine residual is monitored at the point of entry to the distribution system, by an on-line chlorine analyzer, with a target residual of > 0.65 mg/l and < 1.00 mg/l.
6.4 Iron Removal

6.4.1 The raw water from the wells at Belgrave has iron levels higher than what is considered aesthetically acceptable. Through the First Engineers report it was determined that the iron oxidized in the treated water and resulted in higher than acceptable turbidity levels within the distribution system. The treatment building provides iron removal through greensand filters. Potassium permanganate is injected into the water to oxidize the iron and to regenerate the greensand filters. This chemical is injected into to the raw water upstream of the filters.

6.5 System Flows

6.5.1 The Belgrave well supply has 1 PTWW (permit to take water) 5042-8Y5KVG, Nov 1, 2012, which allows 501 cubic metres per day to be pumped from the combined wells.

6.5.2 The Belgrave treatment system has maximum flow and additional information specified in the Municipal Drinking Water Licence - MDWL - 247-101 and Drinking Water Works Permit - DWWP - 247-201 (previously C of A # 1790-7AWPLV). The maximum flow allowed is 6.9 litres per second.

6.6 Distribution System

6.6.1 The treated water is monitored and controlled by an on site PLC.
A PC at the site records the data generated by the PLC at the wells and treatment building.

6.6.2 Distribution piping typically ranges in size from 50 mm to 150 mm, and consists of PVC Polyethylene and High Density Polyethylene Piping.

6.6.3 Typical system pressure ranges from 40 P.S.I to 60 P.S.I.
6.7 Process Diagrams:

6.7.1 Process Flow Schematic
6.7.2 Pumphouse Schematic
6.7.3 Distribution Schematic
7. Risk Assessment

A Risk Assessment Procedure has been established and implemented to determine the potential hazards and critical control points that exist in the water treatment system.

A Risk Assessment Table has been developed to list potential hazards and their effects, and the associated monitoring and control measures. Critical Control Points (CCP) and Critical Control Limits (CCL) are identified using a Risk Priority Number system described in the risk assessment procedure.

For emergency situations or hazardous events outside the regular monitoring and control process, a Contingency Plan is available for response to deviations from critical control limits.

An Operational Plan binder and Contingency Plan are readily available for employee’s reference at the Water Treatment Plant Main Office.

Procedures are implemented for reporting and recording deviations from critical control limits.

An annual Management Review, as described in Element 20, takes place to ensure the system is current and the risk assessment procedure and outcomes are reviewed and maintained.

A full updated Risk Assessment is to be conducted every 36 months in addition to the annual reviews.

Appendix E

APPENDIX B 1: Risk Assessment Procedure

APPENDIX B 2: Risk Assessment Table
8. Risk Assessment Outcomes

Risk Assessment Outcomes - Summary and Analysis

Belgrave Water Treatment System

Basis: Risk Assessment Table and Team Meeting Dec. 14, 2009 (Appendix B2)

1- First Engineer’s Report

No outstanding items

2- Rank Hazardous Events and Identify CCP’s

From the Risk Assessment Table ranking of the potential result of the hazard, the Risk Priority Numbers (RPN) ranged from 3 to 11 (out of a total max of 15).

An RPN Threshold Value of 6 was chosen from review of the Risk Table because the Critical Control Point minimum number is 6 (with the exception of two RPNs of 5 also deemed a CCP). It should be noted that although all hazards were assigned RPNs, only Critical Control Points and hazards with control measures available have Standard Operating Procedures or Contingency Plan response procedures.

Potential hazards and events always considered critically hazardous to water quality are high turbidity, inadequate primary and secondary disinfection, and loss of or low system pressure. These have been taken into account in this assessment.

3- Establishing Procedures for Deviations from Critical Control Limits

Each CCP must have one or more documented response procedure for response if a Critical Control Limit (CCL) is exceeded. These procedures are documented in the Operating Authority’s Operations Manual or Contingency Plan (CP).
Risk Assessment Table Summary

NOTE: A total 28 potential hazards were identified in the Risk Assessment Table – Appendix B2, Critical Control Points are listed below:

CCP’s (see additional details in Table APP B2)

<table>
<thead>
<tr>
<th>CCP Description</th>
<th>RPN</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6- Chemical feed pump failure (primary disinfection)</td>
<td>5</td>
<td>CP-01, OM-02</td>
</tr>
<tr>
<td>10- High Lift Pump failure and related equipment</td>
<td>7</td>
<td>CP-13</td>
</tr>
<tr>
<td>11- Chemical feed pump failure (secondary disinfection)</td>
<td>5</td>
<td>CP-01, OM-02</td>
</tr>
<tr>
<td>15- Pressure Tank System failure</td>
<td>6</td>
<td>CP-03</td>
</tr>
<tr>
<td>16- Watermain break</td>
<td>8</td>
<td>CP-10, OM-09</td>
</tr>
<tr>
<td>17- Loss of chlorine residual</td>
<td>6</td>
<td>CP-01, OM-02</td>
</tr>
</tbody>
</table>

Note: OM – Operations manual and SOP #; CP- Contingency plan and procedure #

Not all high ranking hazards have Critical Control Limits or Control Measures. Although assessed in the Table with RPNs equal to or greater than the threshold value there are hazards not considered CCP's, or assessed as required to have formal Operator response plans because no control measures are available. See the Risk Assessment Table APP B2 for additional potential hazards or hazardous events identified in the risk assessment as >= 6 RPN.

RPN numbers less than 6 will be further assessed on an on-going basis as annual Risk Assessment reviews take place, and additional Monitoring or Control Measures may be considered at that time. Also not all high ranking hazards have Critical Control Limits or Control Measures, and will be considered in Contingency Plans or future reviews as required.
9. **Organizational Structure, Roles, Responsibilities, and Authorities**

The system Owner, and the Operating Authority, Veolia Water Canada, have an organizational structure in place to ensure the management of the drinking water system by qualified staff.

Job descriptions are created for each Operating Authority and Owner position, and are outlined in the Responsibilities Table, showing title, responsibilities and authorities. Organizational Charts show the relationship of roles in the structure. These can be found in Appendix E.

An annual Management Review, as described in Element 20, takes place to ensure the system is current.

**Appendix E**

APPENDIX E 1: Organizational Chart - Veolia

APPENDIX E 2: Responsibilities Table - Veolia

APPENDIX E 3: Job Descriptions - Veolia

APPENDIX E 4: Organizational Chart – Municipality of Morris-Turnberry

APPENDIX E 5: Responsibilities Table - Municipality of Morris-Turnberry

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File: C:\ DWQMS \ Municipality of Morris-Turnberry - 9 - Organizational Structure, Roles, Resp. and Authorities

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<th>Approved By:</th>
</tr>
</thead>
</table>

Note: To be reviewed annually or when a QMS change occurs.

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10. Competencies

All personnel performing duties directly affecting drinking water quality must have adequate training and be competent in their position. This relates to legislative as well as DWQMS requirements.

**Legislative Requirements:**

- All Water Treatment Plant operators shall, at a minimum, attain and maintain a Class I certification as per O. Reg. 128/04.
- The Water Treatment Plant Overall Responsible Operator (ORO) shall maintain, at a minimum, a Class III certification (with exceptions for relief periods as specified in the legislation).
- All Water Treatment Plant distribution employees shall, at a minimum, maintain a Class I certification as per O. Reg. 128/04 and in accordance with the classification of the works.
- The Water Treatment Plant distribution Overall Responsible Operator (ORO) shall maintain, at a minimum, a Class III certification.

Additionally, annual training is provided to ensure that personnel meet or exceed minimum standards for annual training hours and continuing education hours as established in O. Reg. 128/04.

Veolia is required to provide competent operators to maintain effective water treatment. It is required as part of the operator’s responsibility to monitor and ensure he/she receives adequate annual training hours to maintain his/her operator certification for the operation of the Water Treatment Plant.

An annual review of training records and certifications is made by the Compliance Officer (or Project Manager) to ensure classifications are current and competency is maintained. Operators are advised by the CO of upcoming requirements.

The Project Manager may also recommend training courses and approves training registration requests as appropriate. The Compliance Officer assists in course arrangements and maintains and monitors the employee training matrix.

Effectiveness of outside training is evaluated by the Project Manager, after completion, by discussions with the employee. Certifications from the training, when provided, are filed with the employee training records, and added to the Training Matrix.
In-House Training Requirements

In-house training such as new employee orientation, internal systems (SCADA etc.), refresher training is provided by the Project Manager / Overall Responsible Operator or designate.

Training session records are to be noted by the employee, signed by the trainer and trainee, and forwarded to the Compliance Officer for filing and entering in the Training Matrix.

QMS Awareness Training Requirements

All personnel must be aware of the Quality Management System and their requirements under the QMS, especially those pertaining to their specific roles.

The QMS Operational Plan, and any changes to procedures affecting personnel, will be reviewed with employees by the Project Manager and / or QMS Representative at least prior to the accreditation audit, and as appropriate throughout the development of the Operational Plan (Document and Records Control, Risk Assessment, for example) and when changes may be made to the Operational Plan.

New employees will also be made aware of the Drinking Water Quality Management System (DWQMS) through the orientation and training process.

Appendix F

APPENDIX F 1: Competency Requirements Table

APPENDIX F 2: Training Matrix

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<td>Feb. 16, 2010</td>
<td>Release</td>
<td>DC Scott –QMS Rep.</td>
<td>Laurie Cox - Veolia Project Manager</td>
</tr>
</tbody>
</table>

Note: To be reviewed annually or when a QMS change occurs.

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11. Personnel Coverage

The Water Treatment Plant (WTP) is staffed from Monday to Friday from 7:30 a.m. until 4:30 p.m. and attended on weekends for normal daily rounds.

The Water Treatment Plant Project Manager is the primary Overall Responsible Operator (ORO). Back-up OROs are identified in the shift log, as required.

There is an assigned on-call water treatment plant operator during off-hours as described in the After Hours Dispatch Procedure for WTP personnel coverage. The on-call operator conducts a physical verification of conditions at the plant once per day during weekends and statutory holidays.

The normal on-call schedule for water treatment plant operators shall be from quitting time on Tuesday to start time the following Tuesday. The Water Treatment Plant Project Manager establishes and maintains the on-call schedule.

At all times, the Water Treatment Plant is monitored by the SCADA system. The SCADA system has an auto-dialer that has been programmed to contact the Project Manager / Overall Responsible Operator, or personnel designated by the Project Manager, whenever conditions warrant.

The on-call operator is the designated operator in charge and will respond to, and investigate all alarms within 45 minutes.

An Overall Responsible Operator, or designated back-up ORO, is available by cell phone when not physically at the system.

There are regular daily checks of the distribution system conducted by water distribution personnel. The time of the visit and the details of any related action taken are recorded in the on-site daily log.

Procedures are located in the WTP Operations Manual.

Veolia Canada is a non-unionized operation and labour disputes are unlikely, although management personnel are trained in operations if back-up operators are required.

Appendix G

APPENDIX G1: After Hours Dispatch Procedure
Response to Auto-Dialer Alarm Procedure

Page 1 of 1
12. Communications

The Project Manager / ORO shall ensure that the Owner is provided with a current copy of the Operational Plan. The owner shall also be advised of any changes to the Quality Management System, following revisions, and a status update shall be communicated following Management Reviews. This communication may take place during the regular annual report to Council by the Project Manager, or separate meetings arranged as necessary.

In addition to the Operational Plan, potential changes, and Management Reviews, other relevant information could include audit reviews, risk assessment changes, and provision for infrastructure information. The procedure for this information to be communicated to the Owner will be by the Project Manager to the Owner through the Owner's liaison, at Council Meetings, or Committee Meetings, as applicable.

Operating Authority Personnel will be informed of the QMS and any changes or updates through staff meetings with the Project Manager and/or QMS Representative following the original implementation, and thereafter following the Management Review, or as changes occur. The QMS Policy and Operational Plan are to be posted in the Operations Room for access by all employees.

Essential Suppliers shall receive information regarding the QMS from the Operating Authority as required for purchasing as described in Element 13.

Consumers or the General Public will have access to the QMS policy at the Operating Authority’s Water Treatment Plant (WTP) site, as well as at the Municipal Office.

The Owner shall make the Operational Plans available for viewing by the public at the principal office of the owner and at one other publicly accessible location in the geographical area served by the subject system.

Information about the QMS may be added to the Municipal website, as decided by the Owner.
13. Essential Supplies and Services

Essential supplies and services are purchased by the Operating Authority on behalf of the Owner under the direction of the Project Manager.

All essential Chemical, Material, Equipment, and Part Suppliers, and Service Providers must meet the Quality and Performance standards suitable for the production and delivery of safe drinking water to the customer.

Essential suppliers of chemicals and materials must meet NSF / ANSI (National Sanitary Foundation / American National Standards Institute) and / or AWWA (American Water Works Association) standards. Current versions of these standards are to be reviewed, as required, on the appropriate internet website by Operations or Purchasing personnel.

Ontario legislation requires that Laboratories performing drinking water testing must be accredited for the parameters being tested, and Operating Authorities must use accredited labs as required for testing.

Documentation on quality, and other supplier requirements, is provided to all essential suppliers and service providers to advise of the implementation of a Quality Management System, and as required if conditions change, by letter or information outlined on a Purchase Order regarding requirements.

The Project Manager / ORO reviews the requirements annually, or as may be required for changes, and suppliers are informed (as required and noted above), by the Project Manager, Administrative Assistant, or designate.

Meetings are held with contractors and service providers prior to work being carried out on water treatment equipment. They are accompanied by a Water Treatment Operator to ensure water plant and distribution system requirements are understood and met prior to performing their task. Contractors and service providers are required to sign a document confirming the meeting with the Project Manager or Operator, and their understanding of the requirements.

Appendix H lists the Essential Suppliers and Services, Procurement information, and Quality expectations.

Appendix H

APPENDIX H: Essential Supplies and Services Table

<table>
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<td>Laurie Cox - Veolia Project Manager</td>
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<td>Rev. 1</td>
<td>June 23, 2013</td>
<td>Rev. to remove annual letter</td>
<td>DC Scott - QMS Rep.</td>
<td>John Graham - Veolia Project Manager</td>
</tr>
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</table>

Note: To be reviewed annually or when a QMS change occurs.

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14. Review and Provision of Infrastructure

On an annual basis a summary of the Water Treatment System is prepared by the Operating Authority’s Project Manager / Overall Responsible Operator and is submitted to the Owner. Included in the Summary Report is a review and updates on the Operating Authority’s infrastructure and related programs.

The procedure will be for the Project Manager / Overall Responsible Operator to compile information received from the Maintenance Manager and Operators throughout the year based on work orders and observations relating to the infrastructure of the water treatment system. This information will be summarized in an Infrastructure section of the annual summary report and presented to the Owner on an annual basis. The Annual Summary is required to be submitted to the MOE by March 1st, and to the Owner by March 30th of each year.

The report shall cover the infrastructure in place - the water system infrastructure necessary to operate and maintain the system includes buildings, workspace, associated utilities, process equipment, supporting services, vehicles, distribution system and elevated storage. The report will advise on the adequacy or condition of the infrastructure, with recommendations were warranted.

An annual Management Review is carried out as part of the DWQMS requirements, and the results of the infrastructure review are also considered at that time for deficiencies and action items.
15. Infrastructure Maintenance, Rehabilitation and Renewal

The Operating Authority maintains a documented summary of the Operating Authority's infrastructure maintenance, rehabilitation, and renewal programs for the water treatment and distribution system. This assists in ensuring the infrastructure required is in place and is adequately maintained, or plans for improvement are in place for continued safe drinking water to be provided to the customer.

The summary, or list of relevant infrastructure maintenance items, is kept current, and is communicated to the Owner at least annually, or as deemed required by the Operating Authority's Project Manager / Overall Responsible Operator, in presentations to the local council, and committee, if applicable or required.

Monitoring of the effectiveness of the maintenance, rehabilitation, and renewal programs is a requirement of the DWQMS, and is carried out by monitoring the maintenance work order system and assessing the amount of planned versus unplanned maintenance activity.

The Maintenance Request system can be initiated by any employee by filling in a Maintenance Request Form. This request is then forwarded to be assessed by the Maintenance Manager or Project Manager / ORO. Maintenance Requests are filed and reviewed as required to assess or confirm trends and issues are reported in the annual summary.

A “Jobs Plus’ Maintenance system also generates work orders for routine equipment servicing and preventive maintenance for designated equipment in the water treatment and distribution system.

A summary of key infrastructure material and equipment from Jobs Plus is generated by the Maintenance Manager or Project Manager / ORO and also added to the annual infrastructure summary.

Longer term initiatives such as capital plan requirements or renewal programs are communicated to the Owner in the Annual Summary report or presented to Council as required.
16. Sampling, Testing, and Monitoring

The Operating Authority maintains a sampling, testing, and monitoring process as required by the Ontario Regulation 170/03, including under conditions challenging to the system, as shown in the Table in Appendix I. 1.

Specific sampling and monitoring procedures are established for operating the water treatment facility, and are listed in the Operations Manual. Laboratory analysis is carried out in-house as well as from an accredited outside lab. In house test procedures are kept in a binder on site.

Test results are reported to the Operating Authority by the Accredited Lab and Operator Test results are recorded in the logbook in the Water Treatment Plant by the Operator.

All sampling and test records from the PLC system, laboratories, and Operators are recorded, properly filed and maintained according to procedures as outlined in the Document and Records Control Procedures, and the Water Treatment Plant Operations Manual.

The procedure is for test results to be provided to the Owner on a monthly basis by the Compliance Officer who compiles the data and forwards the results to the Owner, The accredited Lab also forwards test results to the owner on a monthly basis, unless otherwise requested by the Owner, to forward the results to the Operating Authority only.

A summary of the sampling and monitoring requirements of the various WTP process steps, including frequency, location, quality targets, challenging conditions, and records is shown in Appendix I - Sampling, Testing and Monitoring Table.

Appendix I

APPENDIX I: Sampling, Testing and Monitoring Summary Table

<table>
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Note: To be reviewed annually or when a QMS change occurs.

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17. Measuring and Recording Equipment Calibration and Maintenance

The Operating Authority maintains a calibration and maintenance process, as required for the measurement and recording equipment used in the water treatment system. Procedures are established for calibration and maintenance of this equipment, and are listed in the Operations Manual.

Specific equipment procedures are available in the Equipment Manufacturer’s Manuals and Users Manuals are available for Operators as required.

Certified sub-contractor’s are used as required for maintenance and calibration of flow meters, and records maintained.

All calibration and maintenance records are properly filed and maintained according to procedures as outlined in the Document and Records Control Procedures, and the Water Treatment Plant Operations Manual.

A summary of the calibration and maintenance requirements, for the WTP measurement and recording instruments, including method, frequency, and records is shown in Appendix J - Measurement and Recording Equipment Calibration Table. The Table is maintained by the Compliance Officer as revisions are required.

Appendix J

APPENDIX J1: Measurement and Recording Equipment Calibration Table
18. Emergency Management

An emergency, with regard to drinking water, is a potential situation or service interruption that may result in the loss of the ability to maintain a supply of safe drinking water to consumers.

Some emergency situations that could occur include chemical, biological, or radiological contamination, major distribution line or watermain breaks, interruptions in pressure, or loss of power. The Risk Assessment Outcomes, and Risk Assessment Table in Section 8 reference potential emergency situations. Procedures or Contingency Plans related to potential emergency situations can be found in the Operations Manual or Contingency Plan.

A Contingency Plan (Emergency Response Plan) for the Operating Authority is available at the Water Treatment Plant listing potential emergencies and the appropriate measures for response, contacts, and how to restore the system to normal operation. WTP Operators and staff are kept up to date with annual reviews of the Operations Manual and Contingency Plan, or as required if changes occur.

It is the responsibility of the Project Manager to ensure that employees are aware of the Contingency Plan and are trained in their responsibilities with regard to emergency preparedness.

A list of emergency contacts and essential suppliers and services is kept with the Contingency Plan.

In addition to the above, the Owner has an Emergency Response Plan, in accordance with current legislation and regulations, at the municipal office that provides information and contact information in the case of a water related emergency situation. Owner Responsibilities are listed in the Municipalities Emergency Response Plan.

Emergency Response Testing can be accomplished by review of one or more Contingency Plan procedures, review of actual emergencies, or by participation in the Municipality’s annual emergency exercise. This should be carried out by the Project Manager, or designate, on a regular basis (minimum annually) and followed up in the form of a documented meeting with Operators and employees to ensure awareness of the procedures, and allow discussion and input on situations that could arise as an emergency situation.

Appendix K

APPENDIX K1: Emergency Procedures

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19. Internal Audits

An Internal Audit procedure has been established by the Operating Authority to comply with the DWQMS standard. The intent of the procedure is to evaluate conformity of the QMS with the requirements of the Standard.

The Procedure, found in Appendix L1, identifies the internal audit criteria, the frequency recommended for the audit schedule, the scope, method and requirement for documentation of the audits.

The procedure also describes how Corrective Action Reports (CARs) are initiated and addressed to provide irreversible corrective actions to deficiencies found in the audits.

Previous internal and external audit results should be reviewed for consideration when planning the internal audit.

An Internal Audit Checklist is also included as Appendix L2 to assist with the audit.

A Checklist will be prepared by the internal auditor(s), based on the review of applicable documentation for the element(s) to be audited. The documentation review could include the Operational Plan – Policy Procedures, and Tables, Operations Manuals/Contingency Plan, Process Maps, Work Instructions, and previous internal and external audit reports.

Internal Audits are required to be completed at least once every 12 months.

Appendix L

APPENDIX L1: Internal Audit Procedure and Schedule

APPENDIX L2: Internal Audit Checklist
20. Management Review

A Management Review procedure has been established by the Operating Authority to comply with the DWQMS standard. The intent of the procedure is to provide a structured mechanism for Top Management to perform an annual review of prescribed topics covering compliance, consumer, performance, and audit information based on the Quality Management System.

Top Management for the Operating Authority is defined, in Element 9 Organizational Structure, Roles, Responsibilities and Authorities, and Appendix E2, as the Area Manager and Project Manager. A Municipality representative is also included in the management review.

The Procedure, found in Appendix M1, identifies the management review process and specific topics to be assessed.

Management Reviews are required to be completed at least once every 12 months.

A report of the results of the management review are reported to the Owner by the Project Manager on an annual basis.

Appendix M

APPENDIX M1: Management Review Procedure
21. Continual Improvement

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

The review of the Operations Plan by a third party represents the first step in improving the effectiveness of the QMS. On-going annual Management Reviews and resulting corrective actions will be the basis for further improvement.
NOTE:

TO VIEW THE APPENDICES FOR THE DWQMS OPERATIONAL PLAN - PROCEDURES, TABLES AND FORMS REFERENCED IN THE ELEMENTS 1-21, PLEASE REFER TO THE HARD COPY BINDER AT THE MUNICIPAL OFFICE, FOR MORE DETAILS.