



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

The Town of Kirkland Lake

OPERATIONAL PLAN

for the *Kirkland Lake Drinking Water System*

(L.J. Sherratt Water Filtration Plant and Kirkland Lake Distribution System)

Revision 0: April 10, 2015



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DISCLAIMER STATEMENT

This Operational Plan is designed for the exclusive use of the Corporation of the Town of Kirkland Lake.

This Operational Plan has been developed with OCWA's operating practices in mind and utilizing OCWA personnel to implement it.

Any use which a third party makes of this Operational Plan, or any part thereof, or any reliance on or decisions made based on information within it, is the responsibility of such third parties. OCWA accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this Operational Plan or any part thereof.

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

OPERATIONAL PLAN

Kirkland Lake Drinking Water System

Owned by the Corporation of the Town of Kirkland Lake
Operated by the Ontario Clean Water Agency

This Operational Plan defines and documents the Quality & Environmental Management System (QEMS) for the Kirkland Lake Drinking Water System operated by the Ontario Clean Water Agency (OCWA). It sets out OCWA's policies and procedures with respect to quality and environmental management in accordance with the requirements of the Province of Ontario's Drinking Water Quality Management Standard (DWQMS).

This Operational Plan expands on OCWA's corporate QEMS Reference Manual. Linkages between OCWA corporate and facility requirements are identified where appropriate.

OPERATIONAL PLAN REVISION HISTORY

Date	Revision #	Description of Revision
Apr. 10, 2015	0	Operational Plan issued

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LIST OF ACRONYMS AND ABBREVIATIONS

AAP	Analysis/Action Plan
ANSI	American National Standards Institute
AWQI	Adverse Water Quality Indicator
AWWA	American Water Works Association
CCP	Critical Control Point
CEO	Chief Executive Officer
CFU	Coliform Forming Units
CPR	Cardiopulmonary resuscitation
CT	Concentration of disinfectant residual x Contact Time
DWQMS	Drinking Water Quality Management Standard
DWS	Drinking Water System
EEP	Environmental Emergency Procedure
FEP	Facility Emergency Plan
GUDI	Groundwater Under the Direct Influence of Surface Water
LMRS	Large Municipal Residential System
MOIR	Monthly Operations Report
ND	Not Detectable
NEO	Northeastern Ontario
NSF	National Sanitation Foundation
NTU	Nephelometric Turbidity Units
O. Reg.	Ontario Regulation
OCWA	Ontario Clean Water Agency
OIC	Operator-In-Charge
OIT	Operator-In-Training
OPEX	Operational Excellence
ORO	Overall Responsible Operator
PCT	Process and Compliance Technician
PDC	Process Data Collection
PLC	Programmable Logic Controller
PPR	Performance Planning & Review
PVC	Polyaluminium chloride
QEMS	Quality & Environmental Management System
QP	Quality Procedure
Rep	Representative
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SOP	Standard Operating Procedure
UV	Ultraviolet (light)
VP	Vice President
WHMIS	Workplace Hazardous Materials Information System
WMS	Work Management System
WTP	Water Treatment Plant

1 OCWA's Quality & Environmental Management System (QEMS)

OCWA is the contracted Operating Authority for the Kirkland Lake Drinking Water System.

OCWA's Quality & Environmental Management System (QEMS) is structured and documented with the purpose of:

1. Establishing policy and objectives with respect to the effective management and operation of water/wastewater facilities;
2. Understanding and controlling the risks associated with the facility's activities and processes;
3. Achieving continual improvement of the QEMS and the facility's performance.

2 Quality & Environmental Management System (QEMS) Policy

The Ontario Clean Water Agency, its Board of Directors, Officers and entire staff are committed to the principles and objectives set out in our Quality & Environmental Management System (QEMS) Policy.

OCWA's Policy is to:

- Maintain and continually improve upon a comprehensive quality and environmental management system (QEMS) to support the delivery of safe, reliable and cost-effective clean water services that protect public health and the environment.
- Establish clear objectives against which OCWA's environmental performance can be measured and assessed with the goal of continual improvement.
- Understand and comply with applicable legislation and regulations and audit the facilities we operate to ensure compliance.
- Utilize a risk-based approach to quality management that accounts for the complexity and specific challenges of providing operation and maintenance services.
- Promote client and consumer confidence through service excellence and effective communications.
- Collaborate with its clients to prevent pollution and contribute to a more sustainable future by promoting the use of operational efficiencies and improved technology.
- Train staff on their responsibilities under the QEMS and how meeting these responsibilities assist with the protection of public health and the environment.
- Report on facility performance to its employees, clients and stakeholders.

Our Board of Directors, Officers and entire staff will act to ensure the implementation of this Policy and will monitor progress of the Quality & Environmental Management System (QEMS).

OCWA's QEMS Policy is readily communicated to all OCWA personnel, the Owner and the public through OCWA's intranet and public websites. A complete review/revision history of the QEMS Policy is maintained on OCWA's intranet.

3 Commitment & Endorsement of OCWA'S QEMS & Operational Plan

This Operational Plan supports the overall goal of OCWA and the Corporation of the Town of Kirkland Lake to provide safe, cost-effective drinking water through sustained cooperation. OCWA will be responsible for developing, implementing, maintaining and continually improving its QEMS with respect to the operation and maintenance of the Kirkland Lake Drinking Water System and will do so in a manner that ensures compliance with applicable legislation and regulations. Through the endorsement of this Operational Plan, the Corporation of the Town of Kirkland Lake commits to cooperating in any reasonable request of OCWA to facilitate this goal.

Top management of both OCWA and the Corporation of the Town of Kirkland Lake has approved the QEMS for the drinking water system as documented in this Operational Plan.

Any major revision of the operational plan will be re-endorsed by top management of both OCWA and the Corporation of the Town of Kirkland Lake. Major revisions include:

1. Change of Owner
2. Addition or removal of any treatment process
3. Operation of additional drinking water subsystems owned by the same Owner


OCWA assumed overall operational responsibility for the Kirkland Lake drinking water system on January 1, 2015. Revision 0 of the Plan was endorsed by both OCWA and the Town of Kirkland Lake. The written endorsement is presented below. The Plan and associated procedures will be communicated to relevant employees and provided to the Owner.

Operating Authority Approval


Eric Nielson,
Senior Operations Manager

Date

Apr 17/15


Gord Williams
Regional Manager, Operations

Date

APR. 13/15

Owner Endorsement & Approval


Tony Antoniazzi
Mayor

Date

April 17/15


Nancy Alliek
Chief Administrative Officer

Date

Apr 17/15


John Ducharme
Clerk

4 Quality Management System Representative

All personnel have a role and associated responsibilities within OCWA's QEMS.

The role of QEMS Representative for the Kirkland Lake Drinking Water System is shared between Facility Level Top Management (Senior Operations Manager and Operations Manager) and the Process & Compliance Technician (PCT).

The Senior Operations Manager and/or Operations Manager are ultimately responsible for activities related to the operation of the drinking water systems and for establishing and maintaining processes and procedures required for the overall administration of the facility's QEMS.

To assist in fulfilling the specific duties set out for the QEMS Representative, Facility Level Top Management and the PCT are responsible for:

- Reporting on QEMS performance and identifying opportunities for improvement,
- Ensuring that current versions of documents related to the QEMS are in use, and
- Ensuring personnel are aware of all applicable legislative and regulatory requirements that pertain to their operational duties.

The QEMS Representative(s) is responsible for promoting awareness of the QEMS to all facility personnel.

5 Document and Records Control

Refer to Appendix A for QEMS Procedure QP-01 Document and Records Control.

6 Drinking Water System

The Kirkland Lake Drinking Water System is owned by the Corporation of the Town of Kirkland Lake and consists of a Class 3 conventional design water treatment plant (approved capacity of 22 500 m³/d) and a Class 2 water distribution system. The Ontario Clean Water Agency (OCWA) is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities. Certified municipal operators assist OCWA by performing routine maintenance, checks and repairs of the distribution system.

Description of the Kirkland Lake Drinking Water System (DWS# 220000308)

The Kirkland Lake Drinking Water System provides a potable water supply to the residents and businesses of the Town of Kirkland Lake. It is a standalone system that is not connected to any other drinking water system.

The following description of the system provides a basic overview of all treatment processes. For detailed description and operating instruction refer to the KLWTP Operating Manual, located at the water treatment plant.

Kirkland Lake draws its water from Gull Lake on the eastern border of the town. Potentially pathogenic organisms are removed from the raw water source by the following processes:

1. Pre-chlorination
2. Coagulation / flocculation / sedimentation
3. Filtration
4. Post-chlorination (primary disinfection)
5. Distribution system chlorine residual (secondary disinfection)

This multiple barrier approach helps to ensure consistently compliant drinking water quality, and ultimately improves the level of public health protection.

Raw Water Supply

The Kirkland Lake WTP draws raw water from Gull Lake through a 146 m long, 710 mm diameter intake pipe. The pipe terminates in an intake chamber located approximately 10 m from the lake shoreline. A 750 mm diameter, 17 m long pipe connects the intake chamber and the WTP.

A traveling water screen is installed immediately inside the plant. The screen removes large floating debris from the water prior to treatment. The provision for a manual screen immediately downstream from the traveling screen offers back up screening in the event the traveling screen is out of service. Following the screening, raw water is disinfected (pre-chlorination) prior to entering the wet well of the Low Lift Pumping Station.

Water Treatment

1. Coagulation / Flocculation / Sedimentation

The Low Lift Pumping Station (LLPS) transfers water from the wet well (where water level corresponds to the water level in the lake) to the treatment processes. The water flows by gravity through the treatment processes.

The first step of water treatment is coagulation -- a process of destabilization and initial aggregation of colloidal and finely divided suspended matter by the addition of a floc-forming chemical.

Raw water enters the treatment stage through an inlet chamber. Just prior to entering the chamber, chemical coagulant, aluminum sulfate (alum), is injected into raw water and is rapidly agitated with a flash mixer.

The mixture then overflows into three (3) contact compartments – one per pre-treatment unit. In the compartments, the mixing weirs gently turn the mixture in order to promote coagulation.

Just prior to leaving the mixing chambers, a flocculant, activated silica -- an inorganic polymer, is added.

Flocculation in water treatment is agglomeration of colloidal and finely divided suspended matter after coagulation by gentle agitation by either mechanical or hydraulic means, sometimes with an aid of chemical flocculant.

The mixture enters the bottom distribution piping of each Degremont Ultra-Pulsator clarifier via vacuum chambers. The vacuum in the chambers is created by the vacuum pumps, one per chamber. The purpose of the vacuum chambers is to create gentle movement of the sludge blanket in the clarifier for both flocculation and sludge removal.

Sedimentation is the process of subsidence and deposition of suspended matter, carried by water or other liquids, by gravity. It is usually accomplished by reducing the velocity of the liquid to below the point at which it can transport the suspended material or floc.

The flow is distributed equally over the full area of the clarifiers through the distribution pipes in the bottom of the unit. The flow percolates through the sludge blanket. Upon exiting the sludge blanket, the water flows through a plate settler and then the tube settler. Clarified water is gathered by the collection pipes at the top of the units and transferred to channels that lead to the filters.

2. Filtration

Filtration is the process of passing a liquid through a filtering medium (for K LWTP this consists of granular material, sand and anthracite) for the removal of suspended or colloidal matter.

There are four (4) dual media filters at the plant. Each filter is approximately 6.4 m x 4.3 m x 3m deep and rated to operate at a max. rise rate of 9.0 m/hr or a max. flow rate of 65.0 L/sec. The filter media consists of 450 mm of anthracite underlain by a 300 mm layer of silica sand. A concrete underdrain slab outfitted with strainer nozzles supports the filter media. During normal operation, the water flows into the filter from the filter channel via an inlet sluice gate and travels through the media in a downward pattern. The filtered water is collected in the underdrain area and transported by pipes to the clearwell, located under the ground slab of the plant. The flow through each filter is measured by individual flow meters and is controlled by dedicated filter control valves. A headloss indicator monitors the filter media condition. The filtrate quality is continuously monitored by individual turbidimeters, and a particle analyzer.

3. Disinfection (Chlorination)

Filtered water is disinfected following filtration. Chlorine solution is diffused into the water stream in the clearwell of the treatment building. The diffuser and a series of baffles promote complete mixing of chlorine with water. The chlorine solution is prepared on-site by mixing chlorine gas with water. A chlorinator controls the chlorine gas feed rate. There are three (3) chlorinators installed at the plant - one serves as a duty pre-chlorinator while the second is a duty post-chlorinator. The third chlorinator serves as a stand-by for either one of the duty chlorinators. Chlorine gas is mixed with water in the ejectors and is sent to diffusers as a chlorine solution. SCADA monitors the chlorinators which will generate alarms upon high and low vacuum levels or abnormal chlorine levels. Each chlorinator is rated to supply 67.0 kg per

day of chlorine gas which, based on the plant rated capacity, equals to the maximum chlorine feed rate of up to 3.0 mg/L (3.0 ppm or parts per million) at each location. The gas is withdrawn at any given time from only one of the two one tonne cylinders that are located on the monitored weigh scale. The chlorine feed system will switch automatically to another cylinder when pressure in the duty cylinder drops below the pre-set value. If both cylinders approach low levels, SCADA will alarm the operator.

4. pH Adjustment

A pH adjustment process utilizing sodium hydroxide (NaOH) restores treated water to a neutral pH. NaOH is delivered in bulk to the plant at 93% strength and stored in a 12 000 litre tank. The NaOH is transferred to a day tank and diluted to a 40% solution. Two metering pumps (1 duty and 1 standby) feed the 40% NaOH to the clearwell of the treatment building at the point of exit to the pumping building.

5. Process Waste Residuals Management

Filter backwash water and withdrawn sludge from the sedimentation tanks are directed to two wastewater tanks. The capacity of each tank is approximately 900 m³. Wastewater is discharged to the sanitary sewer system.

Emergency Power

The plant also has a standby power generator rated at 300 kW and equipped with an automatic transfer switch, underground and in-plant fuel storage tanks.

Distribution System and Elevated Storage Tank

The Kirkland Lake Drinking Water System is classified as a Large Municipal Residential Drinking Water System and provides water to approximately 9000 residents. Distribution piping typically ranges in size from 150 mm to 250 mm, and may consist of cast iron, ductile iron, or PVC, depending on the location and date of installation. Typical system pressure ranges from 55 P.S.I. to 70 P.S.I. The standpipe provides for storage for approximately 7,115 m³ of water, helps stabilize water pressure in the distribution system and provides extra water in the case of an emergency. To ensure optimum chlorine residual in the distribution system there are two chlorine booster stations, one at the Chaput Hughes Standpipe and the other at the Swastika Valve Chamber.

Figure 1: L.J. Sherrat Lake Water Treatment Plant - Process Flow Diagram

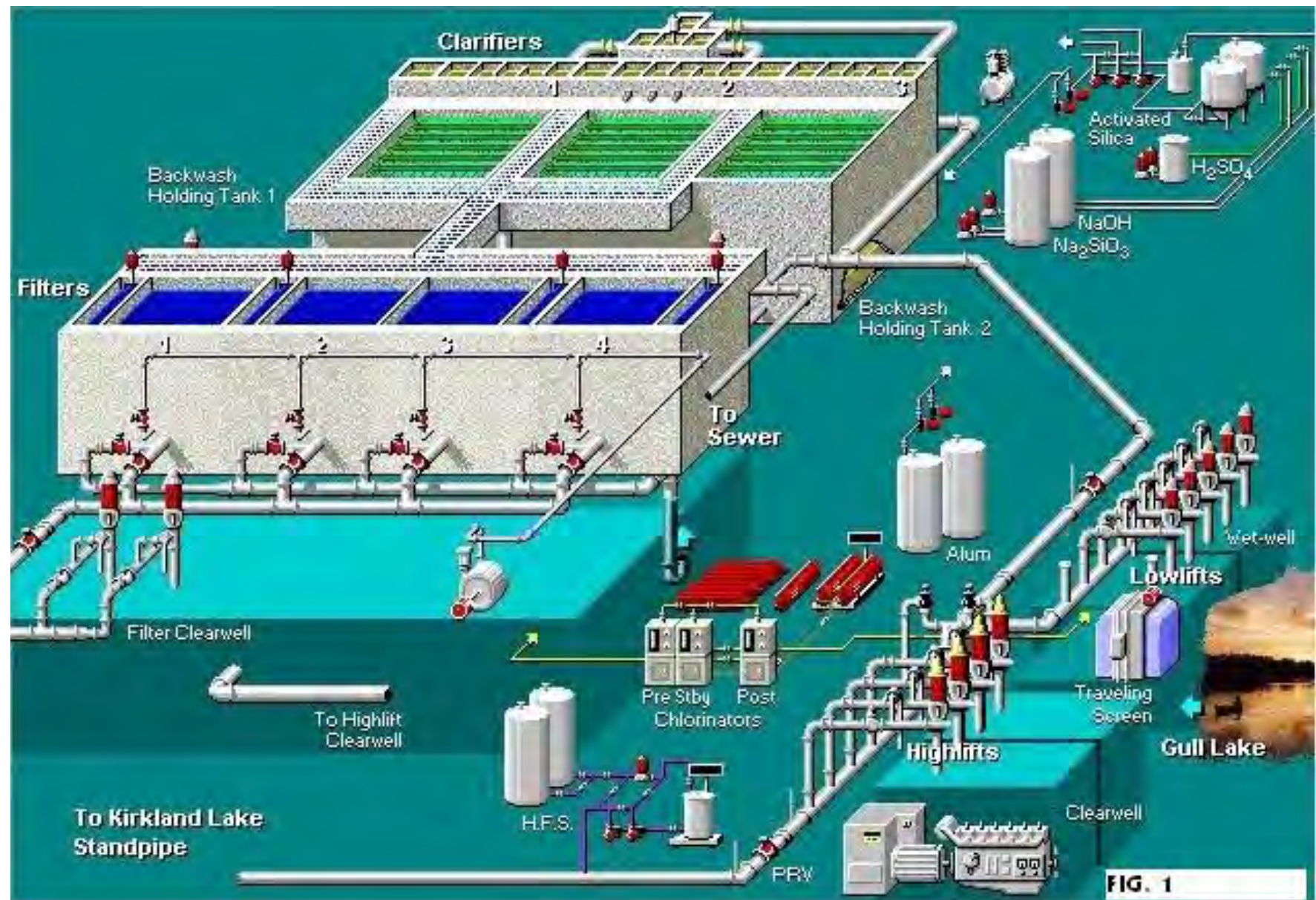
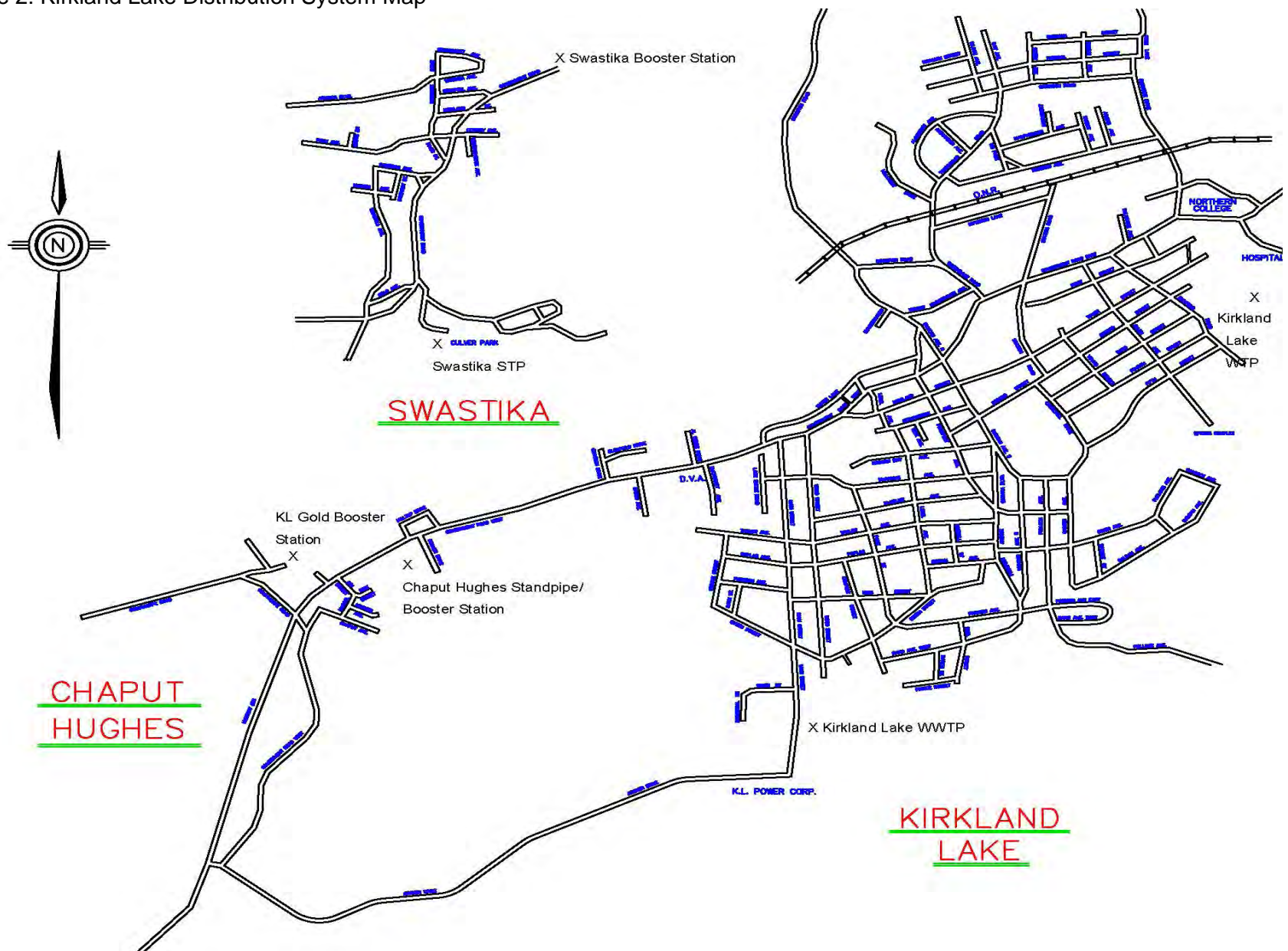


Figure 2: Kirkland Lake Distribution System Map



Source Water

General Characteristics

The raw water source for the treatment plant is Gull Lake. Gull Lake water is typically very low in turbidity (<2 NTU), hardness and alkalinity but moderate in colour, and slightly basic. Temperature fluctuates significantly throughout the seasons ranging from approximately 4 Celsius in the winter to as high as 23 Celsius during the summer. Chemical and bacteriological analysis of the raw water indicates a source of good quality. The local Board of Health, through a provincial Order-In-Council dated Feb. 6th 1934 and The Township of Teck Act 1938, is responsible for the administration of the sanitary control for the public water supply of the Town as sourced from: Gull Lake and the drainage area of Gull, McTavish and Victoria Lakes. The Township of Teck Act 2(1) provides the town with power to control sanitation of this watershed, “The corporation may, with the approval of the department of Health for Ontario, by by-law control and regulate the sanitation of that area...”.

Table 1 – Gull Lake: Raw Water Characteristics (based on 2014 data)

Characteristic	Annual Average
Temperature (°C)	9.9
pH	6.86
Turbidity (NTU)	0.72
Colour	32
<i>E. coli</i> (CFU/100 mL)	2 to 20
Total Coliforms (CFU/100 mL)	2 to >200

Common Fluctuations

Seasonal changes in raw water temperatures cause vertical turnover of the lake water during spring and fall. Turnover typically takes place over a relatively short duration (~2 – 7 days). During this period, settled solids from the lakebed are re-suspended resulting in increased raw water turbidity. Operators must be prepared to make appropriate plant adjustments to treat the elevated levels of turbidity experienced during turnover events.

Changes in water temperature will also impact treatment process performance (settling, disinfection). Optimal treatment requires timely adjustments to treatment chemical dosages (disinfectants and coagulants) in response to temperature fluctuations.

Threats

Potential sources of raw water contamination include potential spills from adjacent train tracks and highway.

Human activity including recreational is limited to help ensure the safety of the water source.

Operational Challenges

Operational challenges include seasonal/weather lake fluctuations such as thermal turnover. Proper operation of the treatment multi-barriers continues to meet the challenges of natural lake fluctuations.

7 Risk Assessment

Refer to Appendix B for QEMS Procedure QP-02 Risk Assessment and Risk Assessment Outcomes.

8 Risk Assessment Outcomes

The Risk Assessment Outcomes are under development and will be completed for Full Scope Accreditation.

9 Organizational Structure, Roles, Responsibilities and Authorities

Organizational Structure and Top Management

OCWA provides operation, maintenance and management services for hundreds of water and wastewater facilities throughout the Province of Ontario. Direct operational activities are primarily delivered through the Agency's Operations Division. Corporate level divisions that carry out administrative functions for the Agency are expanded upon in the QEMS Reference Manual.

To best meet the needs of each facility and its owner, OCWA's Operations Division is structured as follows:

- *Hub* – Facilities are grouped together geographically to form hubs. The Senior Operations Manager has oversight responsibility for all of the facilities contained within a particular hub. In some hubs, an Operations Manager assists the Senior Operations Manager with his/her duties.
- *Regional* – Hubs are further grouped together to form regions, each headed by a Regional Manager. Regional Managers play a critical role within OCWA's QEMS in that they act as a key link between corporate and facility level management.
- *Provincial* – Regions fall under the direction of a VP of Operations.

The chart, QEMS Organizational Structure for the Kirkland Lake Drinking Water System (Appendix C), reflects the lines of responsibility and authority for OCWA's QEMS at both the facility and corporate level.

OCWA has defined two levels of Top Management within its structure, which, through a shared responsibility for conducting periodic management reviews, ensure the maintenance and continual improvement of OCWA's QEMS:

Facility Level Top Management – consisting of the Senior Operations Manager and the Operations Manager. Management, in accordance with QEMS Procedure QP-11 Management Review, holds a special meeting at least once per year to review the effectiveness and performance of the QEMS implemented at the facility and to initiate appropriate facility management action to maintain and improve the QEMS. The results of the meeting are provided to the Regional Manager for consideration by corporate level Top Management and to initiate appropriate action with respect to the Agency's broader QEMS.

Corporate Level Top Management – consisting of Regional Managers, VP of Operations, Director of Operational Services, President & CEO and OCWA's Board of Directors. Each has specific corporate oversight responsibilities for the Agency's QEMS, which are described in the QEMS Reference Manual. The overall performance and effectiveness of OCWA's QEMS is formally reviewed and reported to corporate level Top Management on an annual basis. It is also monitored on an ongoing basis through scheduled meetings of OCWA's Operations & Compliance Committee, Executive Management Team and Board of Directors. Through these reporting and monitoring activities, corporate level Top Management identifies opportunities for improvement, initiates action plans and assigns responsibility for their completion.

QEMS Roles, Responsibilities and Authorities

OCWA management defines the roles, responsibilities and authorities under its QEMS for all employees whose work could have a significant impact on drinking water quality. These are communicated to all personnel to ensure that they understand their individual roles and responsibilities and how they relate to rest of the organization.

Specific QEMS-related roles, responsibilities and authorities of operations personnel working for the water treatment facility are summarized in Table 2 below. Additional duties of employees are described in their job specifications.

Corporate level roles, responsibilities and authorities are defined in the QEMS Reference Manual.

Responsibilities and authorities for implementing and maintaining individual elements of the facility's QEMS are outlined in the QEMS Procedures referenced throughout this Operational Plan.

Table 2: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
All Operations Personnel	<ul style="list-style-type: none"> • Work in accordance with OCWA policies, procedures and plans • Document all activities • Participate in QEMS training • Be aware of all the environmental and public health risks at the facility • Consider risks and ramifications of all actions • Participate in testing and development of procedures and contingency plans • Implement action plans to rectify deficiencies identified in audits and inspections of the facility • Take all appropriate training to ensure competence in their job • Identify and bring forward to the Senior Operations Manager opportunities for improving the facility's QEMS • Perform duties in compliance with applicable legislation and regulations
Regional Manager (Corporate Level Top Management)	<ul style="list-style-type: none"> • Review major issues/deficiencies (including those from audit and inspection reports) and provide further direction to address/resolve • Respond to regular facility Management Reviews, as appropriate • Report to corporate level Top Management on the status of the QEMS implemented at the facilities in his/her region
Senior Operations Manager (Facility Level Top Management, QEMS Representative)	<ul style="list-style-type: none"> • Delegate responsibilities, deploy resources and supervise sound operation and maintenance of the facility and of the QEMS • Liaise with the owner on relevant components of the QEMS including OCWA's roles, responsibilities and authorities for the facility • Ensure appropriate facility resources to maintain and continually improve the QEMS • Ensure that each facility in the hub has a site-specific emergency plan that meets the corporate standard • Arrange for/review annual internal audits (compliance and QEMS) • Lead regular facility Management Reviews • Report to the Regional Manager on the performance and effectiveness of the QEMS implemented at the facility • Develop action plans to respond to the findings of the internal/external audits and MOE inspections and verify action plan completion • Establish a training plan for staff to address regulatory requirements and the QEMS as part of the PPR process • Fulfill defined duties of the QEMS Representative (refer to element 4) • Acts as Overall Responsible Operator (ORO) for the water treatment system, standpipe and booster stations when required. Refer to ORO Letter
Operations Manager (Facility Level Top Management &	<ul style="list-style-type: none"> • Fulfill duties assigned by the Senior Operations Manager • Deploy resources and supervise sound operation and

Table 2: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
<i>QEMS Representative)</i>	<p>maintenance of the facility and of the QEMS</p> <ul style="list-style-type: none"> • Participate in the completion of annual internal audits • Assist in the development and implementation of action plans to respond to audit and MOE inspection findings • Assist in the establishment, testing and updating of a site-specific emergency plans • Participate in regular facility Management Reviews • Report to the Senior Operations Manager on QEMS implementation and identify the need for additional processes and procedures • Liaise with the owner on relevant components of the QEMS • Develop/implement training plans for staff • Support Senior Operations Manager on all aspects of the QEMS and fulfill assigned duties of the QEMS Representative (refer to element 4) • Act for the Senior Operations Manager in his/her absence
<p>Process & Compliance Technician (PCT) <i>(QEMS Representative)</i></p>	<ul style="list-style-type: none"> • Fulfill duties assigned by the Senior Operations Manager • Participate in the completion of annual internal audits and develop/monitor/implement action plans to respond to the findings • Participate in MOE inspections and assist in the response to required actions or recommendations • Actively participate in the development and maintenance of facility emergency plans • Participate in regular facility Management Reviews • Report to the Senior Operations Manager on QEMS implementation and identify the need for additional processes and procedures • Liaise with the owner on relevant components of the QEMS • Deliver/participate in training on regulatory requirements and the QEMS • Implement, monitor and support corporate QEMS programs • Support Senior Operations Manager and Operations Manager on all aspects of the QEMS and fulfill assigned duties of the QEMS Representative (refer to element 4)
Team Lead (ORO)	<ul style="list-style-type: none"> • Fulfill duties assigned by the Senior Operations Manager and/or Operations Manager • Participate as a technical advisor to staff and management and provide specialized training on technical or other issues. • Prepare and/or coordinate staff work assignments and follow up to ensure completion • Assist management in providing recommendation for annual capital forecasts and gathering information for operational reports as required • Assist in the preparation of facility manuals and documenting operating processes and procedures for staff • Actively participate in the development and maintenance of facility emergency plans and assist with emergencies as

Table 2: QEMS Roles, Responsibilities and Authorities

Position	QEMS Roles, Responsibilities and Authorities
	<p>required.</p> <ul style="list-style-type: none"> • Act for management during vacations or periodic absences. • Perform duties of Operator/Mechanic as required • Maintain the facility log book according to regulatory requirements • May act as Operator-in-Charge (OIC) • Act as Overall Responsible Operator (ORO) for the water treatment system, standpipe and booster stations. Refer to ORO Letter
Operator/Mechanic	<ul style="list-style-type: none"> • Fulfill duties assigned by the Operations Manager and/or Team Lead • Monitor facility processes through visual inspection, the SCADA system or by taking readings from the process control equipment • Operate and adjust equipment/processes to maintain compliance with applicable regulations, licences, permits, certificates and established operating procedures • Collect samples and perform laboratory tests and equipment calibrations as required • Regularly inspect operating equipment, perform routine preventive maintenance and repairs and prepare and complete work orders as assigned. • Participate in facility inspections and audits • Train and direct new staff on the facility processes, equipment and procedures. • Maintain the facility log book according to regulatory requirements • May act as Operator-in-Charge (OIC)
Instrumentation Technician	<ul style="list-style-type: none"> • Provide advice and technical expertise on the services required for process control and automation systems • Formulate technical plans and proposals for deployment and delivery of process control and automation systems in support of operational activities • Coordinate, maintain and provide technical services in regards to process control and automation systems including preventive maintenance procedures • Discuss and advise on detailed system and programming requirements, modify existing and new software in response to plant requests, train plant operations and maintenance staff, analyze and resolve problems/error conditions, document changes/modifications and configure, install and support related software, hardware and network for such systems • Conduct inspections of the process control and automation systems to validate that all is operating within established parameters • Install and commission new electrical/electronic equipment and automation systems.

10 Competencies

Table 3 presents the competencies required by OCWA personnel whose duties directly affect drinking water quality.

Table 3: Competencies

Position	Required Competencies
Senior Operations Manager	<ul style="list-style-type: none"> • Operator certification in good standing • Comprehensive general knowledge of and experience in managing water treatment operations, maintenance as well as facility financial planning and administration • Outstanding team leadership, managerial and coordinating skills • Advanced knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures • Excellent knowledge and awareness of the DWQMS • Strong initiative, analytical, evaluating and problem-solving skills to assess administrative and technical needs and capabilities • Well-developed priority-setting and time management skills • Superior interpersonal skills • Excellent oral and written communication skills • Proficiency in office and operational computerized systems • Valid Class G Driver's Licence
Operations Manager	<ul style="list-style-type: none"> • Operator certification in good standing • Experience in water treatment operations, maintenance as well as facility financial planning and administration • Advanced knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures • Knowledge and awareness of the DWQMS • Advanced technical knowledge of principles, practices, technologies and methodologies for water treatment • Familiarity with complex mechanical equipment and electronic controls • Analytical, evaluating and problem-solving skills • Project management, work planning and scheduling skills • Good oral and written communication skills • Proficiency in office and operational computerized systems • Management/supervisory experience • Valid Class G Driver's Licence
Process & Compliance Technician	<ul style="list-style-type: none"> • Operator certification in good standing; • Extensive knowledge of compliance requirements related to water treatment processes • Good knowledge of relevant legislation, regulations, codes, policies, guidelines and procedures to monitor program delivery and ensure compliance • Sound knowledge and awareness of the DWQMS • Good knowledge and understanding to apply impact of changes to legislative and regulatory requirements on programs and operational processes • Excellent knowledge of computers, operating programs and systems

Table 3: Competencies

Position	Required Competencies
	<ul style="list-style-type: none"> • Evaluative and analytical skills to monitor and assess facility performance against legal requirements and corporate goals • Excellent oral and written communication skills to provide technical advice related to compliance to a variety of staff and officials and to prepare analytical reports • Presentation skills to prepare and present informational material • Auditing skills/experience • Problem-solving skills to resolve compliance issues • Ability to work with a team and take initiative when required • Valid Class G Driver's Licence
Team Lead	<ul style="list-style-type: none"> • Operator certification in good standing; • Extensive knowledge and experience of water treatment processes to operate the facility • Experience and knowledge of the maintenance and repair of a variety of equipment and structures • Good working knowledge of legislation, regulations, codes, policies, guidelines and procedures related to operations and maintenance • Knowledge and awareness of the DWQMS • Basic mathematics and chemistry • Good knowledge of computers, monitoring and operating systems • Good knowledge to use and understand operating and maintenance manuals, blueprints and other technical specifications • Planning and organizational skills to lead projects and provide technical direction to staff • Demonstrated leadership and decision making skills required to direct an operational team • Problem solving and evaluative skills to provide technical guidance and resolve operational issues • Planning skills to regularly inspect and monitor the facility, processes and equipment and perform routine preventative maintenance • Good oral and written communication skills • Ability to work in a team and take initiative when required. • Valid Class G Driver's Licence
Operator/Mechanic	<ul style="list-style-type: none"> • Operator certification in good standing; • Good knowledge of water treatment processes to operate the facility • Experience and knowledge of the maintenance and repair of a variety of equipment and structures • Good working knowledge of legislation, regulations, codes, policies, guidelines and procedures related to operations and maintenance • Knowledge and awareness of the DWQMS • Basic mathematics and chemistry • Familiarity with computers, monitoring and operating systems • Knowledge to use and understand operating and maintenance manuals, blueprints and other technical specifications • Planning, scheduling and problem-solving skills to regularly inspect and monitor the facility, processes and equipment and perform routine preventative maintenance

Table 3: Competencies

Position	Required Competencies
	<ul style="list-style-type: none"> • Good oral and written communication skills • Ability to work in a team and take initiative when required. • Valid Class G Driver's Licence
Instrumentation Technician	<ul style="list-style-type: none"> • Operator certification in good standing; • Theoretical and practical knowledge/experience/training in water/wastewater treatment operation processes, design, instrumentation, process control and automation systems • Knowledge and awareness of the DWQMS • Technical evaluation and design skills necessary for process control and automation optimization and deployment • Experience in delivering technical guidance for hardware/software selection • Thorough understanding of network and telecommunications environment, standards and operating systems, computer language, • ladder logic and relational and document based database management systems • Ability to monitor, review and troubleshoot network, hardware, software and instrumentation performance • Analytical and evaluative problem-solving skills to assess client, process and control requirements • Well-developed organizational, time and project management skills • Superior interpersonal skills • Good oral and written communication skills • Valid Class G Driver's Licence

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

Certified operators are responsible for completing the annual number of required training hours for the highest type and class of subsystem where the operator works and completing mandatory courses required by *Safe Drinking Water Act* (SDWA) O. Reg. 128/04 Certification of Drinking Water System Operators and Water Quality Analysts. The Senior Operations Manager takes reasonable steps to ensure that every operator has the opportunity to attend training to meet the annual training hour requirements.

OCWA's Operational Training Program is maintained by the Operational Research and Development Group and aims to:

- Develop the skills and increase the knowledge of Operations staff and management,
- Provide Operations with information and access to resources that can assist them in performing their duties, and

- Assist OCWA operators in meeting the regulatory requirements with respect to training.

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

Facility personnel receive site-specific training on relevant operational and emergency response procedures to ensure effective operational control of processes and equipment which may impact the safety and quality of drinking water.

Awareness of OCWA's QEMS is promoted through the OCWA Employee Orientation Program for new employees, hub/regional level training sessions and meetings and the Agency's Environmental Compliance course. It is recommended that the Environmental Compliance course be attended by all staff at least every five years to ensure staff are kept current on any changes to regulatory requirements and to reinforce their roles and responsibilities under OCWA's QEMS. Other mandatory and recommended training requirements are listed as part of the Employee Orientation Program available on OCWA's intranet or through the Human Resources department.

Individual OCWA employee training records are maintained and tracked using a computerized system, the Training Summary database, which is also administrated by the Risk, Compliance & Training Division. Training records maintained at the facility are controlled as per QEMS Procedure QP-01 Document and Records Control.

As part of OCWA's annual Performance Planning and Review (PPR) process, employee performance is evaluated against their job expectations. Professional development opportunities and training needs (which could include formalized courses as well as site-specific on-the-job training or job shadowing/mentoring) are identified by the facility's management team as part of this process (and on an ongoing basis). In addition to this process, OCWA employees may at any time request training by both internal and external providers by obtaining authorization from their respective managers.

11 Personnel Coverage

Refer to Appendix D for QEMS Procedure QP-03 Personnel Coverage.

12 Communications

Refer to Appendix E for QEMS Procedure QP-04 Communications.

13 Essential Supplies and Services

Refer to Appendix F for QEMS Procedure QP-05 Essential Supplies and Services.

14 Review and Provision of Infrastructure

Refer to Appendix G for QEMS Procedure QP-06 Review and Provision of Infrastructure.

15 Infrastructure Maintenance, Rehabilitation and Renewal

Planned Maintenance

OCWA, under contract with the owner, maintains a program of scheduled inspection and maintenance of infrastructure for which it is operationally responsible. OCWA, as the service provider, has prepared a Preventative Maintenance Plan, which includes a complete list of all equipment, as well as daily, monthly, seasonal, and annual maintenance activities to be conducted to ensure the good and proper upkeep of the water facility. OCWA is responsible for completing the following routine maintenance:

- Inspect and adjust process control and monitoring equipment to ensure proper operation of water treatment systems pumps, chemical feeders, analyzers, and all other equipment installed at the facility
- Inspect and adjust monitoring equipment at the standpipe and booster stations.
- Monitor reservoir and standpipe condition and levels
- Maintain an inventory of all equipment
- Maintain accurate records of work conducted, activities, and achievements

Planned maintenance activities are scheduled using a computerized Work Management System (WMS) that allows user to:

- Enter detailed asset information
- Generate and process work orders
- Access maintenance and inspection procedures
- Plan, schedule and document all asset related tasks and activities
- Access maintenance records and asset histories

Planned maintenance activities are communicated to the person responsible for completing the task through the issuance of WMS work orders. Work orders are generated by a designated Operator/Mechanic on a monthly, quarterly, seasonal, or annual basis and are distributed accordingly. Completed work orders are returned to the designated Operator/Mechanic for entry into WMS except for those pertaining to the calibration of equipment. Completed calibration reports are entered into WMS by a designated Instrumentation Technician. Records of these activities are maintained as per QEMS Procedure QP-01 Document and Records Control.

The Team Lead or designate maintains the inventory of equipment in WMS and ensures that appropriate maintenance plans are in place. Maintenance plans are developed according to the manufacturer's instructions, regulatory requirements, industry standards, and/or client

service requirements. Equipment Operation and Maintenance (O&M) manuals are accessible to staff at the locations specified in QEMS Procedure QP-01 Document and Records Control.

Unplanned Maintenance

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Operations Manager. Unplanned maintenance activities are recorded in the facility's logbook and/or are recorded on work orders and entered into WMS.

Any major unplanned maintenance activities and deficiencies are communicated with the Owner.

Rehabilitation and Renewal

Rehabilitation and renewal activities including capital upgrades are determined on an annual basis in consultation with the Owner (refer to QP-06 Review and Provision of Infrastructure). A list of required replacement or desired new equipment is compiled and prioritized by the Operations Manager and/or designate and is presented to the Owner for review and comment. All major expenditures require the approval of the Owner.

Program Monitoring and Reporting

As mentioned above, maintenance needs for the facility are determined through review of manufacturer's instructions, regulatory requirements, industry standards, and/or client service requirements and are presented on a Preventative Maintenance Schedule. The tasks are communicated by means of monthly, quarterly, seasonal, or annual work orders. In addition to the monthly reports completed by the Operations Manager which indicate the status of completed work, the Senior Operations Manager and Regional Manager are provided with monthly summary reports for each facility to assist in monitoring the effectiveness of the program. OCWA's Executive Management Team is also provided with hub and regional summary reports on an ongoing basis.

OCWA provides the Owner Monthly Operations Reports which describes any system repairs, changes and improvements and gives the status of maintenance work orders. More detailed reports can also be provided at the owner's request.

16 Sampling, Testing and Monitoring

Refer to Appendix H for QEMS Procedure QP-07 Sampling, Testing and Monitoring.

17 Measurement and Recording Equipment Calibration and Maintenance

Refer to Appendix I for QEMS Procedure QP-08 Measurement and Recording Equipment Calibration and Maintenance.

18 Emergency Management

Refer to Appendix J for QEMS Procedure QP-09 Emergency Management.

19 Internal QEMS Audits

Refer to Appendix K for QEMS Procedure QP-10 Internal QEMS Audits

20 Management Review


Refer to Appendix L for QEMS Procedure QP-11 Management Review.

21 Continual Improvement

In conjunction with the internal QEMS audit and Management Review processes documented above, OCWA uses action plan summary to continually improve its QEMS. Through these processes, areas of concern as well as opportunities for improvement are identified at the drinking water systems operated and maintained by OCWA.

Appendix A

QP-01 Document and Records Control

 Ontario Clean Water Agency	<h1>QEMS Procedure</h1>	Proc.: QP-01 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 7
Reviewed by: Ilona Bruneau, PCT	Approved by: Eric Nielson, Senior Operations Manger	

DOCUMENT and RECORDS CONTROL

1.0 Purpose

To describe how OCWA's QEMS documents are kept current and how QEMS documents and records are kept legible, readily identifiable, retrievable, stored, protected, retained and disposed of.

2.0 Scope

Applies to QEMS Documents and QEMS Records pertaining to the Kirkland Lake Drinking Water System, as identified in this procedure.

3.0 Responsibility

Senior Operations Manager
 Operations Manager
 Team Lead
 Overall Responsible Operator (ORO)
 Process & Compliance Technician (PCT)
 All Facility Staff
 Information Technology Department
 Corporate Compliance Group

4.0 Definitions

Controlled – managed as per the conditions of this procedure

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

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

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

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

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

5.0 Procedure

5.1 Documents and records required by OCWA's QEMS are listed in Table 1.

- 5.2 Internally developed QEMS documents and QEMS records (whenever possible) are generated electronically to ensure legibility and are identified through a header/title and issue date. Handwritten records must be legible and permanently rendered in ink or non-erasable marker.
- 5.3 Additional controls for QEMS Procedures within this Operational Plan are used to ensure appropriate review and approval. These include the use of authorized approval, alpha-numeric procedure code, issue date, revision number and revision history.

Authorized personnel for review and approval of QEMS Procedures for the Kirkland Lake Drinking Water System are:

Review	PCT or Team Lead
Approval	Senior Operations Manager or Operations Manager

- 5.4 The PCT and Team Lead are responsible for ensuring that current versions of QEMS documents are being used at all times. Current QEMS documents and records are readily accessible to Operations personnel and to internal and external auditors/inspectors at document control locations established by the QEMS Representative. The currency of internal documents is ensured by comparing the date on the document to that of the master hardcopy and/or electronic copy residing in the designated document control location(s) specified in Table 1.

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

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

Access to facility QEMS records contained within internal electronic databases and applications (e.g., OPEX, WISKI 7/PDC, WMS) is administered by designated application managers/trustees, requires the permission of the Senior Operations Manager or Operations Manager and is restricted through use of usernames and passwords.

SCADA records are maintained and accessible to all staff when required.

- 5.6 Any employee of the drinking water system may request verbally or in writing a revision to improve an existing internal QEMS document or the preparation of a new document. Requests should indicate the reason for the change. The need for new or updated

documents may also be identified through the annual Management Review or system audits.

The QEMS Representative communicates any changes made to QEMS documents to relevant facility personnel and coordinates related training (as required). Changes to corporately controlled QEMS documents are communicated and distributed to facility QEMS Representatives by OCWA's Corporate Compliance Group through e-mails, OCWA's weekly electronic bulletin and provincial, regional, hub or facility-level training sessions.

- 5.7 When a QEMS document is superseded, the hardcopy of the document is promptly removed from its location and forwarded to the QEMS Representative or designate for disposal or retention (as appropriate). The authorized method for disposal of hardcopy documents and records after the specified retention requirements have been met is shredding.
- 5.8 Electronic copies are re-located to an obsolete folder and marked "superseded".
- 5.9 QEMS documents and records are retained in accordance with applicable regulations and legal instruments. Relevant regulatory and corporate minimum retention periods are listed in Table 2.
- 5.10 The Operational Plan is reviewed for currency at least annually in preparation for audits and the Management Review. Other QEMS-related documents are reviewed as per the schedules set out in this Operational Plan or as significant changes (e.g., changes in regulatory requirements, corporate policy or operational processes and/or equipment, etc.) occur. QEMS documents and records are reviewed for evidence of control during each internal system audit as per QEMS Procedure QP-10 Internal QEMS Audits.

6.0 Related Documents

QP-10 Internal QEMS Audits

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Table 1: Designated location for documents and records required by OCWA's QEMS

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Internal QEMS Documents	
Confined Space Program	HC - Kirkland Lake Water Treatment Plant
Emergency Response Plan (corporate)	EC - OCWA's intranet (ocwanet.ocwa.com)
Facility Emergency Plan (FEP) Binder (includes Emergency Contact List, Essential Supplies and Services List, Contingency Plans, Site Specific Emergency Procedures and OCWA's Emergency Management Program)	HC - Kirkland Lake Water Treatment Plant
OCWA's Safety Manual	EC - OCWA's intranet (ocwanet.ocwa.com)
On-call Schedule (OCWA)	EC - Microsoft Outlook Shared Calendar (Team Lead)
Operational Plan (includes QEMS Procedures)	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System EC - www.discoverkl.ca HC - Kirkland Lake Water Treatment Plant HC - Town of Kirkland Lake Municipal Office
ORO Letter	HC - Kirkland Lake Water Treatment Plant
QEMS Policy	EC - Online at www.ocwa.com & OCWA's intranet (ocwanet.ocwa.com) HC - Kirkland Lake Process & Compliance Office HC - Kirkland Lake Wastewater Treatment Plant
QEMS Reference Manual	EC - \\ocwfile\public\NEO DWQMS
Sample Schedule	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System HC - Kirkland Lake Water Treatment Plant
Vacation Calendar (OCWA)	EC - Microsoft Outlook Shared Calendar (Team Lead)
Internal QEMS Forms (Blank)	
Analysis and Action Plan Form	EC - \\ocwfile\public\NEO DWQMS
Call-in Report Form	
Community Complaint Form	
Contingency Plan Review/Test Summary Form	
Distribution Maintenance and Repair Forms	
Environmental Incident Report Form	
Facility Rounds Sheets	
Incidents of Non-Compliance Form	
Instrumentation Calibration/Maintenance Report Form	
Laboratory Chain of Custody Forms	
Loss of Pressure Incident Form	
QEMS – Summary of Findings Form	
Transportation of Dangerous Goods Form	

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
External QEMS Documents & Forms	
Adverse Water Quality Incident (AWQI) Form	EC - \\ocwfile\public\NEO DWQMS
American Water Works Association (AWWA) Standards (as referenced in the DWWP)	HC - Kirkland Lake Water Treatment Plant
Applicable Federal and Provincial Legislation	Online at www.e-laws.gov.on.ca
Drinking Water Works Permit (DWWP)	HC - Kirkland Lake Water Treatment Plant
Equipment Operation /Maintenance Manuals	HC - Kirkland Lake Water Treatment Plant
MOE - Director Notification Form	EC - \\ocwfile\public\NEO DWQMS
MOE - Form 1 (Record of Watermains Authorized as a Future Alteration)	
MOE – Form 2 (Record of Minor Modifications or Replacements to the Drinking Water System)	
MOE – Form 3 (Record of Addition, Modification or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere)	
MOE Inspection Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS -Kirkland Lake Drinking Water System
Municipal By-laws	Municipal Office
Municipal Drinking Water Licence (MDWL)	HC - Kirkland Lake Water Treatment Plant
Operations Manual (including Standard Operating Procedures)	HC - Kirkland Lake Water Treatment Plant
Operator Certificates	HC - Kirkland Lake Wastewater Treatment Plant
Permit to Take Water (PTTW)	HC - Kirkland Lake Water Treatment Plant
QEMS Records (Completed)	
Activity Request Records	HC - Kirkland Lake Process & Compliance Office
Adverse Water Quality Incident (AWQI) Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System HC - Kirkland Lake Process & Compliance Office
Analysis and Action Plan Report	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
Annual Compliance / Summary Reports for Municipalities	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
Audit Reports - External	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
Audit Reports - Internal	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
Call-in Reports	HC - Kirkland Lake Process & Compliance Office
Community Complaint Records	EC - OPEX database
Contingency Plan Review/Test Summary	EC - \\ocwfile\public\NEO DWQMS
Distribution Maintenance and Repair Records	HC - Kirkland Lake Process & Compliance Office
Environmental Incident Reports	EC - OPEX database
Facility Logbooks	HC - Kirkland Lake Water Treatment Plant / Chaput Hughes Booster Station / Swastika Booster Station

Type of Document/Record	Designated Document Control Location (HC = Hardcopy, EC = Electronic)
Facility Rounds Sheets	HC - Kirkland Lake Process & Compliance Office
Incidents of Non-Compliance Reports	EC - OPEX database
Infrastructure Review (letter of capital/maintenance works recommendations)	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
Instrumentation Calibration/Maintenance Records	EC - Workplace Management System (Hansen) HC - Kirkland Lake Process & Compliance Office
Laboratory Analytical Reports and completed Chain of Custody Forms	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
Loss of Pressure Incident Reports	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
Maintenance Records (completed WMS/Hansen work orders)	EC - Workplace Management System (Hansen)
Management Review Documentation	EC - \\ocwfile\public\NEO DWQMS - Kirkland Lake Drinking Water System
MOE - Director Notification	HC - Kirkland Lake Compliance Office
MOE – Completed Form 1 (Record of Watermains Authorized as a Future Alteration)	
MOE – Completed Form 2 (Record of Minor Modifications or Replacements to the Drinking Water System)	
MOE – Completed Form 3 (Record of Addition, Modification or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere)	
Monthly Operations Reports (to the owner)	EC - \\ocwfile\public\NEO DWQMS - Kirkland Lake Drinking Water System
Operator Training Records	EC - OCWA's Training Summary Database
QEMS Communications - External	EC - Microsoft Outlook E-mail
QEMS Communications - Internal	EC - Microsoft Outlook E-mail
QEMS – Summary of Findings Record	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
SCADA Reports (monthly & annual)	EC - \\ocwfile\public\NEO DWQMS\DWQMS - Kirkland Lake Drinking Water System
Transportation of Dangerous Goods Record	EC - \\ocwfile\public\NEO DWQMS
Preventative Maintenance Schedule (spreadsheet)	HC - Kirkland Lake Water treatment Plant (control room)
WMS/Hansen Status Reports	EC - \\ocwfile\public\NEO DWQMS


Table 2: Relevant regulatory and corporate minimum retention periods

Type of Document/Record	Minimum Retention Time	Requirement Reference
DWQMS Operational Plan	10 years	Director's Direction under SDWA
Internal QEMS Audit Results	10 years	OCWA Requirement
External QEMS Audit Results	10 years	OCWA Requirement
Management Review Documentation	10 years	OCWA Requirement
Documents/records required to demonstrate conformance with the DWQMS	3 years	OCWA Requirement
Documents/records required to demonstrate compliance with Ontario legislation	As per applicable regulations	SDWA O. Reg. 170/03, O. Reg. 128/04



Appendix B

QP-02 Risk Assessment and Risk Assessment Outcomes

 Ontario Clean Water Agency	QEMS Procedure	Proc.: QP-02 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 4
Reviewed by: Ilona Bruneau, PCT	Approved by: Eric Nielson, Senior Operations Manager	

RISK ASSESSMENT and RISK ASSESSMENT OUTCOMES

1.0 Purpose

To define the process for conducting a drinking water risk assessment and for documenting and reviewing the results of the assessment at the facility level.

2.0 Scope

Applies to all OCWA-operated municipal residential drinking water systems and includes the identification and assessment of potential hazardous events and hazards that could affect drinking water safety. OCWA's approach to addressing other potential hazards is set out in QEMS Procedure QP-09 Emergency Management.

3.0 Responsibility

Senior Operations Manager
 Operations Manager
 Team Lead
 Overall Responsible Operator (ORO)
 Process & Compliance Technician (PCT)

4.0 Definitions

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

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

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

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

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

- c) a prescribed condition associated with the system's waters or the presence of a prescribed thing in the waters

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

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

Likelihood – the probability of a hazard or hazardous event occurring

5.0 Procedure

- 5.1 The Senior Operations Manager assigns personnel to conduct the risk assessment (e.g., Process & Compliance Technicians (PCTs), Team Lead, ORO, Operations staff, Facility Managers).
- 5.2 Using the system's process diagram, identify hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water in Table 1¹ for each activity/process step.
- 5.3 For each of the hazardous events, specify control measures currently in place at the facility that eliminate the hazard or prevent it from becoming a threat to public health.

Note: Some hazards/hazardous events may have step-by-step contingency plans associated with them. These contingency plans are developed as per OCWA's Emergency Management Program and are further described in QEMS Procedure QP-09 Emergency Management.

- 5.4 To ensure that potential drinking water health hazards are addressed and minimum treatment requirements as regulated by SDWA O. Reg. 170/03 and the *Procedure for Disinfection of Drinking Water in Ontario* are met, OCWA has established mandatory Critical Control Points (CCPs).

As a minimum, the following must be included as CCPs at all OCWA-operated facilities (as applicable):

- Processes necessary to achieve the required log removal or inactivation of pathogens (i.e., chemical and/or UV disinfection system, filtration process² for surface water and GUDI systems)
- Processes necessary for maintaining a disinfectant residual in the distribution system (includes re-chlorination points)
- Fluoridation system

Identify the above processes (as they apply) as mandatory CCPs in the 'CCP?' column in Table 1.

¹ Tables referred to in this procedure are contained within the facility-specific **Summary of Risk Assessment Outcomes**

² Filtration process includes related processes (e.g., chemical coagulation, rapid mixing, flocculation, sedimentation)

- 5.5 To determine if there are any additional CCPs for the system, evaluate and rank the hazardous events (as set out below in steps 5.6 and 5.7) for the remaining activities/process steps (i.e., those not included as OCWA's minimum CCPs).
- 5.6 Taking into consideration existing control measures (including the reliability and redundancy of equipment), assign each hazardous event a value for the likelihood and a value for the consequence of that event occurring based on the following criteria:

Value	Likelihood of Hazardous Event Occurring
1	Rare – Estimated to occur every 50 years or more (usually no documented occurrence at site)
2	Unlikely – Estimated to occur in the range of 10 – 49 years
3	Possible – Estimated to occur in the range of 1 – 9 years
4	Likely – Occurs monthly to annually
5	Certain – Occurs monthly or more frequently

Value	Consequence of Hazardous Event Occurring
1	Insignificant – Little or no disruption to normal operations, no impact on public health
2	Minor – Significant modification to normal operations but manageable, no impact on public health
3	Moderate – Potentially reportable, corrective action required, potential public health impact, disruption to operations is manageable
4	Major – Reportable, system significantly compromised and abnormal operations if at all, high level of monitoring and corrective action required, threat to public health
5	Catastrophic – Complete failure of system, water unsuitable for consumption

Multiply the likelihood and consequence values to determine the risk value (ranking) of each hazardous event and record all values in Table 1. Hazardous events with a ranking of 12 or greater are considered high risk.

- 5.7 Review the hazardous events and rankings documented in Table 1 and identify any activity/process step as an additional CCP if all of the following criteria are met:
- ✓ The associated hazardous event has a ranking of 12 or greater
 - ✓ The associated hazardous event can be controlled through control measure(s)
 - ✓ Operation of the control measures can be monitored and corrective actions can be applied in a timely fashion
 - ✓ Specific control limits can be established for the control measure(s)
 - ✓ Failure of the control measures would lead to immediate notification of Medical Officer of Health (MOH) or Ministry of the Environment (MOE) or both.

5.8 List identified CCPs (required minimum and any additional CCPs established by the risk assessment) in Table 2. Set related critical control limits (e.g., limits for turbidity, chlorine residual, temperature, pH) for each CCP as appropriate.

5.9 Ensure procedures have been developed and implemented at the facility to:

- Monitor the critical control limits
- Respond to, report and record deviations from the critical control limits.

List these procedures in Table 2.

5.10 The information recorded in the Summary of Risk Assessment Outcomes is maintained at the facility level on an ongoing basis. At least once a year, the PCT, in conjunction with the facility level top management and/or operations staff, reviews the risk assessment documentation to verify the currency of the information and the validity of the assumptions used in the risk assessment in preparation for the Management Review.

5.11 The Senior Operations Manager and PCT ensures that a risk assessment is conducted and documented at least once every thirty-six months.

6.0 Related Documents

Summary of Risk Assessment Outcomes (facility-specific)
QP-09 Emergency Management

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued



Summary of Risk Assessment Outcomes

Kirkland Lake Drinking Water System

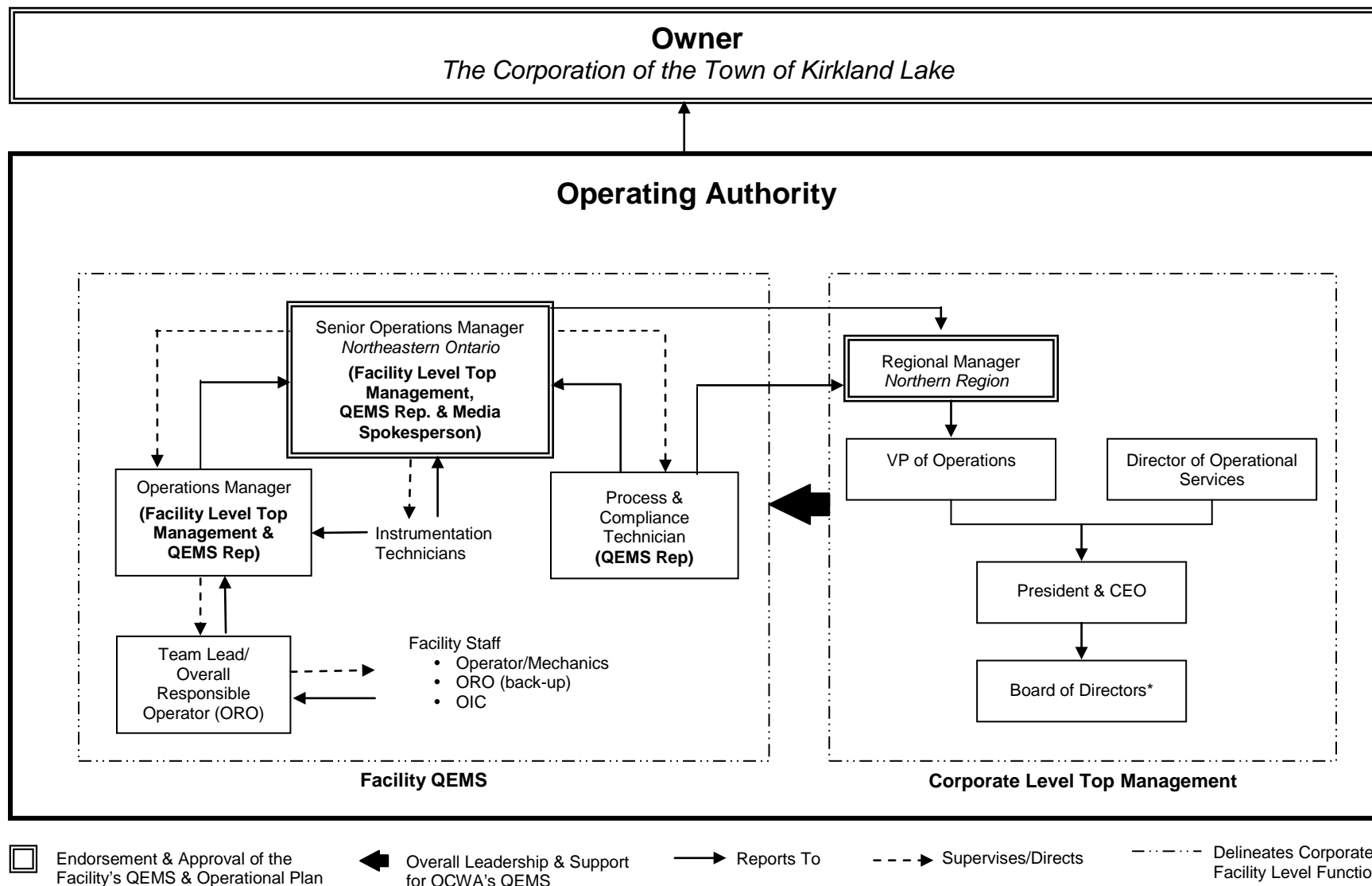
Issued:
Rev. #:
Pages:

The Risk Assessment Outcomes are under development and will be completed for Full Scope Accreditation.

Appendix C

QEMS Organizational Structure for the Kirkland Lake Drinking Water System


QEMS Organizational Structure for the Kirkland Lake Drinking Water System



* Represents the highest level of OCWA's Top Management

Appendix D

QP-03 Personnel Coverage

 Ontario Clean Water Agency	<h1>QEMS Procedure</h1>	Proc.: QP-03 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 3
Reviewed by: Ilona Bruneau, PCT	Approved by: Eric Nielson, Senior Operations Manager	

PERSONNEL COVERAGE

1.0 Purpose

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

2.0 Scope

Applies to operations personnel working in the Kirkland Lake Drinking Water System.

3.0 Responsibility

Senior Operations Manager
 Operations Manager
 Team Lead
 Overall Responsible Operator (ORO)

4.0 Definitions

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

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

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

(Crown Employees Collective Bargaining Act, 1993)

5.0 Procedure

- 5.1 The Senior Operations Manager ensures that personnel meeting the competencies identified in the Operational Plan are available for duties that directly affect drinking water quality.
- 5.2 The Kirkland Lake Drinking Water System is considered an un-manned facility. OCWA operations personnel routinely visit the plant daily Monday through Friday. Operators inspect the Chaput Hughes and Swastika booster stations at least three

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

times per week and the KL Gold booster station once per week. The system is also monitored daily using the plant's remote monitoring SCADA system.

Certified municipal staff visit the distribution system every day during the work week and are responsible for the inspection, maintenance and repair of the system.

Both OCWA and municipal operators are available 24 hours a day, 7 days a week by cell phone. All water facilities (plant and booster stations) are monitored by an alarm system which sends a signal to the plants SCADA system. The only exception is the KL Gold booster station which sends a signal to an alarm dialer when an alarm condition occurs. All alarms are responded to by OCWA operators.

Municipal operators respond to issues in the distribution system and provide reports to OCWA which detail actions taken to resolve the problem.

- 5.3 OCWA personnel are assigned to act as and fulfill the duties of Overall Responsible Operator (ORO) and Operator-in-Charge (OIC) in accordance with SDWA O. Reg. 128/04. Certified municipal operators are also able to act and fulfill the duties of OIC in the distribution system as per the regulation.

The Team Lead is designated overall responsible operator (ORO). When the Team Lead is unavailable, the Senior Operations Manager is designated as the ORO and is recorded as such in the facility logbook.

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

- 5.4 The Operations Manager and/or Team Lead assigns an on-call operator for the time that the facility is un-staffed (i.e.: evenings, weekends and Statutory Holidays). The on-call shift rotates every Friday morning at 0730 hours. The on-call schedule is maintained by the Team Lead and is available to on-call operators in the Microsoft Outlook shared calendar.
- 5.5 The on-call operator conducts an inspection of the facility process at least once per day during the weekends and Statutory Holidays either on-site or via the plant's remote SCADA system. Details of the inspection are recorded in the facility logbook and/or round sheets.
- 5.6 The alarm system is programmed to contact the operator on-call. The operator on-call is responsible for responding to the alarm within a reasonable timeframe. If the nature of the alarm requires additional staff, the on-call operator can request assistance from any of the other certified operators. The on-call operator records details of the call-in in the facility logbook and on the Call-In Report form.
- 5.7 The Operations Manager and/or Team Lead is responsible for approving vacation time for staff in a manner which ensures sufficient personnel are available for the performance of normal operating duties. The vacation calendar is maintained electronically by the Team Lead and is available in the Microsoft Outlook shared calendar.

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

5.9 A contingency plan for Critical Shortage of Staff is included in the Facility Emergency Plan. This plan provides direction to staff in the event that there is a severe shortage of staff due to sickness (e.g., pandemic flu) or other unusual situations where personnel might not be available.

6.0 Related Documents

Call-In Reports

Critical Shortage of Staff Contingency Plan (Facility Emergency Plan)

Facility Logbooks (plant and distribution)

Facility Round Sheets

On-Call Schedule

Vacation Calendar


QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Appendix E

QP-04 Communications

 Ontario Clean Water Agency	<h1 style="text-align: center;">QEMS Procedure</h1>	Proc.: QP-04 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 3
Reviewed by: Ilona Bruneau, PCT		Approved by: Eric Nielson, Senior Operations Manager

COMMUNICATIONS

1.0 Purpose

To describe the procedures for QEMS-related communications between the facility's Top Management and OCWA personnel, the owner, suppliers and the public.

2.0 Scope

Applies to facility level internal and external communications regarding the Quality & Environmental Management System (QEMS) implemented at the Kirkland Lake Drinking Water System.

3.0 Responsibility

Senior Operations Manager (Facility Level Top Management)
 Operations Manager (Facility Level Top Management)
 Team Lead
 Overall Responsible Operator (ORO)
 Process & Compliance Technician (PCT)
 Regional Manager (Corporate Level Top Management)

4.0 Definitions

None

5.0 Procedure

- 5.1 The Senior Operations Manager and PCT are responsible for identifying and coordinating any site-specific communications in relation to the status/development of the facility's QEMS. They are also responsible for ensuring that the Regional Manager is promptly informed regarding QEMS-related matters with Agency-wide significance.
- 5.2 As part of the orientation process, OCWA personnel are scheduled to attend training sessions which provides a general understanding and awareness of environmental compliance and OCWA's QEMS.

The Senior Operations Manager, Operations Manager and/or PCT ensures all facility personnel receive site-specific training on the Operational Plan, QEMS Procedures and other related operating instructions and procedures during regularly scheduled training sessions.

Revisions to the QEMS and associated documentation are communicated to relevant employees at meetings, through internal memos or e-mails on an as-needed basis. The Operational Plan and procedures are available to all facility employees as per Table 1 of QP-01 Document and Records Control. The plan and associated procedures are also accessible to the public at the Kirkland Lake Municipal Office and website (www.discoverkl.com.)

The QEMS Policy and an overview of the QEMS are available to all OCWA personnel through OCWA's intranet. The QEMS Policy is also available to the public on OCWA's internet website.

- 5.3 The continuing suitability, adequacy and effectiveness of OCWA's QEMS are communicated to the owner and as part of the Management Review process (refer to QEMS Procedure QP-11 Management Review). Ongoing QEMS updates are provided to the owner during scheduled meetings, monthly operations reports and through electronic and verbal communications.
- 5.4 Communication requirements for ensuring suppliers and contractors understand the relevant OCWA QEMS policies, procedures and expectations are described in QEMS Procedure QP-05 Essential Supplies and Services.
- 5.5 Media enquiries must be directed to the facility's designated media spokesperson. The Senior Operations Manager is the media spokesperson for the Kirkland Lake Drinking Water System. The media spokesperson coordinates with facility and corporate personnel (as appropriate) and the Owner in responding to media enquiries.
- 5.6 OCWA's QEMS and QEMS Policy are communicated to the public through OCWA's public website. The QEMS Policy is also posted at the, the Kirkland Lake Wastewater Water Treatment Plant and the Kirkland Lake Process and Compliance Office.

Facility tours of interested parties must be approved in advance by the owner. A record of any tour is made in the facility logbook.

All complaints, whether received from the consumer, the community or other interested parties, are documented on a Community Complaint form and recorded in the OPEX database. As appropriate, the Operations Manager, Team Lead or ORO ensures that the owner is informed of the complaint and/or an action plan is developed to address the issue in a timely manner.

Any complaints received by the Town of Kirkland Lake are responded to by the Town's distribution staff. The complaint, along with any actions taken are documented on the Town's Consumer Complaint Form and a copy is provided to OCWA for review, filing and reporting.

All complaints will be included for discussion at the Management Review.

5.7 Internal and external communication responsibilities and reporting requirements for emergency situations are set out under OCWA's Emergency Management Program (i.e., Facility Emergency Plan and OCWA's Emergency Response Plan). Refer to QEMS Procedure QP-09 Emergency Management.

6.0 Related Documents


Activity Request Form
Community Complaint Form
Emergency Response Plan
Facility Emergency Plan
Facility Logbook
Monthly Operations Reports
OPEX Incident Reports
QP-01 Document and Records Control
QP-05 Essential Supplies and Services
QP-09 Emergency Management
QP-11 Management Review

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Appendix F

QP-05 Essential Supplies and Services

 Ontario Clean Water Agency	QEMS Procedure	Proc.: QP-05 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 2
Reviewed by: Ilona Bruneau, PCT	Approved by: Eric Nielson, Senior Operations Manager	

ESSENTIAL SUPPLIES and SERVICES

1.0 Purpose

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

2.0 Scope

Applies to essential supplies and services pertaining to the Kirkland Lake Drinking Water System, as identified in this procedure.

3.0 Responsibility

Corporate Procurement and Administration
 Senior Operations Manager
 Operations Manager
 Team Lead
 Overall Responsible Operator (ORO)
 Process & Compliance Technician (PCT)

4.0 Definitions

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

5.0 Procedure

- 5.1 Essential supplies and services for the Kirkland Lake Drinking Water System are listed in the Facility Emergency Plan binder. The list is reviewed and updated as required by the PCT or designate.
- 5.2 Purchasing is conducted in accordance with OCWA's Corporate Procurement and Administration policies, procedures and guidelines, which are adopted from those of the Ontario Public Service.

Purchases of capital equipment are subject to formal approval by the facility's owner.
- 5.3 As part of the Corporate procurement process, potential suppliers/service providers are informed of relevant aspects of OCWA's QEMS through the tendering process and through specific terms and conditions set out in our agreements and purchase orders. Essential suppliers/service providers (including those contracted locally) are sent a letter that provides an overview of the relevant aspects of the QEMS.

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

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

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

- 5.5 All third-party drinking water testing services are provided by accredited and licensed laboratories.

- 5.6 Calibration services are provided by qualified personnel.

- 5.7 Chemicals purchased for use in the drinking water treatment process must meet AWWA Standards and be ANSI/NSF certified.

- 5.8 Proper procurement of chemical supplies is assured through SCADA notification when chemical levels reach re-order level additionally SCADA will alarm if levels reach low set point. Operators also check supply levels as a part of regular rounds.

Critical chemicals are purchased in large volumes and most of the water plant's storage areas include two storage tanks for each chemical providing additional supply security.

- 5.9 Process components/equipment provided by the supplier must meet applicable regulatory requirements and industry standards for use in drinking water systems prior to their installation.

- 5.10 All supplies purchased, once received, are inspected and/or verified to ensure that an acceptable product is received.

6.0 Related Documents


Essential Supplies and Services List
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Appendix G

QP-06 Review and Provision of Infrastructure

 Ontario Clean Water Agency	<h1>QEMS Procedure</h1>	Proc.: QP-06 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 2
Reviewed by: Ilona Bruneau, PCT		Approved by: Eric Nielson, Senior Operations Manager

REVIEW and PROVISION of INFRASTRUCTURE

1.0 Purpose

To describe OCWA's procedure for reviewing the adequacy of infrastructure necessary to operate and maintain a drinking water system.

2.0 Scope

Applies to the Kirkland Lake Drinking Water System.

3.0 Responsibility

Senior Operations Manager
 Operations Manager
 Team Lead
 Owner/Municipal Representative(s)

4.0 Definitions

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

5.0 Procedure

- 5.1 On an annual basis, the Operations Manager and Team Lead; with input from operational staff, conduct a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system.
- 5.2 The output of the review is a letter, summarizing capital works recommendations and estimated expenditures, is submitted to the owner for review and comment. The owner acknowledges receipt of the letter by a verbal or written response. Together with the owner, timelines and responsibilities for implementation of priority items are determined and documented.
- 5.3 The Senior Operations Manager, Operations Manager or designate ensures that results of the review are included as input to the Management Review process.

6.0 Related Documents

Letter of Capital Works Recommendations
Minutes of Management Review
QP-01 Document and Records Control


7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued



Appendix H

QP-07 Sampling, Testing and Monitoring

 Ontario Clean Water Agency	QEMS Procedure	Proc.: QP-07 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 4
Reviewed by: Ilona Bruneau, PCT	Approved by: Eric Nielson, Senior Operations Manager	

SAMPLING, TESTING and MONITORING

1.0 Purpose

To describe the procedure for sampling, testing and monitoring for process control and finished drinking water quality.

2.0 Scope

Applies to sampling, testing and monitoring at the Kirkland Lake Drinking Water System.

3.0 Responsibility

Senior Operations Manager
 Operations Manager
 Team Lead
 Overall Responsible Operator (ORO)
 Process & Compliance Technician (PCT)
 Operators

4.0 Definitions

Challenging Conditions – any existing characteristic of the water source or event-driven fluctuations that impact the operational process as identified and listed under the Drinking Water System section in the facility's Operational Plan

Environmental Emergency Procedure – site specific procedure developed for emergency situations.

5.0 Procedure

- 5.1 All sampling, monitoring and testing is conducted at a minimum in accordance with SDWA O. Reg. 170/03. Routine sampling of the Kirkland Lake Drinking Water System is conducted by certified OCWA operators. Samples required after water main breaks, repairs or other maintenance activities are collected by certified municipal operators. All sample results are provided to and managed by OCWA. In the event of an adverse water quality incident, OCWA would contact the appropriate personnel and ensure the incident is responded to and reported as per Environmental Emergency Procedures (EEPs) found in the Facility Emergency Plan Binder
- 5.2 Samples are submitted to an accredited and licensed laboratory according to the facility's sampling schedule. The sample schedule is maintained by the PCT and is updated as required.

Analytical results from laboratory reports are manually uploaded into WISKI 7/PDC by the laboratory. Reports are maintained as per QP-01 Document and Records Control.

- 5.3 Continuous monitoring equipment is used to collect and record information on the following parameters related to process control and finished drinking water quality:

L.J. Sherratt Water Filtration Plant

- *Free chlorine residual* – treated water to distribution system
- *Total chlorine residual* – filtered water to clearwell
- *Turbidity* – clarifier effluent and filter effluent
- *Flow rates (including totalized flows)* – raw water, treated water, filtered water,
- *Totalized Flows* – wastewater and backwash water
- *Water Levels* – plant intake, inlet channel, filter building clearwell and highlift clearwell
- *Pressure* – lowlift discharge, highlift head and treated water into the distribution system
- *pH* – finished water
- *Temperature* – raw water
- *Particle Index*

Chaput Hughes Standpipe

- *Free chlorine residuals*
- *Water Level*

Swastika Booster Station

- *Free chlorine residuals*
- *Flow rates (including totalized flows)*

Data from continuous monitoring equipment is captured by the plant's SCADA system. Monthly and annual SCADA reports are stored electronically on OCWA's public drive at <\\Ocwfile\\public\\NEO DWQMS\\DWQMS - Kirkland Lake Drinking Water System>. Results are reviewed by a certified operator in accordance with the requirements of SDWA O. Reg. 170/03. A Standard Operating Procedure for the Continuous Monitoring of Operational Parameters for Drinking Water Systems is available in the systems Operations Manual.

- 5.4 In-house process control activities are conducted on a regular basis by the certified operator(s) on duty and are listed in Table 1.

In-house samples are analyzed following approved laboratory procedures. Instructions for analysis of all parameters listed in Table 1 are posted in the plant's laboratory area. The results of these activities are recorded on a round sheet and selected results are entered into WISKI 7/PDC. Any adjustments made to process parameters are recorded in the facility log book

Table 1: In-house daily analysis for raw water, process water, filtered water and distribution water from the Kirkland Lake Drinking Water System

Raw Water	Process Water	Treated Water	Distribution Water
Total Chlorine Residual (when pre-chlorinating)	Turbidity	Free Chlorine Residual	Free Chlorine Residual
Turbidity	pH	Total Chlorine Residual	Turbidity
Temperature	Free Chlorine	Turbidity	pH
pH	Total Chlorine	Temperature	Colour
Colour		pH Colour Fluoride Aluminum	

5.5 Additional sampling, testing and monitoring activities related to the facility's most challenging conditions are captured within the existing in-house program described above.

5.6 Upstream testing is conducted at least annually at McTavish Lake, Victoria Lake, Victoria Creek, and Mud Lake and includes the following parameters:

- Total, WAD (weak acid dissociable) and Free Cyanide
- Total Ammonia
- Total Phosphorus
- Anion Scan
- Total ICPMS Scan
- Total Petroleum Hydrocarbons (F1-F4)
- Total Coliform
- *E. coli*

The Town is responsible for the collection of samples, submission to laboratory and management of results.

5.7 Sampling, testing and monitoring results are readily accessible to the owner at the Public Works Office and/or the Kirkland Lake Process and Compliance office.

5.8 Owners are provided Monthly Operations Reports which summarizes key operational results. They are also provided with an annual summary of sampling, testing and monitoring results through the SDWA O. Reg. 170/03 section 11 and schedule 22 reports and through the Management Review process outlined in QP-11 Management Review.

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

6.0 Related Documents

Annual Compliance/Summary Reports
Continuous Monitoring of Operational Parameters for Drinking Water Systems SOP
Facility Round Sheets
Facility Logbooks
Monthly Operations Reports
Laboratory Analytical Reports
Reporting and Responding to Adverse Results (EEPs)
Sampling Schedule
QP-01 Document and Records Control
QP-11 Management Review


7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued



Appendix I

QP-08 Measurement and Recording Equipment Calibration and Maintenance

 Ontario Clean Water Agency	QEMS Procedure	Proc.: QP-08 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 2
Reviewed by: Ilona Bruneau, PCT		Approved by: Eric Nielson, Senior Operations Manager

MEASUREMENT and RECORDING EQUIPMENT CALIBRATION and MAINTENANCE

1.0 Purpose

To describe the procedure for the calibration and maintenance of measurement and recording equipment.

2.0 Scope

Applies to the measurement and recording equipment in the Kirkland Lake Drinking Water System.

3.0 Responsibility

Senior Operations Manager
 Operations Manager
 Process & Compliance Technician (PCT)
 Team Lead
 Overall Responsible Operator (ORO)
 Instrumentation Technicians
 Operators

4.0 Definitions

None

5.0 Procedure

- 5.1 All measurement and recording equipment calibration and maintenance activities must be performed by appropriately trained and qualified personnel or by a qualified third-party calibration service provider (refer to QP-05 Essential Supplies and Services).
- 5.2 The Instrumentation Technician or designate establishes and maintains a list of measurement and recording devices and associated calibration schedules using the automated Work Management System (WMS).
- 5.3 Calibration and maintenance activities are carried out in accordance with methods specified in OCWA's calibration procedures, the manufacturer's manual and/or instructions specified in WMS.
- 5.4 Any measurement device which does not meet its specified performance requirements during calibration must be removed from service (if practical) until repaired or replaced. The failure must be reported to the Senior Operations Manager, Operations Manager

or designate as soon as possible so that immediate measures can be taken to ensure that drinking water quality has not been compromised by the malfunctioning device. Any actions taken as a result of the failure are recorded in the facility logbook and/or WMS. Any notifications required by applicable legislation are completed and documented within the specified time period.

- 5.5 Calibration and maintenance records and maintenance/equipment manuals are maintained as per QP-01 Document and Records Control.

6.0 Related Documents


Calibration/Maintenance Records
Facility Logbook
WMS Records
QP-01 Document and Records Control
QP-05 Essential Supplies and Services

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Appendix I

QP-08 Measurement and Recording Equipment Calibration and Maintenance

 Ontario Clean Water Agency	QEMS Procedure		Proc.: QP-08 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 2
Reviewed by: Ilona Bruneau, PCT	Approved by: Eric Nielson, Senior Operations Manager		

MEASUREMENT and RECORDING EQUIPMENT CALIBRATION and MAINTENANCE

1.0 Purpose

To describe the procedure for the calibration and maintenance of measurement and recording equipment.

2.0 Scope

Applies to the measurement and recording equipment in the Kirkland Lake Drinking Water System.

3.0 Responsibility

Senior Operations Manager
 Operations Manager
 Process & Compliance Technician (PCT)
 Team Lead
 Overall Responsible Operator (ORO)
 Instrumentation Technicians
 Operators

4.0 Definitions

None

5.0 Procedure

- 5.1 All measurement and recording equipment calibration and maintenance activities must be performed by appropriately trained and qualified personnel or by a qualified third-party calibration service provider (refer to QP-05 Essential Supplies and Services).
- 5.2 The Instrumentation Technician or designate establishes and maintains a list of measurement and recording devices and associated calibration schedules using the automated Work Management System (WMS).
- 5.3 Calibration and maintenance activities are carried out in accordance with methods specified in OCWA's calibration procedures, the manufacturer's manual and/or instructions specified in WMS.
- 5.4 Any measurement device which does not meet its specified performance requirements during calibration must be removed from service (if practical) until repaired or replaced. The failure must be reported to the Senior Operations Manager, Operations Manager

or designate as soon as possible so that immediate measures can be taken to ensure that drinking water quality has not been compromised by the malfunctioning device. Any actions taken as a result of the failure are recorded in the facility logbook and/or WMS. Any notifications required by applicable legislation are completed and documented within the specified time period.

5.5 Calibration and maintenance records and maintenance/equipment manuals are maintained as per QP-01 Document and Records Control.

6.0 Related Documents


Calibration/Maintenance Records
Facility Logbook
WMS Records
QP-01 Document and Records Control
QP-05 Essential Supplies and Services

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Appendix J

QP-09 Emergency Management

 Ontario Clean Water Agency	<h1 style="margin: 0;">QEMS Procedure</h1>	Proc.: QP-09 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 3
Reviewed by: Ilona Bruneau, PCT	Approved by: Eric Nielson, Senior Operations Manager	

EMERGENCY MANAGEMENT

1.0 Purpose

To describe the procedure for maintaining a state of emergency preparedness at the facility level under OCWA's Emergency Management Program.

2.0 Scope

Applies to potential operations emergency situations or service interruptions identified for the Kirkland Lake Drinking Water System.

3.0 Responsibility

Refer to section 5.8 of this procedure.

4.0 Definitions

Facility Emergency Plan – a facility level plan for preparedness for operations emergencies that can be managed by plant staff and local resources

Emergency Response Plan – a corporate level plan for preparedness for serious operations emergencies

5.0 Procedure

5.1 OCWA recognizes three levels of events:

Level 1 is an event that can be handled entirely by plant staff and regular contractors. The event and the actions taken to resolve it (and to prevent a reoccurrence, if possible) are then included in regular reporting (both internally and externally). Examples may include response to an operational alarm, first aid incident, small on-site spill, or a process upset that can be easily brought under control.

Level 2 is an event that is more serious and requires immediate notification of others (regulator, owner). Examples may include minor basement flooding, injury to staff that requires medical attention, or a spill that causes or is likely to cause localized, off-site adverse effects.

Level 3 is an actual or potential situation that will likely require significant resources from normal operations and/or threatens continued operations. Examples may include disruption of service/inability to meet demand, critical injury, breach of security that is a threat to public health, intense media attention, community emergency affecting water supply/treatment, declared pandemic or catastrophic failure that could impact public health or the environment or cause significant property damage.

5.2 The Facility Emergency Plan (FEP) is the corporate standard for emergency management at OCWA-operated facilities. The FEP supports the facility-level response to and recovery from Level 1, 2 and 3 operations-related events and directly links to the corporate-level Emergency Response Plan (ERP) for management of Level 3 events that require corporate support. The Senior Operations Manager or designate is responsible for establishing a site-specific FEP that meets the corporate standard for each facility in the hub. The document, "Emergency Management Program: OCWA's Approach to Facility Emergency Planning", provides as an overview of OCWA's approach to emergency management and outlines the corporate requirements for implementing the FEP at each facility operated by OCWA.

5.3 Potential emergency situations or service interruptions identified for the Kirkland Lake Drinking Water System include:

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

5.4 The processes for responding to and recovering from each potential emergency situation/service disruption are documented within a contingency plan (CP). The CPs and, if applicable, related site-specific environmental emergency procedures (EEPs) are contained within the FEP.

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

Training Topic	Training Provider	Type of Training	Frequency	Required For
Establishing and maintaining a FEP that meets the corporate standard	Corporate Compliance/Regional Compliance Advisor	On-the-Job Practical	Upon hire and when changes are made to the corporate standard*	PCTs (or others identified by the Senior Operations Manager)
Contents of the site-specific FEP	Hub-Level (QEMS Rep)	On-the-Job Practical	Upon hire and when changes to the FEP are made*	All facility employees with responsibilities for responding to an emergency

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

5.6 At least one CP must be tested each calendar year and each CP must be reviewed at least once in a five-calendar year period. The outcomes of reviews and tests are evaluated using the FEP-01 Contingency Plan Review/Test Summary Form. A CP-related response to an actual event may be considered a review or a test and a scheduled test of a CP may also be regarded as a review of that particular CP as long

as the outcomes are evaluated using the FEP-01 form. Reviewing and testing of the Plans also provides training. Additional information regarding CP review and testing requirements is contained with “Emergency Management Program: OCWA’s Approach to Facility Emergency Planning”.

- 5.7 Revisions to the CPs, EEPs and other FEP documents are made (as necessary) following a review, test, actual event or other significant change (e.g., changes in regulatory requirements, Corporate policy or operational processes and/or equipment, etc.).
- 5.8 Roles and responsibilities for emergency management at OCWA-operated facilities are set out in “OCWA’s Approach to Facility Emergency Planning”. Specific roles and responsibilities related to a particular emergency situation or service interruption (including those of the owner where applicable) are set out in the relevant site-specific CP. A general description of the respective responsibilities of the owner and the operating authority in the event an emergency occurs is included in the service agreement with the owner (as required by the *Safe Drinking Water Act*).
- 5.9 Where they exist, any relevant sections of the Municipal Emergency Response Plan (MERP) are included or referenced in the appendix section of the FEP. Measures specified in the MERP are incorporated into CPs where appropriate.
- 5.10 An emergency contact list is contained within the FEP and is reviewed/updated at least once per calendar year. OCWA’s Emergency Communications Protocol depicts the established escalation of communications in relation to Level 1, 2 and 3 events. Specific notification requirements during emergency situations or service interruptions are set out in the individual contingency plans, emergency procedures and in OCWA’s Emergency Response Plan.

6.0 Related Documents


Corporate Emergency Response Plan
Contingency Plan Review/Test Summary Form
Emergency Contact List and Emergency Communication Protocol (Contacts section of the FEP)
Emergency Management Program: OCWA’s Approach to Facility Emergency Planning
(appendix to the FEP)
Facility Emergency Plan
Municipal Emergency Response Plan
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Appendix K

QP-10 Internal QEMS Audits

 Ontario Clean Water Agency	QEMS Procedure		Proc.: QP-10 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 2
Reviewed by: Ilona Bruneau, PCT	Approved by: Eric Nielson, Senior Operations Manager		

INTERNAL QEMS AUDITS

1.0 Purpose

To describe the procedure for conducting internal audits at the facility level that evaluate the conformance of OCWA's Quality & Environmental Management System (QEMS) to the requirements of the Drinking Water Quality Management Standard (DWQMS).

2.0 Scope

Applies to all activities within the scope of the QEMS implemented at the Kirkland Lake Drinking Water System as documented in the Operational Plan.

Note: this procedure does not include the facility's internal compliance audits conducted in accordance with OCWA's Internal Audit Program.

3.0 Responsibility

Senior Operations Manager
 Operations Manager
 Team Lead
 Overall Responsible Operator (ORO)
 Corporate Compliance Group
 Process & Compliance Technician (PCT)

4.0 Definitions

Internal Auditor – person with skills, training and/or experience to conduct an internal audit

Internal QEMS Audit – a systematic and documented internal verification process that involves objectively obtaining and evaluating documents and processes to determine whether a quality management system conforms to the requirements of the DWQMS

Nonconformity – non-fulfillment of a requirement

5.0 Procedure

- 5.1 The Senior Operations Manager ensures that an internal QEMS audit is conducted for the facility at least once every 12 months by personnel with adequate skills, training and/or experience.
- 5.2 In consultation with the PCTs, the Senior Operations Manager, and/or OCWA's Corporate Compliance Group establishes the audit criteria and develops the internal audit protocol to be used by the facility's auditor(s). Protocol questions are designed to

encompass all of the requirements of the DWQMS. Additional information is included in the protocol to provide clarification on the purpose and application of the requirement. The protocol is reviewed annually and updated as necessary with guidance from the Corporate Compliance Group.

- 5.3 The auditor(s) reviews the facility's approved policies and procedures, the results of previous internal and external QEMS audits, the status of corrective and preventive actions and other QEMS-related documentation prior to the audit.
- 5.4 The auditor(s) follows the audit protocol and engages in activities that may include asking questions, observing operations and reviewing documents and records. Non-conformities with reference to specific documents and details are recorded on the audit protocol along with any additional comments and suggestions.
- 5.5 Upon completion of the final audit report, the auditor(s) reviews the results, identified nonconformities and any opportunities for improvement (OFIs) with the Senior Operations Manager, Operations Manager or designate. The audit report and supporting documentation are filed by the QEMS Representative and retained as per QP-01 Document and Records Control.
- 5.6 When a nonconformity is identified through the internal audit process, an action plan to rectify the issue is developed by the auditor, specifying responsibility and a target date for resolution. An action plan is also developed for an OFI that is considered significant enough to address. The QEMS Representative monitors progress of the action plan until it is fully resolved using the QEMS – Summary of Findings form.
- 5.7 The QEMS Representative ensures that any necessary revisions to QEMS procedures and policies are completed and communicated to relevant facility personnel.
- 5.8 The QEMS Representative ensures that results of the audit are included as input to the management review process.

6.0 Related Documents


Audit Reports
Internal Audit Protocol
QEMS – Summary of Findings Form
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Appendix L

QP-11 Management Review

 Ontario Clean Water Agency	<h1 style="text-align: center;">QEMS Procedure</h1>	Proc.: QP-11 Issued: April 10, 2015 Rev.#: 0 Pages: 1 of 2
Reviewed by: Ilona Bruneau, PCT		Approved by: Eric Nielson, Senior Operations Manager

MANAGEMENT REVIEW

1.0 Purpose

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

2.0 Scope

Applies to the review of the QEMS implemented at the Kirkland Lake Drinking Water System.

3.0 Responsibility

Facility Level Top Management:

- Senior Operations Manager
- Operations Manager

Other Management Review Participants:

- Process & Compliance Technician (PCT)
- Team Lead (as required)
- Overall Responsible Operator (as required)
- Operators (as required)
- Regional Compliance Advisor (as required)
- Corporate Compliance Advisor (as required)
- Regional Manager (as required)

4.0 Definitions

Management Review – a formal (documented) meeting conducted at least once every 12 months by Top Management to evaluate the continuing suitability, adequacy and effectiveness of OCWA's Quality & Environmental Management System (QEMS).

5.0 Procedure

5.1 The Senior Operations Manager determines a suitable frequency for Management Review meetings for the drinking water system. As a minimum, reviews must be conducted at least once every 12 months.

Management Reviews for more than one drinking water system may be conducted at the same meeting provided the systems belong to the same owner and the considerations listed in section 5.2 below are taken into account for each individual system and documented in the Management Review meeting minutes.

5.2 The standing agenda for Management Review meetings is as follows:

- a) Incidents of regulatory non-compliance,
- b) Incidents of adverse drinking water tests,
- c) Deviations from critical control limits and response actions,
- d) The 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 QEMS,
- l) Consumer feedback,
- m) The resources needed to maintain the QEMS,
- n) The results of the infrastructure review,
- o) Operational Plan currency, content and updates, and
- p) Staff suggestions.

The QEMS Representative coordinates the Management Review and distributes the agenda with identified responsibilities to participants in advance of the Management Review meeting along with any related reference materials.

5.3 The Management Review participants review the data presented and make recommendations and/or initiate action plans to address identified deficiencies as appropriate.

5.4 The QEMS Representative ensures that minutes of and action plans resulting from the Management Review meeting are prepared and distributed to appropriate OCWA management (including the Regional Manager), personnel and the municipality.

5.5 The QEMS Representative monitors the progress and documents the completion of action plans resulting from the Management Review.

6.0 Related Documents

Minutes and action plans resulting from the Management Review
QP-01 Document and Records Control

7.0 Revision History

Date	Revision #	Reason for Revision
Apr. 10, 2015	0	Procedure issued

Appendix M

MOE's Director's Directions *Minimum Requirements for Operational Plans* – Schedule "C"

Schedule “C”

Subject System Description Form			
Municipal Residential Drinking-Water System			
Owner of Municipal Residential Drinking-Water System: ¹		The Corporation of the Town of Kirkland Lake	
Name of Municipal Residential Drinking-Water System: ²		Kirkland Lake Drinking Water System	
Subject Systems			
	Name of Operational Subsystems (if applicable)³	Name of Operating Authority⁵	DWS Number(s)⁶
<input checked="" type="checkbox"/> Check here if the Municipal Residential Drinking-Water System is operated by one operating authority. Enter the name of the operating authority in adjacent column ⁴		Ontario Clean Water Agency	220000308
Operational Subsystem 1:			
Operational Subsystem 2:			
Operational Subsystem 3:			
Operational Subsystem 4:			
Add attachments if there are additional ‘Operational Subsystems’			
Contact Information⁷			
Name	Title	Phone No(s).	Email Address
Primary Eric Nielson	Senior Operations Manager	705-567-3955	enielson@ocwa.com
Alternate Ilona Bruneau	Process & Compliance Technician	705-567-3955	ibruneau@ocwa.com
Alternate Anthony Danis	Team Lead	705-567-2236	adanis@ocwa.com

Subject System Description Form Notes:

1. The legal name of the owner should be used for this entry.
2. The name of the municipal residential drinking-water system should be the name most commonly used to describe the entire system. If information or records have been submitted to the ministry respecting this system, using an identifier name (e.g. for DWS), that identifier name should be used.
3. The identification of each operational subsystem will be necessary in cases where the municipal residential drinking-water system is being operated by more than one operating authority. For example, if a municipality owns a treatment and distribution system but contracts the operation of the treatment system to a separate entity there will be two 'operational subsystems', treatment and distribution. The name used to identify these operational subsystems should be one that is commonly used or describes the component. For example, the Everytown Treatment System and the Everytown Distribution System as separate operational subsystems of the same municipal residential drinking-water system.
4. If there is only one operating authority for the municipal residential drinking-water system, the box should be checked as such. In this case the subject system is the municipal residential drinking-water system and there will be no operational subsystem. The operating authority will need to be identified in the adjacent box.
5. The legal or corporate name of the operating authority should be used for this entry.
6. The DWS number is the number, or numbers, assigned to the drinking-water system by the Ministry of the Environment in response to the owner submitting a written notice containing information about the system further to section 10.1 of O. Reg. 170/03. In some cases multiple DWS numbers may exist for components of a municipal residential drinking-water system. In these cases enter all DWS numbers. Conversely, if one DWS number exists for multiple subject systems, enter the number opposite each operational subsystem.
7. The contact entry should identify a person who may be contacted for clarification of information contained in the form. An alternate person may also be identified.