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Sent by Email: cao@laurentianhills.ca

The Corporation of the Town of Laurentian Hills
34465 Highway 17, RR#1
Deep River, Ontario
K0J 1P0

Attention: Ms. Sherry Batten, Chief Administrative Officer

Re: 2019-20 Inspection Report

The enclosed report documents findings of the inspection that was performed at the Chalk River drinking water system on February 6, 2020.

Two sections of the report, namely "Non-compliance with Regulatory Requirements and Actions Required" and "Summary of Recommendations and Best Practice Issues", if found, may cite due dates for the submission of information or plans to my attention.

Please note that "Non-compliance with Regulatory Requirements and 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 may result in the issuance of mandatory abatement instruments which could include orders, tickets, penalties, or referrals to the ministry's Environmental Enforcement and Compliance Office.

"Summary of Recommendations and Best Practice Issues" convey information that the owner or operating 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 industry standards. Please note that items which appear as recommended actions do not, in themselves, constitute violations.

In order to measure individual inspection results, the ministry continues to adhere to 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 Rating Record (IRR), appended to the inspection report, provides the ministry, the system owner and the local Public Health Unit with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance. Please note the IRR methodology document, also appended to the inspection report, describes how the risk model was improved to better reflect any health related and administrative non-compliance issues that may be cited in our inspection reports. IRR ratings are published in the ministry's Chief Drinking Water Inspector's Annual Report. If you have any questions or concerns regarding the rating, please contact Charlie Primeau, Water Compliance Supervisor, at 613-521-3450 ext 239.

Section 19 of the Safe Drinking Water Act, 2002 (Standard of Care) cites a number of obligations of individuals who exercise decision-making authority over municipal drinking water systems. The ministry encourages individuals, particularly municipal councilors, to take steps to be well 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.

Thank you for the assistance afforded to me during the conduct of the compliance assessment. Should you have any questions regarding the content of the enclosed report, please do not hesitate to contact me.

Yours truly,

Karine Bourgon
Water Inspector
Ministry of the Environment, Conservation and Parks
Drinking Water and Environmental Compliance Division
Ottawa District Office
Tel: 613-521-3450 ext. 230
Fax: 613-521-5437 Email: karine.bourgon@ontario.ca

Enclosure

ec: Greg Prangley, Project Manager, American Water, 701 Main Street, Hamilton, ON L8S 1A2, gprangley@amwater.com

- Dave Ethier, Overall Responsible Operator - Chalk River DWS, American Water, 73 Railway Street, Chalk River, ON K0J 1P0, dethier@amwater.com
- Mike Grace, Manager, Environmental Health, Renfrew County and District Health Unit, 7 International Dr., Pembroke, ON K8A 6W5, mgrace@rcdhu.com
- John Swick, District Manager, Ministry of Natural Resources, Pembroke District Office, 31 Riverside Dr., Pembroke, ON K8A 8R6, john.swick@ontario.ca

c: File SI-RE-LH-RA 540 (2019-20)

Ontario

Ministry of the Environment, Conservation and Parks

CHALK RIVER DRINKING WATER SYSTEM

Inspection Report

Site Number:	210000666
Inspection Number:	1-L38TQ
Date of Inspection:	Feb 06, 2020
Inspected By:	Karine Bourgon

Table of Contents:

OWNER INFORMATION:

Company Name:	LAURENTIAN HILLS,THE CORPORATION OF THE TOWN OF		
Street Number:	34465	**Unit Identifier:**	
Street Name:	HIGHWAY 17 Hwy		
City:	DEEP RIVER		
Province:	ON	**Postal Code:**	K0J 1P0

CONTACT INFORMATION

Type:	Owner	**Name:**	Sherry Batten
Phone:	(613) 584-3114	**Fax:**	(613) 584-3285
Email:	cao@laurentianhills.ca		
Title:	Chief Administrative Officer, Laurentian Hills		

Type:	Operating Authority	**Name:**	Greg Prangley
Phone:	(905) 975-8669	**Fax:**	
Email:	greg.prangley@veolia.com		
Title:	Project Manager, Veolia Water Canada Inc.		

Type:	Operating Authority	**Name:**	Dave Ethier
Phone:	(613) 639-9077 xcell	**Fax:**	
Email:			
Title:	Overall Responsible Operator		

Type:	Other - Health Unit	**Name:**	David Tantalo
Phone:	(613) 735-8654 xext535	**Fax:**	(613) 735-3067
Email:	dtantalo@rcdhu.com		
Title:	Manager, Environmental Health, Renfrew County & District Health Unit		

Type:	Other - MNRF	**Name:**	Randy McLaren
Phone:	(613) 732-5520	**Fax:**	(613) 732-5539
Email:	randy.mclaren@ontario.ca		
Title:	District Manager, Ministry of Natural Resources and Forestry		

INSPECTION DETAILS:

Site Name:	CHALK RIVER DRINKING WATER SYSTEM
Site Address:	73 RAILWAY Street CHALK RIVER ON K0J 1P0
County/District:	LAURENTIAN HILLS
MECP District/Area Office:	Ottawa District
Health Unit:	RENFREW COUNTY AND DISTRICT HEALTH UNIT
Conservation Authority:	
MNR Office:	Pembroke District Office
Category:	Large Municipal Residential
Site Number:	210000666
Inspection Type:	Announced
Inspection Number:	1-L38TQ

Date of Inspection: Feb 06, 2020
Date of Previous Inspection: Nov 27, 2018

COMPONENTS DESCRIPTION

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

Site (Name): RAW WATER INTAKE
Type: Source **Sub Type:** Surface
Comments:
The source for the Chalk River drinking water system is Corry Lake, which is a shallow lake within the Chalk River drainage basin. The headwaters of Chalk River are located in the northeastern portion of Algonquin Park where land use is generally restricted to undeveloped forests and wetlands. According to the 2001 Engineers' Report prepared by Stantec Consulting Limited, Corry Lake is subject to potential contamination by storm water run-off, agricultural run- ff an ect r c ntact re u t n n cca na e e ate m cr b a e e

The inlet screen consists of Tensar Biaxial Geogrid SSI screen with 25mm x 40mm openings and 100mm ribs. The screen is fastened to the end of a 400mm polyethylene intake pipe, located approximately 25m from shore and 1.65m below the water surface. Raw water flows by gravity through 60m of PET intake pipe to a three-chambered 2.5m by 2.5m pre-cast concrete valve chamber. Water flows from the first valve chamber to manhole 101 through 75m of 300mm poly vinyl chloride (PVC) pipe, and from manhole 101 to the low lift pumping station through 5m of 300mm corrugated steel pipe. Under normal conditions, the 300mm diameter knife gate isolation valve located within the valve chamber is fully open and the level in the raw water well matches the level in Corry Lake.

In addition, there is a 100mm diameter PVC pipe from the valve chamber to the low lift pumping station (for future use such as chlorination for zebra mussel control) which is currently capped at both ends.

Site (Name): LOW LIFT PUMPING STATION
Type: Source **Sub Type:** Pumphouse
Comments:
The low lift station is a brick and metal clad building located on the bank of Corry Lake. It is equipped with two 25HP horizontal end-suction centrifugal pumps (duty and standby), each with a capacity of 23L/s at 42.7m TDH, controlled by variable frequency drives, however since 2008, the pumps are operated at constant speed and adjusted to demand requirements.

Each pump has a dedicated suction line to the raw water well, which is 4.3m by 4.3m by 2m deep at average lake level. The pumps are brought into service manually or automatically through the use of an ultrasonic level measurement in the clearwell at the water treatment plant.

Water is pumped from the raw water well through a 150mm diameter common discharge header to the treatment plant through a 2000m long 200mm diameter transmission main along Corry Lake Road, Forestry Road, and Railway Street.

Site (Name): CHEMICAL FEED BUILDING
Type: Other **Sub Type:** Other
Comments:
The chemical feed building is located directly adjacent to the low lift pumping station. It is metal clad and is 7.8m long by by 3m wide. The building contains two soda ash chemical feed pumps (duty and standby) each rated at 60L/hr, and two 1000L soda ash solution tanks with containment.

Soda ash solution is dosed to the raw water well, flow-paced based on total raw water flow measured at the common raw water meter FE-101.

Site (Name): TREATED WATER
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
The water treatment facilites are housed in a concrete block, brick and metal clad building 17m by 17m.

Raw water is pumped from the low lift station through a 2000m long 200mm diameter asbestos cement transmission main to the treatment plant. The flow rate is measured by the online flow meter (FE-101) located on the 200mm diameter common intake header just prior to the splitter box which was designed to divide the water flow equally between the two treatment units. PAX-XL 1900 is injected at the spitter box, and polyelectrolyte (Magnafloc LT 27AG) is injected at each the solids contact units.

Treatment Unit #1, installed in 1980, is composed of an ECODYNE solids contact unit and a dual media filter which provides coagulation, flocculation, settling and filtration. Until 2003, it was operated in batch mode at a flow rate equivalent to rated capacity. The solids contact unit contains two compartments: a circular sludge blanket tank with a rotating mixer, and a rectangular sedimentation basin with 60 degree tube settlers. There is no mechanical rake at the bottom of the tank to direct sludge to the drain.

Treatment Unit #2, installed in 2003, is composed of a solids contact unit and a two-compartment dual media (sand and anthracite) filter, which provide coagulation, flocculation, settling and filtration. It has improved operational characteristics including a more efficient solids contact tank which consists of a proprietary flocculator/clarifier providing a mixing zone, a reaction well cone with baffles, a clarification zone and a concentric sludge collector. No increase in rated capacity was made with the addition of the new treatment unit.

Other upgrades that were completed in 2003 included the following:
- Low lift pumps were replaced with variable frequency drive, in order to operate the plant at a lower flow rate.
- The original filters were modified to allow for filter-to-waste capability.
- Flow monitoring equipment and analyzers for pH, turbidity, chlorine residual and fluoride were replaced.
- Chemical feed systems were improved to allow for duty and standby pumps.
- Spill containment was provided for process chemicals.
- A sludge holding tank equipped with a mixer and two submersible pumps (one pump is now equipped with a variable frequency drive) were installed to discharge effluent to the sanitary sewer.
- Piping between the water treatment plant and the distribution system was modified to ensure all treated water was directed to the elevated storage tank prior to entering the distribution system. This was done to provide chlorine contact time needed to achieve 0.5-log inactivation of Giardia cysts and 2-log inactivation of viruses.

Filtered water from both units is directed through a common flow meter (FE-105), injected with hydrofluorosilicic acid, sodium hypochlorite, and soda ash, prior to entering the 100m³ clearwell.

Three horizontal centrifugal high lift pumps each rated at 15L/s at 40.8m TDH draw water from the clearwell and direct it through a common 300mm diameter discharge header to the elevated storage tank. In addition there is a 200mm diameter pipeline between the water treatment plant and the distribution system on Railway Street; the valve is kept closed and locked, but could be used in combination with a Boil Water Advisory in case of watermain failure to the elevated storage tank.

Process chemicals used in the treatment system include:
- sodium hypochlorite for disinfection
- soda ash for pH and alkalinity control
- polyaluminum chlorided (PAX-XL 1900) as a primary coagulant

- polyelectrolyte used as a coagulant aid
- hydrofluorosilicic acid for fluoridation

Water leaving the water treatment plant is directed to the elevated storage tank in order to complete its primary disinfection process.

Site (Name): ELEVATED STORAGE TANK
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
Treated water from the water treatment plant is pumped to the elevated water storage tower through a 470m long, 250mm diameter pipe. The elevated storage tank has a volume of 1380m³, which is used to provide sufficient contact time to complete primary disinfection before water enters the distribution system. This storage capacity represents a one-day reserve in the summer and up to 3 days in the winter. Continuous analyzers are installed at the water tower to monitor chlorine residual, pH, temperature and fluoride.

It should be noted that the water tower inlet pipe is equipped with a swing check valve to keep the tower full in case of watermain failure prior to the tower. There are also swing check vaves at each high lift pump, to prevent backflow into the clearwell.

Site (Name): DISTRIBUTION SYSTEM
Type: Other **Sub Type:** Other
Comments:
Water from the elevated storage tank is conducted to Main Street via a 320m long, 200mm diameter pipe. The distribution system consists of approximately 12km of watermains (less than 10inch diameter) with more than ten dead-ends. Water consumers are not metered and customers are billed a flat rate dependent upon residential or commercial usage.

Site (Name): CHALK RIVER SEWAGE TREATMENT PLANT
Type: Other **Sub Type:** Other
Comments:
Historical records for water treatment operations are kept at the sewage treatment plant. In addition, daily chlorine residual monitoring of distribution system water is conducted there.

The sewage plant and water plant are also closely linked due to issues with the volume of wastewater generated at the water plant impacting the hydraulic capacity of the sewage treatment plant.

INSPECTION SUMMARY:

Introduction

- **The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) 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.

  An announced focused inspection of the Chalk River Drinking Water System was conducted on February 6, 2020, under the authority of Section 81 of the Safe Drinking Water Act, by Karine Bourgon, Water Inspector, herein also referred to as the "inspector".

  The Chalk River Drinking Water System, herein also referred to as the "drinking water system", the "DWS", or the "system", is owned by The Corporation of the Town of Laurentian Hills, herein also referred to as the "owner" and consists of the Chalk River Water Treatment Plant, herein also referred to as the "WTP" and the Chalk River distribution system. The DWS is operated by Veolia Water Canada Inc. herein also referred to as the "operating authority". The DWS was operated during the inspection period under Drinking Water Works Permit Number 261-201 Issue Number 2, herein also referred to as the "DWWP", and Municipal Drinking Water Licence Number 261-101 Issue Number 5, herein also referred to as the "MDWL".

  The inspector was accompanied and assisted during the inspection by David Ethier, ORO/Operator, and Daniel Danis, Operator, both representing Veolia Water Canada Inc.

  The scope of this inspection included a physical inspection of the Chalk River Water Treatment Plant (WTP) and the elevated storage tank site. The inspection examined compliance with, but was not limited to the: Safe Drinking Water Act (SDWA) and its regulations including Ontario Regulation 170/03 Drinking Water Systems (O. Reg. 170/03); Ontario Regulation 169/03 Ontario Drinking Water Standards (O. Reg. 169/03), and Ontario Regulation 128/04 Certification of Drinking Water System Operators and Water Quality Analysts (O. Reg. 128/04); DWWP; MDWL; completed Form 1, Form 2 and Form 3 records of alterations, and Permit To Take Water (PTTW) # 8446-9BPRT6.

  The following documents were also reviewed as part of the compliance assessment: Chalk River Drinking Water System Quality Management System (QMS) Manual including the Operational Plan (OP) for the system and associated work instructions (standard operating procedures) for the start-up, shut-down, and routine operation of the system; Water System Emergency Response Plan (WSERP); logbooks and other record keeping mechanisms;

Introduction

reports/certificates of analysis for drinking water samples, and other records related to the operation of the drinking water system for the period November 17, 2018 to January 31, 2019, inclusive, also herein referred to as the "inspection period". The report for the previous inspection # 1-I8XI6 was also reviewed for determining the status of completing previous required actions and recommendations where applicable.

Source

- **The owner did not have a harmful algal bloom monitoring plan in place.**

  The Chalk River DWS does not have a Harmful Algal Bloom (HAB) plan in place. The inspector reminded the operating authority that during the renewal of the new license, it will be a regulatory requirement to have a HAB plan in place for the DWS.

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.**

  Flow measuring and recording requirements are prescribed in Section 2.0 "Flow Measurement and Recording Requirements" of Schedule C to the MDWL. A copy of MDWL is included in the appendices to this inspection report for reference purposes.

  ABB MagMaster brand electromagnetic flow meters measure the rate and daily volume for the following processes:

  - Raw water entering the treatment system from the Low Lift Pumping Station (FIT-101);
  - Untreated water entering Clarifier #1 (FIT-103);
  - Untreated water entering Clarifier #2 (FIT-104);
  - Filtered water from both treatment units entering the clearwell (FIT-105);
  - Treated water conveyed from the clearwell to the Elevated Storage Tank (FIT-102); and,
  - Treated water conveyed from the Elevated Storage Tank to the distribution system (FIT-106).

  The flow measurement data is continuously transmitted to and recorded by the WTP SCADA system.

  Calibration and maintenance records reviewed for the inspection period by the inspector indicate that all flow meters were calibrated by a third party on September 9 and 10, 2019.

- **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.**

  The rated capacity for the Chalk River WTP is prescribed in Table 1: Rated Capacity in Section 1.0 "Performance Limits" of Schedule C to the MDWL. According to Table 1, the Chalk River WTP is licenced to produce a not-to-exceed maximum daily volume of treated water of 1,987 m3/day based on flow from the treatment subsystem (WTP) to the distribution system.

  The inspector examined flow rate and volume data measured during the inspection period and observed that the reported maximum daily volume flowing from the WTP to the distribution system during this period was 622.81 m3/d, or 31.3% of the approved capacity.

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.**

  On February 6, 2020, the inspector conducted a supervised tour of the Chalk River WTP with David Ethier and Daniel Danis for the purposes of examining the equipment installed and comparing that equipment to the

Treatment Processes

equipment described in the DWWP.

Based upon a comparison of the equipment noted to be installed during the tour of the Chalk River WTP with the equipment described in the DWWP, the inspector observed that none of continuous analyzers nor the propane generator installed at the Elevated Storage Tank are noted in the DWWP. Also, none of the flow meters installed at the WTP are noted in the DWWP. Additionally, one of the three high lift vertical turbine pumps described in the DWWP has been completely removed from the WTP and is no longer used in the process. The DWWP must reflect the equipment installed and therefore the Owner shall, during the next MDWL renewal (2020), review the treatment equipment installed in the entire drinking water system compared to the DWWP description of works and submit a Director Notification (DN); noting all mistakes and omissions to the Ministry as per the submission requirements.

- **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.**

  Drinking water systems that obtain water from a raw water supply that is surface water are required to meet regulatory treatment requirements prescribed in Sections 1-2, 1-4, 1-5 and 1-6 of Schedule 1 to O. Reg. 170/03.

  The Chalk River WTP consists of a conventional filtration process that provides chemically assisted filtration complete with chlorination for disinfection, and is designed to be capable of achieving, at all times, primary disinfection in accordance with the Ministry's Procedure for Disinfection of Drinking Water in Ontario (also herein referred to in the report as "the Disinfection Procedure"), including 99 per cent (2-log) removal or inactivation of Cryptosporidium oocysts, at least 99.9 per cent (3-log) removal or inactivation of Giardia cysts and at least 99.99 per cent (4-log) removal or inactivation of viruses by the time, water enters the distribution system. In addition, to be credited in meeting or exceeding the log removal credits identified above, the WTP must be operated to meet the following criteria:

  - A chemical coagulant must be used at all times when the treatment plant is in operation;
  - The chemical dosages must be monitored and adjusted in response to variations in raw water quality;
  - Effective backwash procedures must be maintained, including filter-to-waste or an equivalent procedure during filter ripening to ensure that the effluent turbidity requirements are met at all times;
  - Filtrate (filter effluent) turbidity must be continuously monitored from each filter; and,
  - 95% of the filtered water turbidity measurements must be 0.3 Nephelometric Turbidity Units (NTU) or less in each month.

  A review of operational logs for the inspection period found:

  - The water treatment equipment was operating whenever water was being supplied to the users of the DWS;
  - Coagulant was dosed to the treatment process at all times when the WTP was operating;
  - Chemical dosages were monitored and adjusted in response to variations in raw water quality, particularly raw water turbidity and temperature;
  - The maximum filter effluent turbidity from each of the two filters during the inspection period was 0.45 NTU and 0.7 NTU;
  - The filtered water turbidity was equal to or less than 0.3 NTU in at least 95 per cent of all samples taken in each month; and
  - Only certified operators made adjustments to the water treatment equipment.

  Each of the two dual media filters in the treatment process is equipped with an ABB MagMaster Model continuous monitoring turbidimeter. Turbidity is recorded by the WTP's SCADA system and filter effluent turbidity alarms are monitored. The WTP is equipped with filter-to-waste capability and this feature is used.

Treatment Processes

Primary disinfection is completed by chlorination. A procedure prepared by the operating authority entitled, "Disinfection Chlorination" (Chalk River WTP Operations Manual Section 3 - D.20), identifies that a minimum free chlorine residual of 0.65 mg/L is required to achieve 0.5-log removal/inactivation of Giardia cysts and 2-log removal/inactivation of viruses under worst case scenario. The primary disinfection process is monitored using a continuous analyzer located at the elevated storage tank where the intended contact time has been completed. A low alarm set point of 0.7 mg/L is also used to ensure that the required primary disinfection is achieved at all times and will trigger a plant shut-down.

According to records reviewed for the inspection period, the minimum primary disinfection free chlorine residual was 0.46 mg/L (continuous analyzer). A review of the daily trends for days where minimum chlorine residuals were below CT worst condition concentrations was completed to ensure regulatory compliance. For every instances mentioned above, the CT value was calculated using the actual chlorine residual and other actual variables and it was determined that at all times, during the inspection period, CT required to achieve primary disinfection was met.

- **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.**

  The inspector examined records for the inspection period including: chain of custody forms, logs for daily chlorine residual testing conducted at the Chalk River Waste Water Treatment Plant and other locations within the distribution system, and observed that the minimum secondary disinfection free chlorine residual reported was 0.30 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.**

  Primary disinfection is achieved through the use of conventional filtration and chlorination.

  Free chlorine is continuously monitored at the outlet of the elevated storage tank where the intended contact time is completed.

  According to the CT calculations under worst case scenario, a minimum free chlorine residual of 0.65 mg/L is required to achieve 0.5-log removal/inactivation of Girdia cysts and 2 log removal/inactivation of viruses. The analyzer is set to alarm if the primary disinfection free chlorine residual drops below 0.70 mg/L and the plant will shut down via interlock controls.

  On the day of the physical inspection the analyzer displayed a free chlorine residual of 1.05 mg/L.

- **Continuous monitoring of each filter effluent line was being performed for turbidity.**

  The inspector observed that each filter effluent line is equipped with an ABB 4600 Turbidimeter to continuously monitor filter performance. The turbidity results from the two (2) turbidimeters are transmitted to, trended and stored by the WTP SCADA system computer.

  At the time of physical inspection, the turbidimeters displayed the following turbidity values:

  Filter 01: 0.09 NTU
  Filter 02: 0.08 NTU

- **The secondary disinfectant residual was measured as required for the distribution system.**

Treatment Process Monitoring

The inspector reviewed records for the inspection period and observed that secondary distribution system free chlorine residuals are recorded continuously from an analyser installed at the Chalk River Wastewater Treatment Plant. The free chlorine residual is also sampled and tested at two (2) or more locations within the distribution system each week, at the same time and locations where microbiological samples are taken. During the inspection review period the free chlorine residuals measured between 0.3 mg/L - 1.32 mg/L.

- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**

  Operational checks are conducted at the Chalk River WTP daily, seven (7) days per week. Daily summary reports produced by the SCADA system, including test results produced by continuous analyzers are reviewed during the operational checks. Verification of the daily review is recorded in the WTP logbook.

- **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.**

  Each filter effluent line is equipped with an ABB brand turbidimeter to continuously monitor filter performance. Each filter effluent turbidimeter is equipped with staged alarms set at: 0.25 NTU, to alert operators of an abnormal measurement.

  A continuous free chlorine residual analyzer is installed to monitor the elevated storage tower free chlorine residual for evaluating primary disinfection. This analyzer has a low alarm set point of 0.7 mg/L to alert operators of an abnormal value. This analyzer will also trigger the high lift pump interlock mechanism and cause a plant shutdown if the free chlorine residual is equal to or less than 0.7 mg/L.

- **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.**

  Continuous analyzers are cleaned and calibrated on a monthly basis.

  The online analyzers and bench-top/handheld colorimeters and pH meters are checked and calibrated annually by a third party, HACH Service Plus, in accordance with manufacturer's instructions. The service dates for calibration of the units occurred on November 7, 2019.

  Calibration records provided by the operating authority demonstrate that the chlorine analyzers, flow meters and turbidity meters were last cleaned and calibrated by a third party instrumentation and control contractor, SCG FlowMetrix. The service dates for calibration of the units occurred on September 9 and 10, 2019.

Operations Manuals

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

  The Operational Manual (Appendices H) for the DWS includes: a process diagram drawing of the Chalk River Distribution System.

  Several Detailed Unit Operations (Work Instructions) are also included in the Operational Manual describing the routine operation for individual unit processes.

Operations Manuals

The documents described above are available to operators in the office/SCADA room, at the Chalk River Water Treatment Plant.

Additionally, engineered floor plans of the Chalk River Water Filtration Plant are framed and displayed on the walls at the Chalk River Waste Water Facility.

- **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.**

  The requirements for Operations and Maintenance Manuals for the DWS are prescribed in section 16.0 "Operations and Maintenance Manual" of Schedule B to the MDWL. A copy of the MDWL is included in appendices to this inspection report for reference purposes.

  The inspector reviewed the Operations Manual for the Chalk River DWS, and observed that it contained:

  - The MDWL and DWWP for the DWS
  - The Operational Plan for the DWS (Detailed Unit Operations);
  - CT calculations for primary disinfection under worst case operating conditions;
  - A Sampling schedule;
  - Several procedures for the provision of adequate equipment, and material to deal with emergencies, upset conditions and equipment breakdown;
  - Procedures for addressing Lockouts;
  - Forms; and,
  - Procedures for responding to complaints.

  Based upon the review of the Operations and Maintenance Manual the inspector concluded that it contained the content prescribed in section 16.0 of Schedule B to the MDWL.

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.**

  The inspector reviewed the bound logbook, Monthly Operational spreadsheets and Chain of Custody Forms completed during the inspection period for results of operational testing of grab samples.

  This review found that operational testing of grab samples was completed by certified operators.

Security

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

  The water plant and low lift station are locked and all exterior doors are secured and equipped with alarm contact switches. All exterior facing doors are signed to alert against trespassing/unauthorized entry. Operators visit the plant on a daily basis.

  The property surrounding the Elevated Storage Tank (EST) is secured by perimeter chain-link fencing complete with locked access gates. Access to the interior of the base of the EST is protected by a locked door completed with an alarm dialer, and door contact switches. The EST is also equipped with a suitable screened vent.

  Operators conduct operational checks at the WTP on a daily basis, including weekends, and statutory holidays and conduct daily operational checks of the EST.

Security

Certification and Training

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

  Chalk River DWS is classified as a Class 2 Water Treatment system and Class 1 Water Distribution system. An appropriately certified operator has been designated as the Overall Responsible Operator (ORO) and is noted in the logbook each day.

  At the time of the inspection, David Ethier was the current ORO.

- **Operators-in-charge had been designated for all subsystems which comprised the drinking water system.**

  The Operator in Charge (OIC) is noted each day in the logbook and both operators employed by the operating authority, Veolia Water Canada Inc., are eligible to act as OIC at any given time.

- **All operators possessed the required certification.**

  The Chalk River WTP is classed as a Class 2 Water Treatment Subsystem (Issued Certificate of Classification # 535 on November 21, 2005). The Chalk River Distribution System is classed as a Class 1 Water Distribution System (Issued Certificate of Classification # 536 on November 21, 2005).

  A review of all operator certificates found that both operators were certified as Water Treatment Subsystem operators (Class 2 through 4), and therefore are deemed to also hold a Water Distribution/Water Distribution & Supply certificate (Class 1). The ORO for the Chalk River DWS holds certification higher than the class of the facilities. Operator licenses were found to be valid at the time of inspection.

- **Only certified operators made adjustments to the treatment equipment.**

  The inspector reviewed the bound logbook and log sheets for the inspection period and observed that only certified operators made adjustments to the water treatment processes and equipment. All operational changes to treatment processes were documented in the logbook, including the time of the entry and the name/initials of the certified operator who made the entry.

Water Quality Monitoring

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

  In the case of the Chalk River DWS, where the reported serviced population is 1,000, at least nine (9) distribution samples, must be taken in each month, with at least one sample being taken in each week and tested for Escherichia coli (E. coli), and total coliforms. At least 25% of all samples taken in each week must be tested for general bacteria population expressed as heterotrophic plate count (HPC).

  The inspector reviewed microbiological sampling and testing records for the inspection period and observed that between 12 distribution samples were taken in each month with three samples taken during each week and submitted to a licensed laboratory for testing for E. coli, total coliforms and analyzing at least one (1) for HPC.

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

  In the case of the Chalk River DWS, where there is a single point of entry into the distribution system, one sample must be taken each week from the point where water enters the distribution system and tested for E. coli, total coliforms, and HPC.

  The inspector reviewed microbiological sampling, and testing records for the inspection period and found that one treated water sample was taken each week and submitted to a licensed laboratory for testing for E. coli, total

Water Quality Monitoring

coliforms, and HPC.

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

  The inspector reviewed chemical sampling, and testing records for the inspection period and observed that water samples were taken every twelve (12) months, on January 23, 2019, and January 29, 2019, from the point where water enters the distribution system at the Chalk River WTP and submitted to a licensed laboratory for testing, for the inorganic parameters listed in Schedule 23 to O. Reg. 170/03.

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

  The inspector reviewed chemical sampling and testing records for the inspection period and observed that water samples were taken every twelve (12) months, on January 23, 2019, and January 29, 2019, from the point where water enters the distribution system at the Chalk River WTP and submitted to a licensed laboratory for testing, for the organic parameters listed in Schedule 24 to O. Reg. 170/03.

- **All haloacetic acid water quality monitoring requirements prescribed by legislation are being conducted within the required frequency and at the required location.**

  The inspector reviewed chemical sampling and testing records for the inspection period and noted that water samples were taken from the distribution system on December 21, 2018, April 23, 2019, July 23, 2019 and October 8, 2019, and submitted to a licensed laboratory for testing for haloacetic acids (a byproduct of disinfection).

  The test results for the above noted samples are summarized below:

  2019 Q1: January 23, 2019 - 45.4 ug/L
  2019 Q2: April 23, 2019– 49.6 ug/L
  2019 Q3: July 23, 2019 – 114 ug/L
  2019 Q4: October 08 – 67.6 ug/L

  The new Ontario Drinking Water Quality Standard for haloacetic acids of 80 ug/L based on a running annual average concentration of quarterly results came into effect on January 1, 2020.

  The calculated running annual average results for the quarterly samples taken during the inspection period are also provided below:

  2019 Q1 – 2019 Q4 = 69.15 ug/L

- **All trihalomethane water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location.**

  The inspector reviewed chemical sampling and testing records for the inspection period and noted that water samples were taken from the distribution system on January 23, 2019, April 24, 2019, July 24, 2019, October 9, 2019, and January 29, 2020 and submitted to a licensed laboratory for testing for trihalomethanes (also a byproduct of disinfection).

  The test results for the above noted samples are summarized below:

  2019 Q1: January 23, 2019 – 47 ug/L
  2019 Q2: April 24, 2019 – 47 ug/L
  2019 Q3: July 24, 2019 – 108 ug/L

Water Quality Monitoring

2019 Q4: October 9, 2019 – 80 ug/L
2020 Q1: January 29, 2020 – 66.0 ug/L

The Ontario Drinking Water Quality Standard for trihalomethanes of 100 ug/L based on a running annual average concentration of quarterly results.

The calculated running annual average results for the quarterly samples taken during the inspection period are also provided below:

2019 Q1 – 2019 Q4 = 70.5 ug/L
2019 Q2 – 2020 Q1 =75.25 ug/L

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

  O. Reg. 170/03 requires that a sample be taken every three months from the point where water enters the distribution system and tested for nitrate and nitrite.

  The inspector reviewed records for the inspection period and found that samples were taken from the point where the treated water enters the distribution system on a monthly basis during the inspection period and submitted to a licensed laboratory for nitrate and nitrite testing.

  The Standard for nitrate is 10 milligrams per litre (mg/L), while the Standard for nitrite is 1.0 mg/L. The nitrate and nitrite concentrations in the samples taken during the inspection period were all less than 0.1 mg/L.

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

  O. Reg. 170/03 requires a sample to be collected once every 60 months from the point where water enters the distribution system and tested for sodium.

  The inspector reviewed records for the inspection period and found that samples were taken from the point where the treated water enters the distribution system on January 24, 2018 and submitted to a licensed laboratory for testing for sodium.

  The test results indicate that sodium was present in the treated water at a concentration of 22 mg/L exceeding the 20 mg/L limit at which notice must be provided to the Ministry of the Environment, Conservation, and Parks, and the local Medical Officer of Health. A resample was taken on January 25, 2018 confirming high sodium content with a result of 23.9 mg/L.

  Sodium sampling is required in 2023 and must be taken within ninety (90) days before or after January 24, 2020.

- **The required daily samples were being taken at the end of the fluoridation process.**

  Fluoridation of the drinking water is practiced at the Chalk River DWS. For systems practicing fluoridating, O. Reg.170/03 requires that a sample be collected at least once every day from the point where water enters the distribution system and tested for fluoride.

  The inspector reviewed records for the inspection period, and found samples were taken from the point where the treated water enters the distribution system continuously and tested for fluoride. The test results are reviewed by operators on a daily basis.

- **All water quality monitoring requirements imposed by the MDWL or DWWP issued under Part V of the**

Water Quality Monitoring

SDWA were being met.

Chalk River has Lead Regulatory Relief under Schedule D of the MDWL. The relief allows for nine (9) sampling points in private plumbing, one (1) sampling point in plumbing that does not serve private residences and two (2) samples in the distribution system in each of the lead sampling periods until April 15, 2019.

For the sampling period of Dec 15, 2018 to April 15, 2019, all required samples in Table 2 under Schedule D were collected and there was five (5) exceedances of the ODWQS for lead (10ug/L) in plumbing that serves a private residence. Letters were sent to residents advising them of the lead test results in their home and the associated exceedances.

During the sampling period of June 15, 2019 to October 15, 2019, only 16 out of the required 20 private residence plumbing samples were taken and there was two (2) exceedances of the ODWQS for lead (10ug/L). Letters were sent to residents advising them of the lead test results in their home and the associated exceedances.

Chalk River DWS is a small drinking water system and has experienced issues in obtaining enough volunteers to complete the required number of samples in private plumbing. It is also noted that the same locations are being sampled during each period; however, efforts are made by the Township to obtain new volunteers. A posting on the Township's website is suggested as further efforts to obtain new volunteers.

It is recommended that the Town applies for continued relief from lead sampling requirements in order to comply with sampling requirements set out in Schedule D to the MDWL.

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

  The inspector examined records for the inspection period and observed that free chlorine residual test results for samples taken at the same time and from the same locations microbiological samples were obtained were recorded on laboratory Sample Submission and Chain of Custody Forms. The test results were also found to have been transposed by the laboratory to the Certificates/Reports of Analysis.

Water Quality Assessment

- **Records showed 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).**

  A review of reports of analysis, operational testing results and a search of the ministry's Drinking Water Information System (DWIS) database for the inspection period, found two adverse drinking water test results relating to lead exceedance in plumbing samples. Lead standard is set out in Schedule 2 of the ODWQS at a level of 10 ug/L.

  A plumbing sample from a non-private residence showed a lead result of 115 ug/L and another sample from a non-private residence taken on the same day showed a lead result of 11ug/L, both exceeding the lead standard.

  The required corrective actions and reporting requirements were met. As required, a letter with the lead results was given to the occupants of the premises from which the samples were taken.

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.**

- **All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.**

Reporting & Corrective Actions

- **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.**

  Alarm signals received from critical process alarms, including continuous water quality analyzers are communicated to an alarm dialer via the WTP SCADA system.

  The Verbatim dialer is programmed to notify the operator on call of an alarm. Operators respond to alarms as soon as possible after receiving notification of an alarm.

  Critical process alarms communicate with an interlock control which cause the high lift pumps and the WTP to shut down, requiring operator intervention to restart the process following an alarm condition.

  The inspector examined the logbook for the DWS during the inspection period and observed that alarms were responded to in an appropriate manner and documented in the operational log book.

Other Inspection Findings

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

  1. Based upon a comparison of the equipment noted to be installed during the tour of the Chalk River WTP with the equipment described in the DWWP, the inspector observed that none of continuous analyzers nor the propane generator installed at the Elevated Storage Tank are noted in the DWWP. Also, none of the flow meters installed at the WTP are noted in the DWWP. Additionally, one of the three high lift vertical turbine pumps described in the DWWP has been completely removed from the WTP and is no longer used in the process.

  2. Chalk River had Lead Regulatory Relief under Schedule D of the MDWL until April 15, 2019. Thereafter, the MDWL requires twenty (20) sampling points in private plumbing, two (2) sampling points in plumbing that does not serve private residences and four (4) samples in the distribution system in each of the lead sampling periods. During the sampling period of June 15, 2019 to October 15, 2019, only 16 out of the required 20 private residence plumbing samples were taken.

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 owner did not have a harmful algal bloom monitoring plan in place.**

   The Chalk River DWS does not have a Harmful Algal Bloom (HAB) plan in place.

   Recommendation:

   The inspector reminded the operating authority that during the renewal of the new license, it will be a regulatory requirement to have a HAB plan in place for the DWS.

2. **The following issues were also noted during the inspection:**
   1. The owner had not ensured that all equipment is installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.

   2. During the Lead sampling period of June 15, 2019 to October 15, 2019, only 16 out of the required 20 private residence plumbing samples were taken.

   Recommendation:

   1. The DWWP must reflect the equipment installed and therefore the Owner shall, during the next MDWL renewal (2020), review the treatment equipment installed in the entire drinking water system compared to the DWWP description of works and submit a Director Notification (DN); noting all mistakes and omissions to the Ministry as per the submission requirements.

   2. It is recommended that the Town applies for continued relief from lead sampling requirements in order to comply with sampling requirements set out in Schedule D to the MDWL.

SIGNATURES

Inspected By:

Karine Bourgon

Signature: (Provincial Officer)

Reviewed & Approved By:

Charlie Primeau

Signature: (Supervisor)

Review & Approval Date: 3/27/2020

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.

APPENDIX A

INSPECTION RATING RECORD AND METHODOLOGY

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2019-2020)

DWS Name:	CHALK RIVER DRINKING WATER SYSTEM
DWS Number:	210000666
DWS Owner:	Laurentian Hills,The Corporation Of The Town Of
Municipal Location:	Laurentian Hills
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	February 6, 2020
Ministry Office:	Ottawa District

Maximum Question Rating: 481

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 56
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 42
Water Quality Monitoring	0 / 112
Reporting & Corrective Actions	0 / 66
Treatment Process Monitoring	0 / 133
TOTAL	**0 / 481**

Inspection Risk Rating	**0.00%**

FINAL INSPECTION RATING:	**100.00%**

Inspection Rating Record Generated On 27-MAR-20 (Inspection ID: 1-L38TQ).

Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2019-2020)

DWS Name:	CHALK RIVER DRINKING WATER SYSTEM
DWS Number:	210000666
DWS Owner:	Laurentian Hills,The Corporation Of The Town Of
Municipal Location:	Laurentian Hills
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	February 6, 2020
Ministry Office:	Ottawa District

Maximum Question Rating: 481

Inspection Risk Rating	**0.00%**

FINAL INSPECTION RATING:	**100.00%**

Inspection Rating Record Generated On 27-MAR-20 (Inspection ID: 1-L38TQ).