



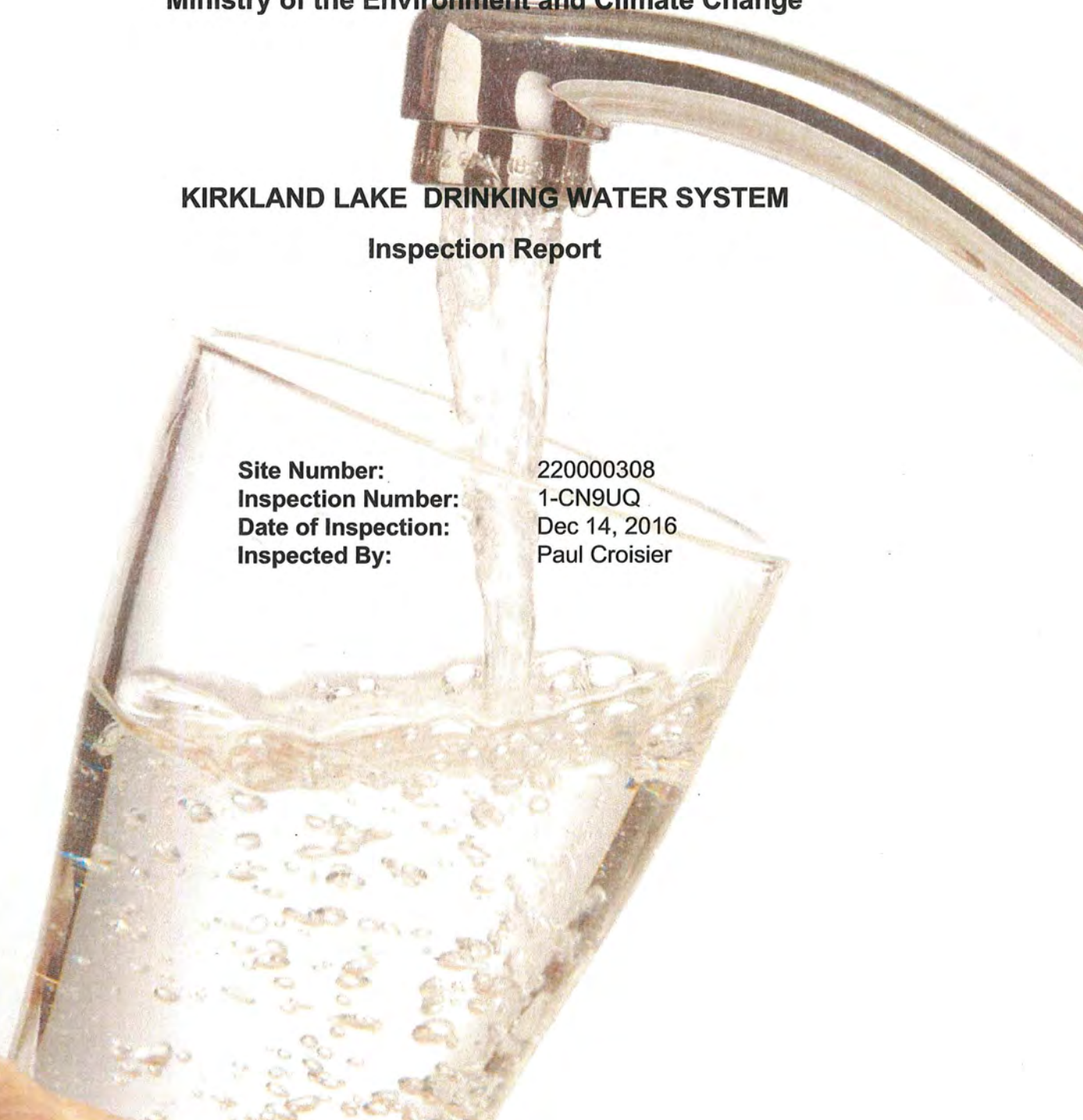
# Ontario

**Ministry of the Environment and Climate Change**

## **KIRKLAND LAKE DRINKING WATER SYSTEM**

### **Inspection Report**

<b>Site Number:</b>	220000308
<b>Inspection Number:</b>	1-CN9UQ
<b>Date of Inspection:</b>	Dec 14, 2016
<b>Inspected By:</b>	Paul Croisier





**Ministry of the Environment and  
Climate Change**

Safe Drinking Water Branch  
Timmins District Office  
Ontario Government Complex  
Hwy. 101 East, P.O. Bag 3080  
South Porcupine, ON P0N 1H0  
Telephone: (705) 235-1500  
Fax: (705) 235-1520

**Ministère de l'Environnement et de  
l'Action en matière de changement  
climatique**

Direction du contrôle de la qualité de l'eau  
potable  
Bureau du secteur de Timmins  
Complexe du gouvernement de l'Ontario  
Autoroute 101 est, C.P. 3080  
South Porcupine, ON P0N 1H0  
Téléphone: (705) 235-1500  
Télécopieur: (705) 235-1520



January 23, 2017

Ms. Nancy Allick  
Chief Administrative Officer  
Corporation of the Town of Kirkland Lake  
3 Kirkland St. W, Postal Bag 1757  
Kirkland Lake, ON P2N 3P4

Dear Ms. Allick:

Re: Inspection Report for the Kirkland Lake Drinking Water System - Inspection #1-CN9UQ

On December 14 and 15, 2016, I conducted the annual inspection of the Kirkland Lake Drinking Water System. The inspection included a physical assessment of the L.J. Sherratt Water Treatment Plant, Water Control Buildings in Chaput Hughes and Swastika, and select aspects of the water distribution system, as well as a document review for the period of December 1, 2015 to December 13, 2016. The resulting inspection report is attached.

Two sections of the report, namely, "*Actions Required*" and "*Recommended Actions*" are intended to identify aspects of the drinking water system's operation with the potential for improvement.

"*Actions Required*" are linked to incidents of non-compliance with regulatory requirements contained within an Act, a Regulation or site-specific approvals, licenses, permits, orders, or instructions. Such violations could result in the issuance of mandatory abatement instruments including Orders, tickets, penalties, or referrals to the Ministry's Investigations and Enforcement Branch.

"*Recommended Actions*" convey information that the owner and operation authority should consider implementing in order to advance efforts already in place to address such issues as emergency preparedness, the fulsome availability of information to consumers and conformance with existing and emerging industrial standards. Please note items which appear as recommended actions do not, in themselves, constitute violations.

Section 19 of the Safe Drinking Water Act (Standard of Care) creates a number of obligations for

individuals who exercise decision-making authority over municipal drinking water systems. Please be aware that the Ministry has encouraged such individuals, particularly municipal councillors, to take steps to be better informed about the drinking water systems over which they have decision-making authority. These steps could include asking for a copy of this inspection report and a review of its findings. Further information about Section 19 can be found in *"Taking Care of Your Drinking Water: A guide for members of municipal council"* found under "Resources" on the Drinking Water Ontario website at [www.ontario.ca/drinkingwater](http://www.ontario.ca/drinkingwater).

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal/external risk experts. The Inspection Summary Rating Record (IRR), included as Appendix B of the inspection report, provides the Ministry, the system owner and the local Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance. Please note the attached IRR methodology memo describing how the risk rating model has improved to better reflect the health related and administrative non-compliance found in an inspection report. IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspector's Annual Report. If you have any questions or concerns regarding the rating, please contact Ms. Sherry Ilersich, Water Compliance Supervisor, at (705) 495-3834 or 1-800-609-5553.

In accordance with the Ministry's Drinking Water Inspection Protocol, copies of this report have been sent to the Timiskaming Health Unit and the Kirkland Lake Office of the Ministry of Natural Resources and Forestry.

If you have any questions or comments regarding this report, please free to contact me at (705) 235-1526.

Yours truly,

A handwritten signature in black ink, appearing to read 'Paul Croisier', with a long horizontal stroke extending to the right.

Paul Croisier  
Water Inspector  
Provincial Officer, Badge #930  
Timmins District Office  
Safe Drinking Water Branch  
Drinking Water Management Division

cc:

Mr. Mark Williams, Director of Physical Services, Town of Kirkland Lake  
Mr. Don Parcher, Waterworks Foreman, Town of Kirkland Lake  
Mr. Eric Nielson, Regional Hub Manager, Northeast Ontario Hub, Ontario Clean Water Agency  
Mr. Anthony Danis, Senior Operations Manager, Ontario Clean Water Agency  
Mr. Ryan Peters, Manager of Environmental Health and Infectious Diseases, Timiskaming Health Unit  
Ms. Kit Ormsby, District Manager, Ministry of Natural Resources and Forestry, Kirkland Lake  
Ms. Sherry Ilersich, Water Compliance Supervisor, Safe Drinking Water Branch, Ministry of the Environment and Climate Change (Timmins/North Bay Office)



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**Ministry of the Environment and Climate Change**

**KIRKLAND LAKE DRINKING WATER SYSTEM  
Inspection Report**

<b>Site Number:</b>	220000308
<b>Inspection Number:</b>	1-CN9UQ
<b>Date of Inspection:</b>	Dec 14, 2016
<b>Inspected By:</b>	Paul Croisier

**OWNER INFORMATION:**

<b>Company Name:</b>	KIRKLAND LAKE, THE CORPORATION OF THE TOWN OF		
<b>Street Number:</b>	1	<b>Unit Identifier:</b>	
<b>Street Name:</b>	DUNFIELD Rd		
<b>City:</b>	KIRKLAND LAKE		
<b>Province:</b>	ON	<b>Postal Code:</b>	P2N 3P4

**CONTACT INFORMATION**

<b>Type:</b>	Municipal Admin. Contact	<b>Name:</b>	Nancy Allick
<b>Phone:</b>	(705) 567-9361	<b>Fax:</b>	(705) 567-3535
<b>Email:</b>	nancy.allick@tkl.ca		
<b>Title:</b>	Chief Administrative Officer - Town of Kirkland Lake		

<b>Type:</b>	Phys. Services Dept. Contact	<b>Name:</b>	Mark Williams
<b>Phone:</b>	(705) 567-9365	<b>Fax:</b>	(705) 567-9400
<b>Email:</b>	mark.williams@tkl.ca		
<b>Title:</b>	Director of Physical Services - Town of Kirkland Lake		

<b>Type:</b>	Waterworks Dept. Contact	<b>Name:</b>	Donald Parcher
<b>Phone:</b>	(705) 567-9365	<b>Fax:</b>	(705) 567-9400
<b>Email:</b>	don.parcher@tkl.ca		
<b>Title:</b>	Waterworks Foreman - Town of Kirkland Lake		

<b>Type:</b>	Operating Authority	<b>Name:</b>	Eric Nielson
<b>Phone:</b>	(705) 567-3955	<b>Fax:</b>	(705) 567-7974
<b>Email:</b>	enielson@ocwa.com		
<b>Title:</b>	Regional Hub Manager - Ontario Clean Water Agency (OCWA)		

<b>Type:</b>	Operating Authority	<b>Name:</b>	Anthony Danis
<b>Phone:</b>	(705) 567-3955	<b>Fax:</b>	(705) 567-7974
<b>Email:</b>	adanis@ocwa.com		
<b>Title:</b>	Senior Operations Manager - OCWA		

<b>Type:</b>	Operating Authority	<b>Name:</b>	Ilona Bruneau
<b>Phone:</b>	(705) 567-3955	<b>Fax:</b>	(705) 567-7974
<b>Email:</b>	ibruneau@ocwa.com		
<b>Title:</b>	Process and Compliance technician - OCWA		

<b>Type:</b>	Environment and Climate Change	<b>Name:</b>	Sherry Ilersich
<b>Phone:</b>	(705) 495-3834	<b>Fax:</b>	(705) 497-6866
<b>Email:</b>	sherry.ilersich@ontario.ca		
<b>Title:</b>	Water Compliance Supervisor - Safe Drinking Water Branch - MOECC - Timmins/North Bay		

**INSPECTION DETAILS:**

<b>Site Name:</b>	KIRKLAND LAKE DRINKING WATER SYSTEM
<b>Site Address:</b>	1 DUNFIELD RD KIRKLAND LAKE P2N 2C5
<b>County/District:</b>	Kirkland Lake

**MOECC District/Area Office:** Timmins District  
**Health Unit:** TIMISKAMING HEALTH UNIT  
**Conservation Authority:**  
**MNR Office:** Kirkland Lake District Office  
**Category:** Large Municipal Residential  
**Site Number:** 220000308  
**Inspection Type:** Announced  
**Inspection Number:** 1-CN9UQ  
**Date of Inspection:** Dec 14, 2016  
**Date of Previous Inspection:** Dec 01, 2015

## COMPONENTS DESCRIPTION

**Site (Name):** MOE DWS Mapping  
**Type:** DWS Mapping Point

**Sub Type:**

**Site (Name):** GULL LAKE / INTAKE SYSTEM  
**Type:** Source

**Sub Type:** Surface

**Comments:**

The owner's "Engineer's Report – Kirkland Lake Water Supply System" (First Engineer's Report) dated January 2001 and Drinking Water Works Permit (Permit) No.214-201 Issue No.2 (dated April 13, 2016) provide the following details pertaining to the source water and intake system:

- raw water is generally characterized as having low levels of turbidity, hardness and alkalinity, but contains moderate levels of colour, dissolved organic carbon and microbiological parameters
- system includes raw water intake pipe, 710 mm diameter x 150 m long, extending from Gull Lake into the raw water well of the water treatment plant (WTP)
- intake system is complete with a screened intake bell structure submerged in approximately 5.8 m water depth and elevated off the lake bottom approximately 1.7 m
- intake piping includes a chlorine injection point as an optional provision for zebra mussel control if required in the future
- hydraulic capacity of the intake structure is rated at 45,000 cubic metres/day.

NOTE: Numerous restrictions that apply to the drainage areas of Gull Lake, McTavish Lake, and Victoria Lake are outlined in the following documents:

- "The Township of Teck Act" created under the Municipal Act
  - "Application No.34-C-1" created under the Public Utilities Act R.S.O., 1927 and Public Health Act R.S.O. 1927
- In general terms, the restrictions relate specifically to controlling sanitation, controlling water removal, maintaining water levels and prohibiting activities that could cause the tainting or fouling of the water used as source water by the Town of Kirkland Lake.

Additionally, signage is posted at public access points on each of these lakes to reflect the general intent of these restrictions.

**Site (Name):** L.J. SHERRATT WATER TREATMENT PLANT

**Type:** Treated Water POE

**Sub Type:** Treatment Facility

**Comments:**

The owner's First Engineer's Report and Permit No. 214-201 provide the following details pertaining to the L.J. Sherratt WTP:

- WTP is located on the west end of Gull Lake and is directly south of the Kirkland Lake and District Hospital
- the entire treatment works occupies two interconnected brick and concrete constructed buildings
- low lift pumping station is equipped with mechanical screening device and five vertical turbine pumps with fixed rate control systems (each rated at 65.0 L/second), having a firm capacity of 260.0 L/second

- treatment process train consists of:
  - coagulant flash-mix tank with common discharge to each of three pre-treatment units
  - three Degremont "Ultra-Pulsator" treatment trains consisting of flocculation/sedimentation facilities, each rated at 130.0 L/second
  - four dual media filters (anthracite and silica sand), each rated at 65.0 L/second
- includes filter backwash facilities consisting of an air scour blower and two pumps rated at 340.0 L/second each
- includes treated water storage facilities (in ground) with combined volume of 2,281.0 cubic metres at minimum operating level of 5.0 m
- high lift pump station includes two treated water clearwells with combined volume of 640.0 cubic metres and is equipped with four vertical turbine pumps; two are rated at 63 L/second (one is currently equipped with variable frequency drive unit (VFD)), and two are rated at 130 L/second, having a firm capacity of 310.0 L/second
- includes a wastewater treatment facility consisting of two collection tanks and two variable speed driven pumps, each rated at 65.0 L/second
- includes a standby power generator rated at 300 kW and equipped with an automatic transfer switch, underground and in-plant fuel storage tanks (each with adequate spill protection/containment)
- treatment process chemicals includes alum, chlorine gas, sodium silicate, sodium hydroxide, sulfuric acid (activated silica is produced on-site and is used to aid in the flocculation process)
- includes manual and computerized systems designed to monitor and control process facilities, equipment operation, and assimilate/archive data from field equipment/instruments.

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**Site (Name):** CHAPUT WATER CONTROL BUILDING

**Type:** Other

**Sub Type:** Booster Station

**Comments:**

The owner's First Engineer's Report and Permit No.214-201 provide the following details pertaining to the Chaput Water Control Building:

- consists of a block-constructed building located on Beaver Drive in Chaput Hughes
- equipped with re-chlorination facilities (sodium hypochlorite injection) and continuous free chlorine analyzer intended to monitor free chlorine residual in water primarily during the "drain" cycle of the Chaput Standpipe
- equipped with altitude valve, standpipe drain system, and flow control valves leading to and from the Chaput Standpipe
- includes monitoring facilities that are equipped to continuously monitor process parameters and communicate to the Supervisory Control and Data Acquisition (SCADA) system operated at the L.J. Sherratt WTP.

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**Site (Name):** CHAPUT STANDPIPE

**Type:** Other

**Sub Type:** Reservoir

**Comments:**

The owner's First Engineer's Report and Permit No.214-201 provide the following details pertaining to the Chaput Standpipe:

- located adjacent to the Chaput Water Control Building on Beaver Drive in Chaput Hughes
- includes storage capacity of 7,123.0 cubic metres of water at normal operating level of 26.5 m (with vessel being 18.0 m diameter)
- serves as water storage for firefighting purposes
- considered to be "floating storage", provides for demand management and helps regulate water pressures within the distribution system.

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**Site (Name):** SWASTIKA WATER CONTROL BUILDING

**Type:** Other**Sub Type:** Booster Station**Comments:**

The owner's First Engineer's Report and Permit No.214-201 provide the following details pertaining to the Swastika Water Control Building:

- consists as a block-constructed building located on Highway 66 at the east entrance to the village of Swastika
- intended purpose is for the provision of water pressure and flow control into Swastika
- equipped with magnetic flow meter, pressure/flow control valves, chlorine monitoring and re-chlorination facilities (on-site storage and injection of sodium hypochlorite)
- includes monitoring facilities that are equipped to continuously monitor process parameters and communicate to the SCADA system at the L.J. Sherratt WTP.

**Site (Name):** KL GOLD MINE BOOSTER PUMPING STATION**Type:** Other**Sub Type:** Booster Station**Comments:**

The owner's "Schedule C: Authorization to Alter the Drinking Water System" (dated June 26, 2012) provides the following details pertaining to the KL Gold Mine Booster Pumping Station:

- facility consists of a wood frame-constructed building located in Chaput Hughes just off of the Goldthorpe Road (in the vicinity of the property of the former Kirkland West Public School)
- facility is intended to service the KL Gold Mine and residences along the Goldthorpe Road
- facility had been designed to provide a single booster pump rated at 96.4 L/second, and includes a 200 mm diameter flow meter, various valves, pressure gauges and other appurtenances.

NOTE: Although construction of this pumping station was completed in the summer of 2013, at the time of inspection on December 14, 2016, the facility had not been commissioned into service.

**Site (Name):** DISTRIBUTION SYSTEM**Type:** Other**Sub Type:** Other**Comments:**

The distribution system serves an estimated population of 9,000 people throughout the residential areas of Kirkland Lake, Chaput Hughes and Swastika. The distribution system itself consists primarily of ductile iron constructed water mains ranging in sizes from 4 inch to 16 inch diameter. The majority of residential service connections consist of ½ inch to ¾ inch diameter copper tubing. Based on the number of residential service connections (approximately 2,800), the owner has indicated that this is classified as a large municipal residential drinking water system. Additionally, the Chaput Standpipe and the water control buildings located in Chaput Hughes and Swastika provide additional water flow and pressure control, and re-chlorination capabilities within the distribution system.

## INSPECTION SUMMARY:

### Introduction

- The primary focus of this inspection is to confirm compliance with Ministry of the Environment and Climate Change (MOECC) legislation as well as evaluating conformance with ministry drinking water related policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment and distribution components as well as management practices.

This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O.Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.

This report is based on a "focused" inspection of the system. Although the inspection involved fewer activities than those normally undertaken in a detailed inspection, it contained critical elements required to assess key compliance issues. This system was chosen for a focused inspection because the system's performance met the ministry's criteria, most importantly that there were no deficiencies as identified in O.Reg. 172/03 over the past 3 years. The undertaking of a focused inspection at this drinking water system does not ensure that a similar type of inspection will be conducted at any point in the future.

This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

Mr. Anthony Danis, Ms. Ilona Bruneau, Mr. Don Parcher, Mr. Marc Vermette (Town Operator) and Mr. Dixitkumar Patel (Town Environmental Compliance Coordinator) accompanied Ministry of the Environment and Climate Change Water Inspector Paul Croisier (at various times on December 14 and 15, 2016) during this "focused" inspection. The Corporation of the Town of Kirkland Lake is the owner and OCWA is the accredited operating authority of Kirkland Lake Drinking Water System's water treatment and water distribution subsystems.

The inspection included the physical assessments of the L.J. Sherratt WTP, Chaput Hughes Standpipe and Water Control Building, Swastika Water Control Building, and select aspects of the distribution subsystem on December 14 and 15, 2016, as well as a document review for the period of December 1, 2015 to December 13, 2016. This period is referred to as the "inspection period" in the report.

The abovementioned individuals from the municipality and OCWA were contacted during the inspection process as a means of providing information regarding the administration, operation, and maintenance of this drinking-water system.

### Capacity Assessment

- There was sufficient monitoring of flow as required by the Municipal Drinking Water Licence or Drinking Water Works Permit issued under Part V of the SDWA.

Condition 2.1 of Schedule C to Municipal Drinking Water Licence (Licence) No.214-101 Issue No.2 (issued April 13, 2016) requires that continuous flow measurement and recording shall be undertaken for:

2.1.1 The flow rate and daily volume of treated water that flows from the treatment subsystem to the distribution system (equivalent to treated water flow from the high lift pump facilities).

2.1.2 The flow rate and daily volume of water that flows into the treatment subsystem (equivalent to raw water flow from the low lift pump facilities).

- The owner was in compliance with the conditions associated with maximum flow rate or the rated capacity conditions in the Municipal Drinking Water Licence issued under Part V of the SDWA.

### Capacity Assessment

Condition 1.1 of Schedule C to Licence No.214-101 required the owner of the system to ensure the system was operated such that the maximum daily volume of water that flows from the treatment subsystem to the distribution system does not exceed the rated capacity of 22,500.0 cubic metres/day.

The maximum daily volume of water that was pumped from the treatment subsystem into the distribution system during this inspection period was 13,580.0 cubic metres/day. The average daily volume of water directed to the distribution system during this inspection period was 9,149.9 cubic metres/day.

### Treatment Processes

- **The owner had ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.**
- **The owner/operating authority was in compliance with the requirement to prepare Form 1 documents as required by their Drinking Water Works Permit during the inspection period.**

The owner of the system prepared and retained copies of "Form 1 - Record of Watermains Authorized as a Future Alteration" for a watermain replacement project conducted during this inspection period for portions of King St., Folger St., Poplar Ave. and Comfort St. in Kirkland Lake.

- **The owner/operating authority was in compliance with the requirement to prepare Form 2 documents as required by their Drinking Water Works Permit during the inspection period.**

The owner of the system prepared "Form 2 – Record of Minor Modifications or Replacements to the Drinking Water System" documents for the following:

- replacement of one existing (diaphragm type) activated silica metering pump rated for 391 L/hour with a new peristaltic metering pump rated for 210 L/hour
- replacement of one existing VFD unit on backwash pump No.2 with a new VFD unit of similar specifications (different manufacturer)
- replacement of one existing 125 HP high lift pump and adjustable speed drive unit rated at 90.0 L/second with one new 75 HP pump and VFD control system rated at 63.0 L/second
- replacement of two existing (diaphragm type) activated silica metering pump rated for 391 L/hour with two new peristaltic metering pumps rated for 210 L/hour each
- replacement of two valve and actuator assemblies on the sulfuric acid inlet lines (that feed into the activated silica mix tanks)
- 35 day trial for the replacement of activated silica with a polymer treatment chemical ("Flopam FO 4240 PWG")
- replacement of two existing 200 HP high lift pumps rated at 130.0 L/second each with two new 150 HP pumps and VFD control systems rated at 126.0 L/second (work to be completed in 2017).

Additionally, OCWA has submitted an application for a "Schedule C: Authorization to Alter the Drinking Water System" to amend DWWP 214-201 to include the installation of a new soda ash injection system, with an injection point into the raw water channel immediately upstream of the travelling screen equipment.

- **Records indicated that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a Drinking Water Works Permit and/or Municipal Drinking Water Licence issued under Part V of the SDWA at all times that water was being supplied to consumers.**

In order to provide primary disinfection in accordance with Ontario Regulation 170/03 of the Safe Drinking Water Act, 2002 (O.Reg.170/03) for a system using surface water as the raw water source, the owner and operating authority for the system was required to ensure that the water treatment equipment designed to comply with the Ministry's "Procedure for Disinfection of Drinking Water in Ontario" (Disinfection Procedure) was operated to achieve:

- at least 99% (2.0 log) removal or inactivation of *Cryptosporidium* oocysts,
- at least 99.9% (3.0 log) removal or inactivation of *Giardia* cysts and,

### Treatment Processes

- at least 99.99% (4.0 log) removal or inactivation of viruses, by the time the water enters the distribution system (primary disinfection).

In order to ensure effective pathogen inactivation to the required level through disinfection, the CT disinfection concept must be applied. The Disinfection Procedure defines the CT concept as using the combination of disinfectant residual concentration (C) and the effective disinfection contact time (T) to quantify the capability of a chemical disinfection system in providing pathogen removal. Using this concept involves the determination of CT values required at the actual variable operating conditions (chlorine residual, water flow, temperature, pH), and ensuring that the disinfection process achieves these values at all times.

The initial 2.5 log credits for Giardia cyst removal or inactivation are provided by the treatment process that includes conventional filtration that meets the criteria as detailed in section 3.4.1 of the Disinfection Procedure. Therefore, the disinfection portion of the treatment process must account for the remaining 0.50 log credit for Giardia cyst removal or inactivation.

Information provided in the First Engineer's Report indicates that the remaining 0.5 log Giardia cyst removal or inactivation credit would be provided by the total available CT of 46.8 mg/L\*minute that is provided by the primary disinfection process. This CT calculation was based on the following assumptions:

- water flow at the design capacity rate of 260.0 L/second
- free chlorine residual of 1.0 mg/L in the clearwells
- available chlorine contact volume provided by clearwells being 1043.8 cubic metres
- minimum clearwell depth of 5.0 metres
- baffle factor of the clearwells being 0.7

Additional information provided in the First Engineer's Report indicated that, under the above assumptions, CT "required" with water temperature at 0.50 degrees Celsius is 35.0 mg/L\*minute, and CT "required" with water temperature at 25.0 degrees Celsius is 6.0 mg/L\*minute (at pH of 7.0).

NOTE: The owner's information relative to flow, clearwell levels, water temperature, pH, and free chlorine residuals (measured at the end of the primary disinfection process) indicated that the available CT provided by the disinfection process was sufficient to ensure adequate primary disinfection at all times during this inspection period.

NOTE: The SCADA system at the WTP is configured to conduct real-time CT calculations; therefore, operators have ready access to this data and can conduct "CT required" vs "CT achieved" comparisons at any time.

- **Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined.**

All test results for free chlorine residual measured in the distribution system during this inspection period were greater than 0.05 mg/L. The data included results obtained:

- by operators using the manual test kit while conducting twice weekly free chlorine residual testing at points within the distribution system - minimum result was 0.13 mg/L
- from the continuous free chlorine analyzer operated at the Chaput Water Control Building during periods when the Chaput Standpipe was being filled (since the re-chlorination system is shut off during the standpipe's fill cycle) - minimum result was 0.10 mg/L.

### Treatment Process Monitoring

- **Primary disinfection chlorine monitoring was conducted at a location approved by Municipal Drinking Water Licence and/or Drinking Water Works Permit issued under Part V of the SDWA, or at/near a location where the intended CT has just been achieved.**

Subsection 7-2(1) of Schedule 7 to O.Reg.170/03 requires the owner of the system to sample and test free chlorine residual using continuous monitoring equipment in treated water at or near the location where the intended CT has just been completed in accordance with the Disinfection Procedure. At Kirkland Lake's WTP, this sample point is located on the high lift pump discharge header, immediately downstream of the (high lift) pump equipment. This point represents the location where water is taken from the clearwells (where primary disinfection/CT is achieved)



### Treatment Process Monitoring

and directed to the distribution system.

- **Continuous monitoring of each filter effluent line was being performed for turbidity.**
- **The secondary disinfectant residual was measured as required for the distribution system.**

Subsection 7-2(3) of Schedule 7 to O.Reg.170/03 requires the owner and operating authority for the system to ensure at least seven water samples are collected weekly from locations in the distribution system and tested for free chlorine residual. For this inspection period, the operators conducted the required free chlorine testing in accordance with the rules prescribed by Subsection 7-2(4) of Schedule 7 to O.Reg. 170/03; specifically, four tests one day early in a week and three tests on a day of that week at least 48 hours from the previous tests (for that week).

During the inspection period, operators typically conducted free chlorine tests at five distribution system locations on either Monday or Tuesday and at three distribution system locations on either Thursday or Friday of each week. NOTE: The owner of the system also operates a continuous analyzer at the Chaput Water Control Building for monitoring free chlorine residual in water during the fill/drain cycles in the Chaput Standpipe. It is possible for these test results to be used to satisfy the secondary chlorine residual monitoring requirements during periods when the Chaput Standpipe is being filled. The owner and operating authority for the system must first confirm that the water being fed to the analyzer (during the fill cycle) is representative of the water in the distribution system at that time and is not under influence of the on-site sodium hypochlorite injection system that operates during the standpipe's drain cycle.

- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**
- **All continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6.**

The owner of the system has installed analyzers for the continuous monitoring of specified parameters at the following locations:

- total chlorine in treated water clearwell under the filters in WTP (analyzer is used for chlorination/primary disinfection process control), minimum alarm set at 1.30 mg/L
- free chlorine from the high lift pump discharge header, which is located just downstream of point where primary disinfection has been achieved (as required by legislation), minimum alarm set at 0.65 mg/L
- turbidity from each of four filter effluent lines (as required by legislation), high alarm set at 1.0 NTU (also shuts off filter effluent flow at 1.0 NTU)
- free chlorine at Chaput Water Control Building (water entering and exiting the Chaput Standpipe), minimum alarm set at 0.15 mg/L
- free chlorine at the Swastika Water Control Building (water entering the village of Swastika), minimum alarm set at 0.20 mg/L.

For each respective analyzer (required by legislation), the alarm set-points are all sufficient to comply with the "Minimum Alarm Standard" (for free chlorine residual analyzers) and "Maximum Alarm Standard" (for the filter effluent turbidimeters) as prescribed by the Table in Section 6-5 of Schedule 6 to O.Reg.170/03.

- **Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and recording data with the prescribed format.**
- **All continuous analysers were calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.**

## Treatment Process Monitoring

### Operations Manuals

- **The operations and maintenance manuals contained plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.**

With the addition/modification/removal of treatment chemicals and processes, as well as with the addition of new equipment such as VFD's for the high lift pumps, it is imperative that all such changes get included into the operations manuals in a timely manner.

- **The operations and maintenance manuals met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA.**

### Logbooks

- **Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.**

### Security

- **The owner had provided security measures to protect components of the drinking water system.**

The following is a review of security measures used at the Kirkland Lake Drinking Water System:

- the WTP and water control buildings (in Chaput Hughes and Swastika) are equipped with intrusion alarm systems that are interfaced with the WTP's SCADA system and automatic dialing device
- the WTP and water control buildings are kept locked at all times
- control room at WTP is equipped with a motion detector that is interfaced with the building's main alarm system
- access on the road leading to the WTP is controlled by a locked security gate (although left open in winter)
- the WTP and water control buildings are on the patrol route of the local detachment of the Ontario Provincial Police
- keys and alarm codes are restricted to only operations staff
- there is a locked cover at the tanker truck connection for the alum bulk storage facility
- the man-way hatches on the roof of the Chaput Standpipe are inspected (to ensure closed) twice yearly
- operators conduct regular checks to ensure the Chaput Standpipe roof access ladder has not been tampered with
- all components of this drinking-water system are visited by operations staff at least once daily from Monday to Friday.

NOTE: There were no security issues (break-ins, vandalism etc.) observed during this inspection period.

### Certification and Training

- **The overall responsible operator had been designated for each subsystem.**

Anthony Danis was designated as overall responsible operator (ORO) for Kirkland Lake's water treatment and water distribution subsystems.

Eric Nielson served as alternate ORO during periods that Mr. Danis was unavailable.

- **Operators in charge had been designated for all subsystems which comprised the drinking-water system.**
- **Only certified operators made adjustments to the treatment equipment.**

### Water Quality Monitoring

- **All microbiological water quality monitoring requirements for distribution samples were being met.**

Section 10-2 of Schedule 10 to O.Reg.170/03 required the owner and operating authority for the system to ensure at least 17 water samples were collected each month from the distribution system (based on estimated population of 9,000) and tested for E.coli and total coliforms. Additionally, 25% of those samples must have been tested for general background population expressed as colony counts on a heterotrophic plate count (HPC).

NOTE: Operators routinely collected five distribution system samples each week and had them tested for E.coli and total coliforms, with two of those weekly samples also being tested for HPC.

- **All microbiological water quality monitoring requirements for treated samples were being met.**

Section 10-3 of Schedule 10 to O.Reg.170/03 required the owner and operating authority for the system to ensure a sample of treated water was collected at least once every week and tested for E.coli, total coliforms and HPC.

- **All inorganic water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Section 13-2 of Schedule 13 to O.Reg.170/03 required the owner and operating authority for the system to ensure at least one sample of treated water was collected every 12 months (+/- 30 days) and tested for every parameter set out in Schedule 23 to O.Reg.170/03 (most recently tested October 3, 2016 and October 5, 2015).

- **All organic water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Section 13-4 of Schedule 13 to O.Reg.170/03 required the owner and operating authority for the system to ensure at least one sample of treated water was collected every 12 months (+/- 30 days) and tested for every parameter set out in Schedule 24 to O.Reg.170/03 (most recently tested October 3, 2016 and October 5, 2015).

- **All trihalomethanes water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Section 13-6 of Schedule 13 to O.Reg.170/03 required the owner and operating authority for the system to ensure at least one water sample is collected every three months (+/- 30 days) from points in the distribution system (including connected plumbing) likely to have an elevated potential for the formation of trihalomethanes (THM), and have the sample(s) tested for THM.

NOTE: Most recent tests (and subsequent results) were conducted on January 11 (69.1 ug/L), April 11 (61.3 ug/L), July 11 (136.0 ug/L) and October 3 (80.8 ug/L) of 2016. Based on these results, the current running annual average (RAA) THM concentration is 86.8 ug/L.

NOTE: The standard for THM in drinking-water samples as prescribed by Ontario Regulation 169/03 of the SDWA, 2002 (Ontario Drinking Water Quality Standards), is 100.0 ug/L expressed as a RAA.

NOTE: As of January 1, 2016 laboratories are no longer responsible for calculating a drinking water system's RAA for THM's. Drinking water system owners and operating authorities will be required to calculate a new RAA and notify (in writing) existing authorities of any adverse test results within seven days of the end of every calendar quarter (immediate verbal notification is no longer required). Resamples will no longer be required as part of the prescribed corrective actions for adverse results for THM's because multiple test results are already used in calculating the RAA.

- **All nitrate/nitrite water quality monitoring requirements prescribed by legislation were conducted within the required frequency for the DWS.**

Section 13-7 of Schedule 13 to O.Reg.170/03 required the owner and operating authority for the system to ensure at least one treated water sample was collected every three months (+/- 30 days) and tested for nitrate and nitrite (most recently conducted on January 11, April 11, July 11, and October 3 of 2016).

- **All sodium water quality monitoring requirements prescribed by legislation were conducted within the**

**required frequency.**

Section 13-8 of Schedule 13 to O.Reg.170/03 required the owner and operating authority for the system to ensure at least one treated water sample was collected every 60 months (+/- 90 days) and tested for sodium (most recently tested October 5, 2015 and February 16, 2012).

- **All fluoride water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Section 13-9 of Schedule 13 to O.Reg.170/03 required the owner and operating authority for the system to ensure at least one treated water sample was collected every 60 months (+/- 90 days) and tested for fluoride (most recently tested October 5, 2015, February 21, 2014 and September 4, 2012).

- **Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.**

**Water Quality Assessment**

- **Records did not show that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O.Reg. 169/03).**

The operating authority for the system reported the following "Notice of Adverse Test Results and Other Problems" (AWQI) to the Medical Officer of Health (MOH) and the ministry during the inspection period:

- one instance where testing indicated the presence of three total coliform colonies/100 ml in a drinking water sample collected from the distribution system on September 6, 2016.

NOTE: The test results of the subsequent resamples collected in response to this AWQI (No.131122) indicated no total coliforms present.

**Reporting & Corrective Actions**

- **Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.**

The operating authority for the system reported the following "Notice of Adverse Test Results and Other Problems" (AWQI) to the Medical Officer of Health (MOH) and the ministry during the inspection period:

- one instance where testing indicated the presence of three total coliform colonies/100 ml in a drinking water sample collected from the distribution system on September 6, 2016.

NOTE: The test results of the subsequent resamples collected in response to this AWQI (No.131122) indicated no total coliforms present.

Additionally, the owner and operating authority for the system reported three instances where there was possible contamination of water being directed to the users of water from the system as a result of watermain breaks. In each case, the MOH issued a "Boil Water Advisory" to users of water in the affected areas of the distribution system until such time as testing indicated absence of microbiological parameters (following the completion of the necessary repairs, localized flushing and confirmation of adequate free chlorine residual levels).

- **All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.**
- **Where required continuous monitoring equipment used for the monitoring of chlorine residual and/or turbidity triggered an alarm or an automatic shut-off, a qualified person responded in a timely manner and took appropriate actions.**

Critical alarms, including those from the continuous total and free chlorine analyzers and filter effluent turbidimeters at the L.J. Sherratt WTP, and free chlorine analyzers at the Chaput Water Control Building and Swastika Water Control Building, are interfaced with the WTP's SCADA system and automatic dialing device that uses telephone

### **Reporting & Corrective Actions**

notifications to alert on-call operators of any alarm conditions.

Additionally, the responses by operators to alarms generated from all sources were detailed in the facility's operations logbook.

### **Other Inspection Findings**

- **The following issues were also noted during the inspection:**

Water usage data obtained for this inspection period identified that the average daily water usage was 7,835 cubic metres/day (adjusted to residential use allocation only), and based on a population of 9,000 people, this translates into a consumption rate of 870 L/person/day. Information obtained from Environment Canada indicates that the estimated average consumption of water should be between approximately 275 L/person/day to 350 L/person/day; therefore water use in Kirkland Lake is between 2.5 to 3.2 times greater than the typical daily per capita water usage across Canada.

Although average daily water consumption is slightly less than 50% of the WTP's rated capacity, the main focus of concern would be the wasting of the water resource (from Gull Lake) and the costs associated with water production and distribution. Additionally, the costs associated with collecting water in the communal sanitary sewage systems and treating it at the municipality's two water pollution control plants would be impacted if this "wasted" portion of water makes its way into the sanitary sewage systems.

Although the owner of the system has undertaken a number of measures to monitor water use (to a limited extent), proactively detect obvious leaks, and reactively repair breaks and leaks in a timely manner, the owner should now consider taking additional measures in an attempt to reduce unnecessary water-related costs and the unnecessary depletion of their water source.

- **The following items are noted as being relevant to the Drinking Water System:**

In order to ensure the reliable delivery of safe drinking water to the users of water from the Kirkland Lake DWS, the Corporation of the Town of Kirkland Lake, in following with the recommendations and enlisted services of OCWA, undertook to conduct the following significant upgrade projects:

1. Conducted an in-plant trial for the use of soda ash in an attempt to optimize the treatment process that has resulted in the full-time use of that chemical
2. Conducted an in-plant trial for the use of a new flocculent "Flopam FO 4240 PWG" in an attempt to optimize the treatment process and reduce maintenance issues being experienced with the current activated silica mixing and injection systems
3. Installation of VFD controllers on the pump motor controls for the four high lift pumps, which allows for enhanced water flow rate and pressure control in the distribution system and for increased pumping efficiency (and energy conservation)
4. Continued replacement of key equipment in the treatment process that has become antiquated and sometimes unreliable
5. Ongoing replacement and upgrading of sections of watermains within the distribution system.

**NON-COMPLIANCE WITH REGULATORY REQUIREMENTS AND ACTIONS REQUIRED**

This section provides a summary of all non-compliance with regulatory requirements identified during the inspection period, as well as actions required to address these issues. Further details pertaining to these items can be found in the body of the inspection report.

Not Applicable

## SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES

This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following issues and consider measures to address them.

**1. The following issues were also noted during the inspection:**

Water usage data obtained for this inspection period identified that the average daily water usage was 7,835 cubic metres/day (adjusted to residential use allocation only), and based on a population of 9,000 people, this translates into a consumption rate of 870 L/person/day. Information obtained from Environment Canada indicates that the estimated average consumption of water should be between approximately 275 L/person/day to 350 L/person/day; therefore water use in Kirkland Lake is between 2.5 to 3.2 times greater than the typical daily per capita water usage across Canada.

**Recommendation:**

It is recommended that the owner of the system consider additional measures that can be taken to ultimately reduce the amount of water used by residents of the drinking water system. Such measures may include:

- more comprehensive use of water meters on both residential and non-residential service connections
- implementation of water-use restrictions
- conducting a water leak detection survey.

Reference material can be obtained from the American Water Works Association (AWWA Water Loss Control Committee), as well as from the Federation of Canadian Municipalities and National Research Council (Infraguide: Water Use and Loss in Water Distribution Systems).

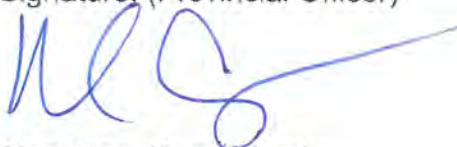
As an option, the owner of the system could consider enlisting the services of a qualified consultant to review the issue of water usage and possible water loss, and provide advice on the owner's next steps towards the goal of eliminating all sources of water loss from the distribution system.

**SIGNATURES**

Inspected By:

Paul Croisier

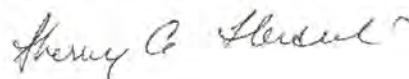
Signature: (Provincial Officer)



Reviewed &amp; Approved By:

Sherry Ilersich

Signature: (Supervisor)



Review &amp; Approval Date:



Note: This inspection does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they apply or may apply to this facility. It is, and remains, the responsibility of the owner and/or operating authority to ensure compliance with all applicable legislative and regulatory requirements.





**Ministry of the Environment and Climate Change  
Drinking Water System Inspection Report Appendix A**

**KEY REFERENCE AND GUIDANCE MATERIAL FOR STAKEHOLDERS  
(AS ATTACHED)**



# Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are available to help you operate your drinking water system. Below is a list of key materials owners and operators of municipal residential drinking water systems frequently use.

To access these materials online click on their titles in the table below or use your web browser to search for their titles. Contact the Public Information Centre if you need assistance or have questions at 1-800-565-4923/416-325-4000 or [picemail.moe@ontario.ca](mailto:picemail.moe@ontario.ca).

For more information on Ontario's drinking water visit [www.ontario.ca/drinkingwater](http://www.ontario.ca/drinkingwater) and email [drinking.water@ontario.ca](mailto:drinking.water@ontario.ca) to subscribe to drinking water news.



PUBLICATION TITLE	PUBLICATION NUMBER
Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils	7889e01
FORMS: Drinking Water System Profile Information, Laboratory Services Notification, Adverse Test Result Notification Form	7419e, 5387e, 4444e
Procedure for Disinfection of Drinking Water in Ontario	4448e01
Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids	7152e
Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (February 2011)	8215e
Filtration Processes Technical Bulletin	7467
Ultraviolet Disinfection Technical Bulletin	7685
Guide for Applying for Drinking Water Works Permit Amendments, Licence Amendments, Licence Renewals and New System Applications	7014e01
Certification Guide for Operators and Water Quality Analysts	
Guide to Drinking Water Operator Training Requirements	9802e
Taking Samples for the Community Lead Testing Program	6560e01
Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption	7423e
Guide: Requesting Regulatory Relief from Lead Sampling Requirements	6610
Drinking Water System Contact List	7128e
Technical Support Document for Ontario Drinking Water Quality Standards	4449e01

[ontario.ca/drinkingwater](http://ontario.ca/drinkingwater)

# Principaux guides et documents de référence sur les réseaux résidentiels municipaux d'eau potable

De nombreux documents utiles peuvent vous aider à exploiter votre réseau d'eau potable. Vous trouverez ci-après une liste de documents que les propriétaires et exploitants de réseaux résidentiels municipaux d'eau potable utilisent fréquemment.

Pour accéder à ces documents en ligne, cliquez sur leur titre dans le tableau ci-dessous ou faites une recherche à l'aide de votre navigateur Web. Communiquez avec le Centre d'information au public au 1 800 565-4923 ou au 416 325-4000, ou encore à [picemail.moe@ontario.ca](mailto:picemail.moe@ontario.ca) si vous avez des questions ou besoin d'aide.



Pour plus de renseignements sur l'eau potable en Ontario, consultez le site [www.ontario.ca/eaupotable](http://www.ontario.ca/eaupotable) ou envoyez un courriel à [drinking.water@ontario.ca](mailto:drinking.water@ontario.ca) pour suivre l'information sur l'eau potable.

TITRE DE LA PUBLICATION	NUMÉRO DE PUBLICATION
Prendre soin de votre eau potable – Un guide destiné aux membres des conseils municipaux	7889f01
Renseignements sur le profil du réseau d'eau potable, Avis de demande de services de laboratoire, Formulaire de communication de résultats d'analyse insatisfaisants et du règlement des problèmes	7419f, 5387f, 4444f
Marche à suivre pour désinfecter l'eau potable en Ontario	4448f01
Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids (en anglais seulement)	7152e
Total Trihalomethane (TTHM) Reporting Requirements: Technical Bulletin (février 2011) (en anglais seulement)	8215e
Filtration Processes Technical Bulletin (en anglais seulement)	7467
Ultraviolet Disinfection Technical Bulletin (en anglais seulement)	7685
Guide de présentation d'une demande de modification du permis d'aménagement de station de production d'eau potable, de modification du permis de réseau municipal d'eau potable, de renouvellement du permis de réseau municipal d'eau potable et de permis pour un nouveau réseau	7014f01
Guide sur l'accréditation des exploitants de réseaux d'eau potable et des analystes de la qualité de l'eau de réseaux d'eau potable	
Guide sur les exigences relatives à la formation des exploitants de réseaux d'eau potable	9802f
Prélèvement d'échantillons dans le cadre du programme d'analyse de la teneur en plomb de l'eau dans les collectivités	6560f01
Échantillonnage et analyse du plomb dans les collectivités : échantillonnage normalisé ou réduit et admissibilité à l'exemption	7423f
Guide: Requesting Regulatory Relief from Lead Sampling Requirements (en anglais seulement)	6610
Liste des personnes-ressources du réseau d'eau potable	7128f
Document d'aide technique pour les normes, directives et objectifs associés à la qualité de l'eau potable en Ontario	4449f01

[ontario.ca/eaupotable](http://ontario.ca/eaupotable)



**Ministry of the Environment and Climate Change  
Drinking Water System Inspection Report Appendix B**

**MINISTRY'S INSPECTION RATING RECORD**

**(AS ATTACHED)**



Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2016-2017)

DWS Name:

Regulation: O.REG 170/03

Category: Large Municipal Residential System

Type Of Inspection: Focused

Inspection Date: December 14, 2016

Ministry Office: Timmins District

Maximum Question Rating: 467

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 64
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 28
Water Quality Monitoring	0 / 104
Reporting & Corrective Actions	0 / 66
Treatment Process Monitoring	0 / 133
TOTAL	0 / 467

Inspection Risk Rating	0.00%
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FINAL INSPECTION RATING:	100.00%
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Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2016-2017)

DWS Name: KIRKLAND LAKE DRINKING WATER SYSTEM  
DWS Number: 220000308  
DWS Owner: Kirkland Lake, The Corporation Of The Town Of  
Municipal Location: Kirkland Lake

Regulation: O.REG 170/03  
Category: Large Municipal Residential System  
Type Of Inspection: Focused  
Inspection Date: December 14, 2016  
Ministry Office: Timmins District

Maximum Question Rating: 467

Inspection Risk Rating	0.00%
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FINAL INSPECTION RATING:	100.00%
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