

Ministry of the Environment,
Conservation and Parks

Ministère de l'Environnement, de
la Protection de la nature et des Parcs

Barrie District

District de Barrie

1201-54 Cedar Pointe Drive
Barrie ON L4N 5R7
Tel: (705) 739-6441
1-800-890-8511
Fax: (705) 739-6440

1201-54 chemin Cedar Pointe
Barrie ON L4N 5R7
Tél: (705) 739-6441
1-800-890-8511
Télé: (705) 739-6440

November 27, 2019

Attention: John Pinsent Chief Administrative Officer

**Re: 2019 Drinking Water Inspection Report
Brechin and Lagoon City Drinking Water System**

Please find enclosed the Ministry of the Environment, Conservation and Parks inspection Report for Brechin and Lagoon City Drinking Water System (Water Works # 210001273). The physical inspection process took place on November 1, 2019.

The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks legislation and authorizing documents, as well as evaluating conformance with Ministry drinking water-related policies and guidelines during the inspection review period.

No issues of non-compliance were identified. No Provincial Officer's Orders were issued in conjunction with this inspection.

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation and Enforcement Secretariat and advice of internal/external risk experts. The Inspection Summary Rating Record (IRR), included as Appendix A of this 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. If you have any questions or concerns regarding the rating, please contact Sheri Broeckel, Drinking Water Supervisor at (705) 716-3712.

If you have any questions regarding the inspection report please feel free to contact the undersigned at (705) 716-5655.

Sincerely,



Laura Greidanus
Provincial Officer
Drinking Water Inspection Program, Safe Drinking Water Branch
Barrie District Office, Ministry of the Environment Conservation and Parks

CC Medical Officer of Health, Simcoe Muskoka District Health Unit
Manager of Environmental Services, Township of Ramara
Barrie District Office File, Ministry of the Environment, Conservation and Parks



Ministry of the Environment, Conservation and Parks

**BRECHIN & LAGOON CITY DRINKING WATER SYSTEM
Inspection Report**

Site Number:	210001273
Inspection Number:	1-KYBUX
Date of Inspection:	Nov 01, 2019
Inspected By:	Laura Mary Greidanus

OWNER INFORMATION:

Company Name:	RAMARA, THE CORPORATION OF THE TOWNSHIP OF	Unit Identifier:	
Street Number:	2297		
Street Name:	HIGHWAY 12 Hwy		
City:	BRECHIN	Postal Code:	L0K 1B0
Province:	ON		

CONTACT INFORMATION

Type:	Owner	Name:	John Pinsent
Phone:	(705) 484-5374 xext222	Fax:	(705) 484-0441
Email:	jpinsent@ramara.ca		
Title:	Cheif Administrative Officer		
Type:	Operating Authority	Name:	David Readman
Phone:	(705) 238-9092	Fax:	(705) 484-0885
Email:	dreadman@ramara.ca		
Title:	Manager of Environmental Services		

INSPECTION DETAILS:

Site Name:	BRECHIN & LAGOON CITY DRINKING WATER SYSTEM
Site Address:	2 POPLAR Crescent BRECHIN ON L0K 1B0
County/District:	RAMARA
MECP District/Area Office:	Barrie District
Health Unit:	SIMCOE MUSKOKA DISTRICT HEALTH UNIT
Conservation Authority:	
MNR Office:	
Category:	Large Municipal Residential
Site Number:	210001273
Inspection Type:	Announced
Inspection Number:	1-KYBUX
Date of Inspection:	Nov 01, 2019
Date of Previous Inspection:	Nov 01, 2018

COMPONENTS DESCRIPTION

Site (Name):	MOE DWS Mapping	Sub Type:	
Type:	DWS Mapping Point		
Site (Name):	INTAKE STRUCTURE/SYSTEM	Sub Type:	Surface
Type:	Source		
Comments:			

The raw water intake structure for the facility is located approximately 400 metres offshore to the east in Lake Simcoe. A raw water low lift pumping station situated at the facility draws water from the lake through a 300 millimetre diameter intake pipe. The low lift pumping station is equipped with two manually cleaned screens and

three vertical turbine pumps, one of which is rated at a capacity of 2,435 cubic metres per day and the other two are rated at 2,029 cubic metres per day. There is a 100 mm diameter pipe for backflushing. A small pump operates on a continuous basis, providing raw water from the raw water wet well to continuous monitoring equipment measuring raw source water quality parameters turbidity, pH and temperature.

Prior to being directed to the treatment train, the raw water is dosed through a diffuser into the wet well by a paced to flow pre-chlorination system and by a paced to flow coagulation system that utilizes polyaluminum chloride. The water is then directed through a 200 millimetre pipe equipped with an ABB magnetic flowmeter, and injected with carbon dioxide for pH control prior to entering the filtration system. The carbon dioxide system consists of two 340 kg stainless steel refillable storage cylinders containing liquefied carbon dioxide gas. A wall-mounted metering panel is installed, equipped with an actuated control valve and bypass piping, gas feed flowmeter, filter, carbon dioxide gas pressure regulator and isolating manual ball valves. There is an indoor carbon dioxide detector installed.

Site (Name): TREATED WATER
Type: Treated Water POE **Sub Type:** Pumphouse
Comments:

The Brechin and Lagoon City water treatment plant is a surface water treatment facility with chemically assisted filtration.

Raw water from the wet well flows through an ABB magnetic flow meter with a 4-20 milliamp signal connected to the SCADA system for continuous monitoring and recording purposes. Raw water is directed to a filtration system which begins with four spiral flow flocculation tanks that each provide 12.7 cubic metres volume. Water then flows to two filters, each equipped with two surface agitators and three backwash wastewater collection troughs, and are comprised of 1,140 millimetres of granulated activated carbon over sand and gravel sitting on a 200 millimetre underdrain. The filters are designed to provide a total maximum day filtration treatment capacity of 4,000 m3. The vertical turbine backwash wastewater pump has a capacity of 7,514 cubic metres per day at 9.1 TDH, providing a potential backwash rate of 44 metres per hour. Water discharging from the filters is monitored separately by two continuous on-line turbidity analysers that have signal outputs connected to a datalogging device and an auto dialer for continuous monitoring and alarming purposes. During backwash cycles, filter to waste water is directed to an 80 cubic metre backwash holding tank, equipped with two manually controlled submersible pumps that discharge to the sanitary sewer at a controlled rate and an overflow weir that is directed to the same sanitary sewer. All flows from the backwash cycles are monitored by a flow meter located on the backwash holding tank discharge pipe.

After passing through the filters, the partially treated water is dosed with sodium hypochlorite in the combined filter discharge header. The primary sodium hypochlorite disinfection system consists of one approximately 300 litre chemical storage tank, two chemical metering pumps (one duty, one standby), each rated at 10.5 litres/hour, and an alarm with automatic switchover on duty pump failure. After chemical dosing, the water is directed into a 1,091 cubic metre concrete in-ground reservoir situated under and adjacent to the pumphouse. The reservoir is equipped with baffling and an ultrasonic level measuring device for treatment control and high lift pump lockout at 3.89 metres water depth to maintain adequate chlorine contact time. Water discharging from the reservoir is monitored by on-line turbidity and chlorine analysers that have signal outputs connected to a datalogging device and an auto dialer for continuous monitoring and alarming purposes. The water for these analysers is drawn continuously by a pump to ensure that the water is being drawn from a location that represents the point at which CT is being achieved. Water then passes into a 6.8 metre by 2.1 metre by 4.65 metre high lift pump wet well where one submersible pump with a rating of 1,944 m3/d and four vertical turbine pumps rated with one pump at 1,145 m3/d, one pump with capacity of 1,728 m3/d and two pumps with capacities of 4,536 m3/d, all at TDH of 70 m provide water to the distribution system. Each pump is equipped with lockout features for low water level and low chlorine residuals. Treated water flows through an ABB magnetic flowmeter prior to being discharged to the distribution system. High lift pumps are activated based on the Brechin tower level.

A secondary disinfection system is also located after the reservoir that is comprised of one chemical storage tank, two chemical metering pumps (one duty, one standby), with an alarm and automatic switchover on duty pump failure. Sodium hypochlorite is injected through a diffuser into the high lift wet well at a constant rate during high lift pump operation.

There are three continuous, on-line turbidimeters measuring in NTU's which are separately supplied with continuous samples from each of the filter effluent lines and the treated water supply from the same location identified for the

chlorine analyzer. Each of the analyzers are equipped with signal outputs connected to a datalogging device and an auto dialer for continuous monitoring and reporting purposes.

A 24 hour alarm system continuously monitors illegal entry, power interruptions, low pressure, low filter levels, low and high levels in the clearwell and the Brechin elevated storage tower and treated water quality for turbidity and free available chlorine residual. The water treatment plant is equipped with one (1) stand-by 175 kW diesel engine generator set with sufficient capacity to run the works for 32 hours.

Site (Name): DISTRIBUTION (WATER INSPECTION)
Type: Other **Sub Type:** Reservoir

Comments:

The Brechin and Lagoon City distribution system services approximately 1,264 service connections and an approximate population of 2,618 persons. Of these, approximately five are considered industrial, 40 are commercial and five are institutional users.

Lagoon City has approximately 11,800 m of PVC, ductile iron and asbestos cement watermains ranging in diameter from 150 mm to 300 mm.

Brechin has approximately 6,100 m of PVC watermains ranging in diameter from 150 mm to 250 mm.

A treated water elevated reservoir is located within Brechin that provides a storage volume of 945 cubic meters and is equipped with a level sensor that controls high lift pump activation through telephone communication lines. In addition, the owner has installed an uninterruptible power supply at the tower to maintain communication capabilities in the event of power failure.

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.

The Brechin and Lagoon City Drinking Water System is owned and operated by the Corporation of the Township of Ramara and serves an estimated population of 2,618 people in the communities of Brechin and Lagoon City. The Brechin and Lagoon City Drinking Water System is categorized as a large municipal residential drinking water system, as defined by Ontario Regulation 170/03 and operates under DWS number 210001273.

The Brechin and Lagoon City Drinking Water System draws water from Lake Simcoe. Treatment consists of chemically assisted filtration and chlorination. Three low lift pumps draw water from Lake Simcoe. Raw water is injected with carbon dioxide for pH adjustment, sodium hypochlorite and polyaluminum chloride. Water is then directed to four spiral flow flocculators and two filter-absorbers. Water is then injected with sodium hypochlorite and directed to the clearwell. Five highlift pumps discharge treated water to the distribution system. There is an elevated storage tower in the town of Brechin.

This inspection was conducted pursuant to section 81 of the Safe Drinking Water Act in order to assess compliance with the requirements of Ontario Regulation 170/03 and other Ministry control documents. The drinking water inspection included: physical inspection of the treatment equipment and facility; interview with Township of Ramara staff; and a review of relevant documents and data from the period of November 1, 2018 to November 1, 2019 (hereafter referred to as the "inspection review period"). The previous inspection of the Brechin and Lagoon City Drinking Water System was conducted on November 1, 2018.

Source

- **The owner had a harmful algal bloom monitoring plan in place.**

The Operating Authority has treated and raw water samples tested for microcystin from the beginning of June to the end of September.

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.**

Capacity Assessment

Condition 2.1 of Schedule C of Municipal Drinking Water Licence 147-101 Issue Number 3 requires that for each treatment subsystem, continuous flow measurement and recording shall be undertaken for the flow rate and daily volume of treated water that flows from the treatment subsystem to the distribution system, and the flow rate and daily volume of water that flows into the treatment subsystem.

There is a magnetic flow meter installed on the raw water header, as well as on the treated water discharge line. Each of the flow meters provides a 4-20 mA signal. Raw and treated water flows are continuously recorded on the SCADA system. Daily log print outs include the 24 hour flows from Lake Simcoe and the volume entering the distribution system, as well as the minimum, maximum and average flow for 24 hours, the amount of flow since midnight (the logsheets print at approximately 6:00 am) and the flow meter reading at the end of the day.

- **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.**

Table 1 of Schedule C of Municipal Drinking Water Licence 147-101 Issue Number 3 states that the rated capacity for Brechin and Lagoon City Drinking Water System is 4,000 m³/day. This value was not exceeded during the inspection review period. There is not a maximum flow rate indicated in Table 2 of the Municipal Drinking Water Licence.

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.**

During the inspection installed equipment appeared to meet the description contained in Schedule A of Drinking Water Works Permit 147-201 Issue Number 4, with the exception that the coagulant has changed. Polyaluminum chloride (PAX-XL6) is now used and was switched to in June 2019. A Director Notification Form was completed for the coagulant change.

There is not a Schedule C associated with the Permit.

- **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.**

During the inspection review period 13 Form 2s were completed for maintenance and activities performed for the Brechin and Lagoon City Drinking Water System. Activities included the switch from aluminium sulphate to PAX-XL6 on June 11, 2019. A Director Notification Form was also submitted for the coagulant switchover. The Operating Authority has educated Operators about the requirements to complete Form 2s and have them available at the treatment plant.

- **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.**

Condition 1 of Schedule E of Municipal Drinking Water Licence 147-101 Issue Number 3 states that the Brechin and Lagoon City Water Works achieves 2 log removal of cryptosporidium oocysts, 2 log removal of giardia cysts and one log removal of viruses by direct filtration, and 1 log removal of giardia cysts and 3+ log removal of viruses by chlorination, if the applicable log removal/inactivation credit assignment criteria is met.

The log removal/inactivation credit assignment criteria for direct filtration are:

1. A chemical coagulant shall be used at all times when the treatment plant is in operation;
2. Chemical dosages shall be monitored and adjusted in response to variations in raw water quality;
3. Effective backwash procedures shall be maintained including filter-to-waste or an equivalent procedure during filter ripening to ensure that effluent turbidity requirements are met at all times;
4. Filtrate turbidity shall be continuously monitored from each filter; and
5. Performance criterion for filtered water turbidity of less than or equal to 0.3 NTU in 95% of the measurements

Treatment Processes

each month shall be met for each filter.

The coagulant and carbon dioxide systems are tied into the raw water pumps, so that coagulant is used at all times when the treatment plant is in operation. Raw water is continuously monitored for turbidity. The daily logsheet indicates the dosage for the pre-chlorine, reservoir chlorine and coagulant, as well as the amount used in 24 hours. Operators monitor the dosage and make adjustments where necessary in response to raw water quality. Backwash cycles for both filters are initiated manually based on the head loss for each filter and observations of raw water quality, and include a filter-to-waste portion. Backwashing is documented on the logsheets. A continuous turbidity analyser is installed on each filter effluent line, and values are continuously recorded by the SCADA system. The daily logsheet includes a calculation of the percentage of turbidity readings that are less than 0.3 NTU. In January 2019 the logsheets were altered to include a count of the number of readings above 0.3 NTU so that reporting can occur when the threshold for the number of readings will mean that the 95% value of less than or equal to 0.3 NTU cannot be met for that month. In November 2018 the filter turbidity readings did not meet the threshold, however this was the result of analyser error and sample readings during backwash and not believed to be reflective of the actual filtered water turbidity. Action was taken to ensure the analysers were reading accurately. In all months during the inspection review period the direct filtration log removal/inactivation criteria were met.

The log removal/inactivation credit assignment criteria for chlorination are:

1. Sampling and testing for free chlorine residual shall be carried out by continuous monitoring equipment in the treatment process at or near a location where the intended contact time has just been completed in accordance with the Ministry's Procedure for Disinfection of Drinking Water in Ontario; and
2. At all times, CT provided shall be greater than or equal to the CT required to achieve the log removal credits assigned.

A continuous chlorine analyser is fed sample water after the clearwell, where contact time is afforded for disinfection of the Brechin and Lagoon City drinking water. Alarms have been programmed to notify the Operator in Charge in the event that the analyser is reading below the set point (which is set above the required value for CT) or if the clearwell level is below the set point required to provide adequate time for disinfection to occur. In the event that Operators are notified of an alarm, manual CT calculations are performed to verify if the disinfection criteria have been met. All criteria were met for chlorination log removal credits during the inspection review period.

- **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.**

Section 1-2. (2) 4. of Schedule 1 of Ontario Regulation 170/03 requires that if the drinking water system's water treatment equipment provides chlorination or chloramination for secondary disinfection, the equipment is operated so that, at all times and at all locations within the distribution system, the free chlorine residual is never less than 0.05 mg/L, if the drinking water system provides chlorination and does not provide chloramination.

During the inspection review period free chlorine residual was not measured below 0.05 mg/L in the Brechin Lagoon City distribution system. The lowest recorded distribution free chlorine reading from the Brechin and Lagoon City Drinking Water System during the inspection review period was 0.29 mg/L.

At the time of inspection a free chlorine residual of 0.72 mg/L was measured at the Ramara Environmental Services office.

- **Where an activity has occurred that could introduce contamination, all parts of the drinking water system were disinfected in accordance with Schedule B, Condition 2.3 of the Drinking Water Works Permit.**

Condition 2.3 of Schedule B of Drinking Water Works Permit 147-201 Issue Number 4 states that all parts of the drinking water system in contact with drinking water which are:

2.3.1 Added, modified, replaced, extended; or

2.3.2 Taken out of service for inspection, repair or other activities that may lead to contamination, shall be disinfected before being put into service in accordance with a procedure approved by the Director or in accordance with the applicable provisions of the following documents:

- a) The ministry's Watermain Disinfection Procedure, effective January 29, 2017;

Treatment Processes

- b) AWWA C652 – Standard for Disinfection of Water Storage Facilities;
- c) AWWA C653 – Standard for Disinfection of Water Treatment Plants; and
- d) AWWA C654 - Standard for Disinfection of Wells.

The Brechin and Lagoon City Water Works Contingency and Emergency Plan, which was updated in January 2019, references the watermain disinfection procedure and the most recent version of ANSI/AWWA C651 Standard for Disinfecting Water Mains where required. The ministry's Watermain Disinfection Procedure is appended in the Contingency Plan. The ministry Procedure references the ANSI/AWWA C651 document.

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.**

The continuous chlorine analyser is fed sample water from a point after the reservoir and the intended CT, prior to water entering the distribution system.
- **Continuous monitoring of each filter effluent line was being performed for turbidity.**

Subsection 7-3 (2) (b) of Schedule 7 of Ontario Regulation 170/03 requires that if a drinking water system obtains water from a raw water supply that is surface water and the system provides filtration the owner of the system shall ensure that sampling and testing for turbidity is carried out by continuous monitoring equipment on each filter effluent line.

There is a continuous turbidity analyser for each of the two filter effluent lines. There is also a continuous analyser that measures the turbidity of the treated water and the raw water.
- **The secondary disinfectant residual was measured as required for the distribution system.**

Subsection 7-2 (3) of Schedule 7 of Ontario Regulation 170/03 requires that the owner of a large municipal residential system that provides secondary disinfection and the operating authority for the system shall ensure that at least seven distribution samples are taken each week in accordance with subsection (4) and are tested immediately for free chlorine residual, if the system provides chlorination and does not provide chloramination. Subsection 7-2 (4) of Schedule 7 of Ontario Regulation 170/03 states that the following rules apply to the distribution samples referred to in subsection (3) unless at least one sample is taken on each day of the week:

 1. At least four of the samples must be taken on one day of the week, at least 48 hours after the last sample was taken in the previous week.
 2. At least three of the samples must be taken on a second day of the week, at least 48 hours after the last sample was taken on the day referred to in paragraph 1.
 3. When more than one sample is taken on the same day of the week under paragraph 1 or 2, each sample must be taken from a different location.

A free chlorine residual was measured in the Brechin Lagoon City distribution system every day during the inspection review period.
- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**

Subsection 6-5. (1) 3. of Schedule 6 of Ontario Regulation 170/03 requires that test results recorded under paragraph 1 or 2 must be examined, within 72 hours after the tests are conducted by a certified operator, in the case of, a large municipal residential system, such as the Brechin and Lagoon City Drinking Water System. An Operator typically reviews the data recorded by the continuous monitoring equipment each day, and always during the inspection review period within 72 hours. Data is able to be reviewed remotely and comments entered electronically onto the daily logsheets.
- **All continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or**

Treatment Process Monitoring

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.

- **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.**

During the inspection review period Operators compared the chlorine residual readings from the continuous analyser with the hand held colorimeter multiple times each week and made adjustments to the continuous analyser where appropriate.

The Brechin and Lagoon City Operations Manual indicates that the chlorine analyser should be checked weekly against hand held test equipment to verify the accuracy. Operators are to recalibrate the analyser as needed as per the manufacturer's recommendations or when results obtained from hand held and analyser differ by more than 0.2 mg/L. The Manual also states that the probe should be replaced every year or as needed as per manufacturer's recommendations.

The pre chlorine analyser was replaced in October 2019. The final turbidity analyser was replaced in May 2019. The electrolyte for the reservoir chlorine analyser was changed in December 2018. The analysers were calibrated by Metcon on January 16th and 17th, 2019. Operators performed calibrations of the chlorine and turbidity analysers periodically throughout the inspection review period.

Operations Manuals

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

In January 2019 the Operating Authority under took a review and performed revisions of the Operations and Maintenance Manuals for the Lagoon City Water Works. The revisions were performed to ensure that the procedures and information contained in the Manuals accurately reflected the activities performed by operators and the installed equipment. Previously an engineering company authored the Operations Manuals.

The Manual indicates that all adjustments or works undertaken on the system are to be incorporated into the Manual prior to work being completed and that the Operating Authority and all Operators are to review the documents annually to ensure accuracy and familiarity with the content.

- **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.**

Section 16.2 of Schedule B of Municipal Drinking Water Licence 147-101 Issue Number 3 requires that the operations and maintenance manual or manuals, shall include at a minimum:

- 16.2.1 The requirements of this licence and associated procedures;
- 16.2.2 The requirements of the drinking water works permit for the drinking water system;
- 16.2.3 A description of the processes used to achieve primary and secondary disinfection within the drinking water system, including where applicable:
 - a) A copy of the CT calculations that were used as the basis for primary disinfection under worst case operation conditions; and
 - b) The validated operating conditions for UV disinfection equipment, including a copy of the validation certificate;
- 16.2.4 Procedures for monitoring and recording the in-process parameters necessary for the control of any treatment subsystem and for assessing the performance of the drinking water system;
- 16.2.5 Procedures for the operation and maintenance of monitoring equipment;
- 16.2.6 Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown;

Operations Manuals

16.2.7 Procedures for dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in respect of the complaint; The Operations and Maintenance manuals meet the requirements of the Municipal Drinking Water Licence. The Operations and Maintenance manuals for the Lagoon City Water Works were updated in January 2019 by the Operating Authority.

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 sample stations and treatment plant are locked. The treatment plant is also alarmed for forced entry. The tower in Brechin is locked and has a locked fence surrounding it. No trespassing signage and the Township's contact information are prominently displayed at the treatment building and the elevated water reservoir.

Certification and Training

- **The overall responsible operator had been designated for each subsystem.**
The Brechin and Lagoon City Drinking Water System is comprised of a Water Distribution Class I and Water Treatment Class II subsystem. The Overall Responsible Operator is designated for both of the subsystems.
- **Operators-in-charge had been designated for all subsystems which comprised the drinking water system.**
The Brechin and Lagoon City Drinking Water System is comprised of a Water Distribution Class I and Water Treatment Class II subsystem. The Operators In Charge are designated for both of the subsystems.
- **All operators possessed the required certification.**
- **Only certified operators made adjustments to the treatment equipment.**

Water Quality Monitoring

- **All microbiological water quality monitoring requirements for distribution samples were being met.**
Subsection 10-2 of Schedule 10 of Ontario Regulation 170/03 requires that the owner of a drinking water system and the operating authority for the system shall ensure that if the system serves 100,000 people or less, at least eight distribution samples, plus one additional distribution sample for every 1,000 people served by the system, are taken every month, with at least one of the samples taken in each week. The owner of the drinking water system and the operating authority for the system shall ensure that each of the samples taken is tested for Escherichia coli and total coliforms and at least 25 per cent of the samples required to be taken are to be tested for general bacteria population expressed as colony counts on a heterotrophic plate count (HPC).
The population served by the Brechin and Lagoon City Drinking Water System is approximately 2,618 people. As such, 10 distribution samples are required to be collected each month. During the inspection review period, three distribution samples were taken each week and tested for the required parameters, including all samples being tested for HPC.
- **All microbiological water quality monitoring requirements for treated samples were being met.**

Water Quality Monitoring

Section 10-3 of Schedule 10 of Ontario Regulation 170/03 requires that the owner of a drinking water system and the operating authority for the system shall ensure that a water sample is taken at least once every week and tested for Escherichia coli, total coliforms and general bacteria population expressed as colony counts on a heterotrophic plate count (HPC).

During the inspection review period, a treated water sample was collected each week and tested for the required parameters.

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

Section 13-2 of Schedule 13 of Ontario Regulation 170/03 requires that the owner of a large municipal residential system and the operating authority for the system shall ensure that, at least one water sample is taken every 12 months and tested for every parameter set out in Schedule 23, if the system obtains water from a raw water supply that is surface water.

Subsection 6-1.1 (5) of Schedule 6 of Ontario Regulation 170/03 states that if this Regulation requires at least one water sample to be taken every 12 months and tested for a parameter, the owner of the drinking water system and the operating authority for the system shall ensure that at least one sample that is taken during a 12-month period for the purpose of being tested for that parameter is taken not more than 30 days before or after the first anniversary of the day a sample was taken for that purpose in the previous 12-month period.

During the inspection review period treated water samples were collected and tested for every Schedule 23 parameter on August 21, 2019. Prior to that, samples were collected and tested for all parameters listed in Schedule 23 on August 29, 2018.

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

Section 13-4 of Schedule 13 of Ontario Regulation 170/03 requires that the owner of a large municipal residential system and the operating authority for the system shall ensure that, at least one water sample is taken every 12 months and tested for every parameter set out in Schedule 24, if the system obtains water from a raw water supply that is surface water.

Subsection 6-1.1 (5) of Schedule 6 of Ontario Regulation 170/03 states that if this Regulation requires at least one water sample to be taken every 12 months and tested for a parameter, the owner of the drinking water system and the operating authority for the system shall ensure that at least one sample that is taken during a 12-month period for the purpose of being tested for that parameter is taken not more than 30 days before or after the first anniversary of the day a sample was taken for that purpose in the previous 12-month period.

During the inspection review period treated water samples were collected and tested for every Schedule 24 parameter on August 21, 2019. Prior to that, samples were collected and tested for all parameters listed in Schedule 24 on August 29, 2018.

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

Section 13-6.1 of Schedule 13 of Ontario Regulation 170/03 requires that the owner of a drinking water system that provides chlorination or chloramination and the operating authority for the system shall ensure that at least one distribution sample is taken in each calendar quarter, from a point in the drinking water system's distribution system, or plumbing that is connected to the drinking water system, that is likely to have an elevated potential for the formation of haloacetic acids (HAA), and have the samples tested for haloacetic acids.

The requirement to sample for HAA came into effect on January 1, 2017. The standard for HAA as a reportable limit comes into effect on January 1, 2020.

During the inspection review period a sample was collected from the Brechin and Lagoon City distribution system in November 2018, February 2019, May 2019 and August 2019 and tested for HAA as required. The average for HAA during the inspection review period was 61 ug/L.

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

Water Quality Monitoring

the required frequency and at the required location.

Section 13-6 of Schedule 13 of Ontario Regulation 170/03 requires that the owner of a drinking water system that provides chlorination or chloramination and the operating authority for the system shall ensure that at least one distribution sample is taken every three months, from a point in the drinking water system's distribution system, or plumbing that is connected to the drinking water system, that is likely to have an elevated potential for the formation of trihalomethanes (THMs). The samples are to be tested for THMs.

During the inspection review period samples were collected and tested for THMs in November 2018, February 2019, May 2019 and August 2019. The average for THMs during the inspection review period was 70.75 ug/L.

- **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 of Ontario Regulation 170/03 requires that the owner of a drinking water system and the operating authority for the system shall ensure that at least one water sample is taken every three months and tested for nitrate and nitrite.

During the inspection review period samples tested for nitrate and nitrite were collected from the treated water point of entry for the Brechin and Lagoon City Water System in November 2018, February 2019, May 2019 and August 2019.

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

Section 13-8 of Schedule 13 of Ontario Regulation 170/03 requires that the owner of a drinking water system and the operating authority for the system shall ensure that at least one water sample is taken every 60 months and tested for sodium.

Section 6-1.1 (7) of Schedule 6 of Ontario Regulation 170/03 states that if this Regulation requires at least one water sample to be taken every 60 months and tested for a parameter, the owner of the drinking water system and the operating authority for the system shall ensure that at least one sample that is taken during a 60-month period for the purpose of being tested for that parameter is taken not more than 90 days before or after the fifth anniversary of the day a sample was taken for that purpose in the previous 60-month period.

The most recent treated water sample tested for sodium was collected on August 25, 2015 from the Brechin and Lagoon City Drinking Water System. A resample was collected and tested for sodium on September 2, 2015. Prior to that a sample was taken and tested for sodium on August 17, 2010 and a resample collected on August 25, 2010.

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

Section 13-9 of Schedule 13 of Ontario Regulation 170/03 requires that if a drinking water system does not provide fluoridation, the owner of the system and the operating authority for the system shall ensure that a water sample is taken at least once every 60 months and tested for fluoride.

Section 6-1.1 (7) of Schedule 6 of Ontario Regulation 170/03 states that if this Regulation requires at least one water sample to be taken every 60 months and tested for a parameter, the owner of the drinking water system and the operating authority for the system shall ensure that at least one sample that is taken during a 60-month period for the purpose of being tested for that parameter is taken not more than 90 days before or after the fifth anniversary of the day a sample was taken for that purpose in the previous 60-month period.

The most recent treated water sample was collected and tested for fluoride on August 15, 2017. Prior to that a sample was collected on August 22, 2012 and tested for fluoride from the treated water sample point at the Brechin and Lagoon City Drinking Water System.

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

Subsection 6-3. (1) of Schedule 6 of Ontario Regulation 170/03 states that if this Regulation requires a water

Water Quality Monitoring

sample to be taken and tested for a microbiological parameter, the owner of the drinking water system and the operating authority for the system shall ensure that another sample is taken at the same time from the same location and is tested immediately for free chlorine residual, if the system provides chlorination and does not provide chloramination.

During the inspection review period free chlorine residual was tested at the same time from the same location as treated water and distribution microbiological samples as required.

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).**

All treated water and distribution system microbiological samples collected during the inspection review period, as well as sample results for all parameters listed in Schedules 23 and 24 of Ontario Regulation 170/03, nitrate, nitrite, THM, HAA and the most recent result for fluoride, met the Ontario Drinking Water Quality Standards.

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.**

During the inspection review period there was one adverse water quality incident reported. The report was for the filtered water turbidity readings not being equal to or less than 0.3 NTU in 95% of the monthly readings for November 2018. The Operating Authority made changes to the logsheets to highlight the number of filter turbidity readings above 0.3 NTU so that it can be reported as soon as the threshold number of samples is reached that will mean 95% of the values that month will not be equal to or less than 0.3 NTU.

The readings being above 0.3 NTU are believed to be the result of the analyser being left in operation during a backwash which would cause false high readings and issues with the analyser. Handheld readings were less than what was being measured by the continuous analyser. It is believed that the readings while water was being produced during the month of November 2018 met the criteria stated in the Procedure for Disinfection of Drinking Water in Ontario to get the log removal credits required for primary disinfection.

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

During the inspection review period there was one adverse water quality incident reported. The report was for the filtered water turbidity readings not being equal to or less than 0.3 NTU in 95% of the monthly readings for November 2018. The Operating Authority made changes to the logsheets to highlight the number of filter turbidity readings above 0.3 NTU so that it can be reported as soon as the threshold number of samples is reached that will mean 95% of the values that month will not be equal to or less than 0.3 NTU.

The readings being above 0.3 NTU are believed to be the result of the analyser being left in operation during a backwash which would cause false high readings and issues with the analyser. It is believed that the readings while water was being produced during the month of November 2018 met the criteria stated in the Procedure for Disinfection of Drinking Water in Ontario to get the log removal credits required for primary disinfection.

- **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.**

During the inspection review period Operators responded to four chlorine alarms, six turbidity alarms and five tower alarms. Operators are able to check alarms and analyser readings remotely with their cell phones.

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.

Not Applicable

SIGNATURES

Inspected By:

Laura Mary Greidanus

Signature: (Provincial Officer)



Reviewed & Approved By:

Sheri Broeckel

Signature: (Supervisor)



Review & Approval Date:

NOV 27, 2019

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.



Inspection Summary Rating Record

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

DWS Name: BRECHIN & LAGOON CITY DRINKING WATER SYSTEM
DWS Number: 210001273
DWS Owner: Ramara, The Corporation Of The Township Of
Municipal Location: Ramara

Regulation: O.REG 170/03
Category: Large Municipal Residential System
Type Of Inspection: Focused
Inspection Date: November 1, 2019
Ministry Office: Barrie District

Maximum Question Rating: 506

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 81
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 / 506

Inspection Risk Rating 0.00%

FINAL INSPECTION RATING: 100.00%

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

DWS Name: BRECHIN & LAGOON CITY DRINKING WATER SYSTEM
DWS Number: 210001273
DWS Owner: Ramara, The Corporation Of The Township Of
Municipal Location: Ramara

Regulation: O.REG 170/03
Category: Large Municipal Residential System
Type Of Inspection: Focused
Inspection Date: November 1, 2019
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Maximum Question Rating: 506

Inspection Risk Rating 0.00%

FINAL INSPECTION RATING: 100.00%