Ministry of the Environment, Conservation and Parks
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Thunder Bay ON P7E 6S7
Tel.: 807 475-1633
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Ministère de l'Environnement, de la Protection de la nature et des Parcs
435, rue James sud
Bureau 331
Thunder Bay ON P7E 6S7
Tél. : 807 475-1633
Téléc. : 807 475-1161

Ontario

Sent via e-mail:

July 17, 2018

The Corporation of the Township
of Terrace Bay
1 Selkirk Avenue
Terrace Bay, ON P0T 2W0

Attention: Mr. Terry Hanley
Public Works Supervisor

Dear Mr. Hanley:

Re: Terrace Bay Water Treatment Plant 2018-19 Annual Inspection Report

Please find attached the 2018-2019 municipal water works inspection report. The unannounced, detailed inspection was conducted on May 29 and 30, 2018.

There are no Provincial Orders written as a result of this inspection. It is the Ministry's expectation that all water works fully comply with the Safe Drinking Water Act and the regulations made pursuant to it.

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

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal/external risk experts. The Inspection Summary Rating Record (IRR) provides the Ministry, the system owner and the local Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance. Please note the attached IRR methodology memo describing how the risk rating model has improved to better reflect the health related and administrative non-compliance found in an inspection report. IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspector's Annual Report. If you have any questions or concerns regarding the rating, please contact Dave Manol, Water Compliance Supervisor, at 807-475-1689.

Should you have any questions or comments in regards to this inspection, please feel free to contact me at 807-475-1633.

Please note that as of June 29, 2018 the Ministry of the Environment and Climate Change's name has changed to the Ministry of the Environment, Conservation and Parks. This name change will take some time to be reflected in ministry materials and systems.

Yours truly,

Maria Lesschaeve

Maria Lesschaeve
Provincial Officer
Water Inspector
Water Compliance Unit
Thunder Bay District Office

:ml
Attach.

ec.: Township of Terrace Bay
Attention: Jonathan Hall, Chief Administrative Officer/Clerk
cao@terracebay.ca

Ontario Clean Water Agency
Attention: Larry Wachter, Sr. Operations Manager
lwachter@ocwa.com
Attention: Linda McBride, Operator
lmcbride@ocwa.com

Thunder Bay District Health Unit
999 Balmoral Avenue
Thunder Bay, ON, P7B 6E7
Attention: Abby Mackie, Sr. Public Health Inspector
abby.mackie@tbdhu.com

Ministry of Natural Resources
P.O. Box 970
Nipigon, ON, P0T 2J0
Attention: Chris Magee, District Manager
Chris.Magee@Ontario.ca

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Ministry of the Environment and Climate Change

TERRACE BAY DRINKING WATER SYSTEM

Inspection Report

Site Number:	250001769
Inspection Number:	1-I4X13
Date of Inspection:	May 29, 2018
Inspected By:	Maria Lesschaeve

TABLE OF CONTENTS

OWNER INFORMATION:

Company Name:	TERRACE BAY, THE CORPORATION OF THE TOWNSHIP OF		
Street Number:	1	**Unit Identifier:**	
Street Name:	SELKIRK Ave		
City:	TERRACE BAY		
Province:	ON	**Postal Code:**	P0T 2W0

CONTACT INFORMATION

Type:	Main Contact	**Name:**	Terry Hanley
Phone:	(807) 825-9016	**Fax:**	(807) 825-1182
Email:	t.hanley@terracebay.ca		
Title:	Public Works Supervisor - Terrace Bay		
Type:	Operator	**Name:**	Linda McBride
Phone:	(807) 825-2547	**Fax:**	(807) 825-2548
Email:	lmcbride@ocwa.com		
Title:	Operator/Mechanic		
Type:	Owner	**Name:**	Jonathan Hall
Phone:	(807) 825-3315	**Fax:**	(807) 825-9576
Email:	cao@terracebay.ca		
Title:	CAO/Clerk - Terrace Bay		
Type:	Operating Authority	**Name:**	Larry Wachter
Phone:	(807) 276-2391	**Fax:**	(807) 767-4861
Email:	lwachter@ocwa.com		
Title:	Operations Manager		

INSPECTION DETAILS:

Site Name:	TERRACE BAY DRINKING WATER SYSTEM
Site Address:	11 BEAVER CREEK RD TERRACE BAY ON P0T 2W0
County/District:	Terrace Bay
MOECC District/Area Office:	Thunder Bay District
Health Unit:	THUNDER BAY DISTRICT HEALTH UNIT
Conservation Authority:	
MNR Office:	Terrace Bay Regional Office
Category:	Large Municipal Residential
Site Number:	250001769
Inspection Type:	Unannounced
Inspection Number:	1-I4X13
Date of Inspection:	May 29, 2018
Date of Previous Inspection:	Jun 22, 2017

COMPONENTS DESCRIPTION

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

Site (Name): DISTRIBUTION (WATER INSPECTIONS)
Type: Other **Sub Type:**
Comments:
The Terrace Bay distribution system has approximately 720 residential service connections and 55 commercial service connections, supplying a population of approximately 1,850 people. The distribution system consists of mainly 150 mm to 300 mm diameter watermains, hydrants, shutoff valves and pressure reducing valves at key locations. The majority of the network is comprised of cast iron pipe, with only a small portion of the industrial/ commercial area constructed of PVC piping. The distribution system is approximately 12 kilometres in length. There are 114 fire hydrants located throughout the distribution system.

Water is delivered to the distribution system via six (6) vertical turbine distribution pumps, three (3) pumps rated at 63.1 L/s at 70.4 TDH (total dynamic head) each, two (2) pumps rated at 31.5 L/s at 70.4 TDH each and one (1) rated at 6.30 L/s at 70.4 TDH.

Due to elevated levels of lead in the drinking water system, a corrosion control program was implemented in July 2013 with the introduction of a blended phosphate.

Site (Name): HAYS LAKE EMERGENCY SUPPLY
Type: Treated Water POE **Sub Type:** Surface Water
Comments:
Prior to switching to the Municipal Drinking Water Works Licence and Permit, the Certificate of Approval included an emergency water supply system taking water from Hays Lake. Equipment provided pre-treatment before the slow sand filters and included:

-polymer addition system consisting of two (2) chemical pumps each capable of pumping 410 ml/min of Aluminex-2 polymer and Nalclear flocculant, two (2) 1,040 L chemical solution tanks complete with mixers and piping necessary to add polymer at the Hays Lake raw water influent line and the influent line to the pressure filtration;

- a recirculation chamber with two (2) pumps each rated at 27.3 L/s;

- a dual media pressure filtration system consisting of anthracite and silica, 3.35 m in diameter, rated at 53 L/s.

The Township of Terrace Bay now uses their own intake from Lake Superior and the Hays Lake system is no longer used.

The equipment remains in the water treatment plant. Recently the chemical metering pumps were modified to be used as part of the corrosion control program.

Site (Name): TREATED WATER - SLOW SAND FILTRATION
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
The present water treatment plant was commissioned in November of 2005. A filter by-pass, for use in emergency situations, was completed at the end of May 2008 .

Raw water entering the plant is directed to four (4) slow sand filter units, each with 1.2 m thickness of filter sand, 600 mm gravel and a perforated pipe underdrain system.

Filtered water then passes through two (2) ultraviolet disinfection units (one duty, one standby) providing a minimum ultraviolet dosage of 40 millijoules/cm2 at a peak flow rate of 45 L/sec.

UV disinfected water entering the reservoir feed pipe is injected with a sodium hypochlorite solution.

Chlorinated water is then directed to an underground 5193 m3 concrete reservoir, consisting of four (4) interconnected chambers with baffles providing chlorine contact time.

Post chlorination with sodium hypochlorite takes place after the reservoir when the continuous chlorine residual analyzer monitoring primary disinfection measures a residual of less than 1.0 mg/L.

Site (Name): RAW WATER
Type: Source **Sub Type:** Surface
Comments:
The main raw water supply for the Township of Terrace Bay is Jackfish Channel in Lake Superior.
Until April of 2009, the water intake and raw water supply system used to supply the water treatment plant was owned and operated by Terrace Bay Pulp Incorporated, who owned and operated a kraft mill in the community of Terrace Bay.

As of April of 2009, the Township of Terrace Bay started using their own intake and pumphouse. The new intake is located approximately 75 m to the west of the intake owned by the mill. Lake Superior water gravity feeds to a wet well in the pumphouse. Three submersible verticle turbine pumps, rated at 22.5 L/s, are available to pump water through the 2.5 km long by 250 mm transmission main to the Terrace Bay water treatment plant.

Aside from the new intake in Lake Superior, there are four groundwater wells on the shore of Lake Superior, that were used for dewatering during the construction of the new pumphouse. The groundwater wells are listed on the PTTW as back-up supplies to Lake Superior. The ground water wells are 250 mm in diameter and 17 m deep. Each has a submersible pump rated at 15 L/s and discharge to the wet well in the low lift pump station.

INSPECTION SUMMARY:

Introduction

- **The primary focus of this inspection is to confirm compliance with Ministry of the Environment and Climate Change (MOECC) legislation as well as evaluating conformance with ministry drinking water 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 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 inspection review period, referred to herein, is the period of time from June 22, 2017 to May 29, 2018, unless otherwise stated.

  Ministry audit samples were not collected during this inspection.

Source

- **Trends in source water quality were not being monitored.**

Permit To Take Water

- **The owner was not in compliance with all conditions of the PTTW.**

  The Amended Permit to Take Water no. 5887-8JHPXU permit authorizes the following water takings:
  1) PW1 / Back-up Supply: a maximum of 900 L/min; a maximum of 972,000 L/day; a maximum of 10 days per year.
  2) PW2 / Back-up Supply: a maximum of 900 L/min; a maximum of 972,000 L/day; a maximum of 10 days per year.
  3) PW3 / Back-up Supply: a maximum of 900 L/min; a maximum of 972,000 L/day; a maximum of 10 days per year.
  4) PW4 / Back-up Supply: a maximum of 900 L/min; a maximum of 972,000 L/day; a maximum of 10 days per year.
  5) Lake Superior / Main Supply: a maximum of 2,700 L/min; a maximum of 3,888,000 L/day; a maximum of 365 days per year.
  6) PW1 / Maintenance: a maximum of 900 L/min; a maximum of 9,000 L/day.
  7) PW2 / Maintenance: a maximum of 900 L/min; a maximum of 9,000 L/day.
  8) PW3 / Maintenance: a maximum of 900 L/min; a maximum of 9,000 L/day.
  9) PW4 / Maintenance: a maximum of 900 L/min; a maximum of 9,000 L/day.

  The permit also states: "The Permit Holder shall maintain a record of all water takings. This record shall include the dates and times of water takings, and the total measured or calculated amounts of water pumped per day for each day that water is taken under the authorization of this Permit. A separate record shall be maintained for each source."

Permit To Take Water

Three (3) of the four (4) groundwater wells run daily for 10 minutes each (well no. 2 is off-line). The raw groundwater is pumped to the wet well. The volume of water delivered to the wet well from each groundwater well is a calculated amount.

As well, the Permit allows the taking of water from the four groundwater wells as an alternate source for a period of 10 days per year. A review of records indicates that for calendar year 2017, groundwater wells 1, 3 and 4 were each used in excess of the permitted 10 days. When questioned about the excess number of days that the three groundwater wells were used, the operating authority indicated that when raw water turbidity is high (above 1.0 ntu), the groundwater wells are used to help dilute the Lake Superior source. In the past, it was found that the impellors on the wet well pumps were worn. This was attributed to the amount of sand that was being conveyed into the wet well from Lake Superior.

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.**

  Schedule A of the Drinking Water Works Permit #237-201, Issue Number 4, lists the following flow meters:

  - One (1) flow meter to monitor the raw water flow
  - Four (4) flow meters to monitor filter effluent flow, one per filter
  - One (1) flow meter to monitor flow to waste from the recirculation chamber
  - One (1) flow meter to monitor treated water flow to distribution

  Aside from the flow meters identified in the permit there is also a flow meter on the inlet to the pressure filter system, on the backwash supply line for the pressure filter system and on the line supplying the mill.

  The SCADA system records the flow from the meters.
  No flow meters are associated with the wells and flow data for these is a calculated value.

- **The flow measuring devices were calibrated or verified in accordance with the requirements of the Municipal Drinking Water Licence issued under Part V of the SDWA.**

  Flow meter verification was last conducted by OCWA staff on July 18, 2017. The certification indicates that the meters passed.

- **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 Drinking Water Works Licence lists the rated capacity in Schedule C, Condition 1.1. The licence states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 3,888 m^3/day.

  A review of treated water flow data did not indicate any capacity exceedances. The day with the highest maximum treated flow was on October 13, 2017, when 1791.4 m^3 of treated water was delivered to the distribution system.

- **Appropriate records of flows and any capacity exceedances were made in accordance with the Municipal Drinking Water Licence issued under Part V of the SDWA.**

  The SCADA system records the flow from the meters.
  No flow meters are associated with the wells and flow data for these is a calculated value.
  There were no capacity exceedances for this inspection period.

Treatment Processes

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.**

  Treatment equipment appeared to be installed in accordance with Drinking Water Works Permit No. 237-201, Issue Number 4. The Permit lists 2 -1500 L sodium hypochlorite solution tanks. Only one is installed in the chemical room. The second tank is available for times when the main tank is being cleaned.

- **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.**

- **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.**

  A review of records indicates that distribution chlorine residual readings ranged from 0.08 to 1.52 mg/L.

- **The owner had evidence indicating that all chemicals and materials that come in contact with water within the drinking water system met the AWWA and ANSI standards in accordance with the Municipal Drinking Water Licence and Drinking Water Works Permit issued under Part V of the SDWA.**

- **Up-to-date plans for the drinking-water system were kept in a place, or made available in such a manner, that they could be readily viewed by all persons responsible for all or part of the operation of the drinking water system in accordance with the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA.**

- **Where a potential bypass of primary or secondary treatment equipment existed, measures were taken to ensure that raw or partially treated water was not directed to the distribution system.**

  A bypass around the slow sand filters is available. The bypass was installed for emergency purposes only (ex: fighting a large fire). A bypass cannot be initiated without first obtaining permission from council or its designate. A flange in the piping is capped and would have to be physically removed by an operator in order to use the bypass piping.

  Condition 2 of Schedule D of the Municipal Drinking Water Licence, number 237-101, discusses temporary relief from regulatory requirements during an Emergency and the conditions for this relief.

  There have been no bypasses since the last inspection.

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 monitoring is conducted from a location after water exits the clearwell.

  Aside from the chlorine analyzer measuring primary disinfection, another analyzer is being used to measure the chlorine residual of the water entering the reservoirs. This serves to shutdown the treatment process and notify the operators of a problem with the injection of sodium hypochlorite.

  The "injection point" chlorine analyzer is also programmed to alarm at a high free chlorine residual to notify

Treatment Process Monitoring

operators if the pumps have accidentally been left at a high setting.

- **Operators were aware of the operational criteria necessary to achieve primary disinfection within the drinking water system.**

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

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

  Distribution chlorine residuals are measured twice per week; four on Tuesday and three on Friday.
  Distribution chlorine residual readings ranged from 0.08 to 1.52 mg/L.

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

  Results are examined daily. The results recorded during the weekend are examined on the Monday morning.

  Monthly filter effluent values are being evaluated within 72 hours of the last day of each month.

  A review of the logbooks indicates that data review is being conducted as required.

- **Samples for chlorine residual analysis were tested using an acceptable portable device.**

  A portable HACH colourimeter is used for taking grab chlorine residual readings.

- **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.**

  Schedule 6 of O. Reg. 170/03 contains a Table that lists the minimum alarm standard for continuous on-line analyzers.

  Free Chlorine Residual Required to Achieve Primary Disinfection
  Item 1. of the Table states: "The minimum alarm standard is 0.1 milligrams per litre less than the concentration of free chlorine residual that is required to achieve primary disinfection."
  Schedule 6-5(2) also states that for the purposes of the Table, the concentration of free chlorine residual that is required to achieve primary disinfection for the drinking water system shall be determined in accordance with the Ministry's "Procedure for Disinfection of Drinking Water in Ontario".
  For the Terrace Bay drinking water system, two documents address CT: the "CT Evaluation Report" dated February 10, 2016 (provided by KGS) and the Standard Operating Procedure "CT Calculations" issued February 11, 2016.
  The "CT Evaluation" document states that 0.8 mg/L is the amount of free chlorine concentration.
  The alarm setpoint for the continuous chlorine analyzer monitoring primary disinfection has been programmed to alarm at 0.7 mg/L. This alarm setpoint meets the requirement of the regulation.

  Turbidity
  Item 5. of the Table states: "1.0 Nephelometric Turbidity Units (NTU)".
  The alarm setpoint for the turbidity is 0.3 NTU (HIGH) and 1.0 NTU (HIGH HIGH). These alarm setpoints meet the requirement of the regulation.

- **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.**

  A record of data readings is made at one minute intervals.

Treatment Process Monitoring

- **All continuous analysers were calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.**

  A review of records indicate that the chlorine residual analyzers and the turbidimeters are being maintained and calibrated.

Process Wastewater

- **The process wastewater and residual solids/sludges were treated, handled and disposed of in accordance with the design requirements approved under the Drinking Water Works Permit and the Municipal Drinking Water Licence.**

Distribution System

- **The owner had up-to-date documents describing the distribution components as required.**

- **There is no backflow prevention program, policy and/or bylaw in place.**

- **Existing parts of the distribution system that are taken out of service for inspection, repair or other activities that may lead to contamination, and all new parts of the distribution system that come in contact with drinking water, were disinfected in accordance with Schedule B, Condition 2.3 of the Drinking Water Works Permit, or an equivalent procedure (i.e. the Watermain Disinfection Procedure).**

- **The owner had not implemented a program for the flushing of watermains as per industry standards.**

  In the fall the hydrants are normally operated and inspected. This maintenance activity involves some flushing of the distribution system.

- **Records confirmed that disinfectant residuals were routinely checked at the extremities and "dead ends" of the distribution system.**

- **A program for inspecting and exercising valves did not exist.**

  Valves are being used as little as possible due to problems with the age of the valves and the packing. Valves have been unreliable and have resulted in larger areas having to be isolated to complete repairs of the distribution system. Approximately three to four valves are replaced each year, or if a rehabilitation project is undertaken, valves are replaced in conjunction with the project. For example, four valves will be replaced with the Kenogami Road watermain replacement project scheduled to commence in June 2018.

- **There was a program in place for inspecting and operating hydrants.**

  The hydrants are usually inspected/operated in the fall in conjuction with flushing.

- **There was a by-law or policy in place limiting access to hydrants.**

  Access to hydrants is prohibited without the consent of the Corporation of the Township of Terrace Bay.

- **The owner was able to maintain proper pressures in the distribution system and pressure was monitored to alert the operator of conditions which may lead to loss of pressure below the value under which the system is designed to operate.**

  During normal operation the owner and operating authority are able to maintain proper pressures in the distribution. The water leaves the water treatment plant at 60 psi. At the mid-point in town the pressure is 85 psi and at the end

Distribution System

of town the pressure reaches 100 psi.

Operations Manuals

- **Operators and maintenance personnel had ready access to operations and maintenance manuals.**
- **The operations and maintenance manuals contained plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.**
- **The operations and maintenance manuals met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA.**

Logbooks

- **Logbooks were properly maintained and contained the required information.**
- **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.**
- **For every required operational test and every required sample, a record was made of the date, time, location, name of the person conducting the test and result of the test.**
- **The operator-in-charge ensured that records were maintained of all adjustments made to the processes within his or her responsibility.**
- **Logs or other record keeping mechanisms were available for at least five (5) years.**

Contingency/Emergency Planning

- **Spill containment was provided for process chemicals and/or standby power generator fuel.**

  The chemicals at the water treatment plant are located in a room with a grated floor above a concrete containment. Any spills will collect in this area and must be manually pumped for removal.
- **Clean-up equipment and materials were in place for the clean up of spills.**

  A spill clean-up kit is available at the water treatment plant.
- **Standby power generators were tested under normal load conditions.**

Security

- **All storage facilities were completely covered and secure.**

  The reservoir is located beneath the water treatment plant floor.
- **Air vents and overflows associated with reservoirs and elevated storage structures were equipped with screens.**
- **The owner had provided security measures to protect components of the drinking water system.**

Security

The plant is located within a gated and locked area. The building is security alarmed and locked.
The Lake Superior Pumphouse is fenced, locked, and visited by an operator on Mondays, Wednesdays and Fridays.

Consumer Relations

- **The owner and/or operating authority undertook efforts to promote water conservation and reduce water losses in their system.**

  By-law No. 21-2006 restricts the use of water from March 1st to November 13th each year, through the implementation of measures such as odd/even watering days based on the street number and calendar day.

Certification and Training

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

  The Terrace Bay Treatment Plant is a Class II facility operating under licence number 3790, issued April 30, 2006. The Terrace Bay Distribution System is a Class I facility operating under licence number 3571, issued April 30, 2006.

  An appropriately licenced operator employed by Ontario Clean Water Agency (OCWA) is the designated overall responsible operator for both the water treatment and distribution subsystems.

  An appropriately licenced operator, also employed by OCWA, provides back-up ORO coverage.

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

  The operating authority has two adequately certified operators designated as Operators in Charge for the Terrace Bay distribution and water treatment subsystems.

- **All activities that were undertaken by uncertified persons in the DW subsystems were overseen by persons having the prescribed qualifications.**

  Any work undertaken by Terrace Bay Public Works staff in the distribution system is overseen by a certified operator (OCWA).

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

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

- **An adequately licenced operator was designated to act in place of the overall responsible operator when the overall responsible operator was unable to act.**

  The operating authority has adequately certified individuals to act as backup ORO should the need arise.

Water Quality Monitoring

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

  Lake Superior is the main source of raw water supply. Four ground water wells also serve as a backup to the Lake Superior supply. For maintenance purposes, the four well pumps are exercised each day of the week. When these pumps are exercised, water drawn from the wells is directed to the wet well in the pumphouse.
  Reg. 170/03, Schedule 10-4(1) requires water to be sampled every week prior to any treatment. Schedule 10-4(2), requires samples to be collected from each well in the system.

Water Quality Monitoring

The pumphouse wet well delivers raw water to the treatment plant. The sample point for raw water is at the treatment plant, prior to any treatment being applied. Due to both Lake Superior and the four groundwater wells each supplying water to the wet well, the raw water supplied to the plant is a blended source.
Schedule D of the Municipal Drinking Water Works Licence provides relief for raw well water sampling on the condition that raw water sampling is taken at a location where the well water and surface water blending has taken place.

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

  Schedule 10, section 10-2, O. Reg. 170/03, requires owners and operating authorities of drinking water systems that serve 100,000 people or fewer to ensure that at least eight distribution samples plus one additional distribution sample for every 1,000 people served by the system are taken each month. At least one of the samples must be collected each week. The samples must be tested for Escherichia coli and total coliform bacteria with at least 25% of the required samples to be tested for general bacteria populations measured using heterotrophic plate counts.

  The minimum number of distribution samples required to be taken from the Terrace Bay water distribution system is nine per month. Throughout the inspection review period, between nine and 12 samples were taken, with at least one collected each week. All samples were tested for total coliform bacteria and Escherichia coli, plus more than 25% of the samples were tested for heterotrophic plate count (HPC) bacteria.

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

  At least one treated water sample must be taken from the point of entry to the distribution system, each week, and tested for Escherichia coli, total coliform bacteria, and HPC bacteria, in accordance with Schedule 10, section 10-3, O. Reg. 170/03. Records reviewed for the inspection period indicate that weekly treated water samples were collected and analyzed as prescribed.

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

  Treated water samples must be tested at least once every 12 months (plus or minus 30 days from the first anniversary of the previous sampling date) for inorganic parameters listed in Schedule 23 of O. Reg. 170/03. These parameters were sampled on January 17, 2018. Previous samples were collected on January 25, 2017. Test results were below the maximum acceptable concentrations identified in O. Reg. 169/03.

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

  Treated water samples must be tested at least once every 12 months (plus or minus 30 days from the first anniversary of the previous sampling date) for organic parameters listed in Schedule 24 of O. Reg. 170/03. These parameters were sampled on January 17, 2018. Previous samples were collected on January 25, 2017. Test results were below the maximum acceptable concentrations identified in O. Reg. 169/03.

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

  As of January 1, 2017, haloacetic acid (HAA) samples are required to be collected from the distribution system or plumbing that is connected to the DWS that is likely to have an elevated potential for the formation of haloacetic acids.

  O. Reg. 170/03, Schedule 13, Section 13-6.1 requires drinking water system owners and operating authorities to ensure that water samples are collected from the distribution system in each calendar quarter.

  In accordance with O. Reg. 170/03, Scheduled 6-1.1 (4), when a sample is required to be collected in each calendar quarter, samples must be taken at least 60 days and not more than 120 days after the sample was last

Water Quality Monitoring

taken.

Collection dates and values for this inspection period are as follows:
July 10, 2017 – 18.2 µg/L
October 10, 2017 – 23.5 µg/L
January 17, 2018 – 8.8 µg/L
April 9, 2018 – 11.0 µg/L

Factors influencing the creation of HAAs

The levels of DBPs formed depend on many water quality parameters and operating conditions. In the case of HAAs, higher precursor concentrations (synthetic and natural organic matter, bromide ion) in the raw water, chlorine dose, chlorination pH, water temperature and the residence time will influence the type (THMs, HAAs, etc.) and the levels of DBPs formed. Studies found that surface water sources are more likely to produce higher HAAs than ground water sources.

HAAs concentrations are found to be higher in the distribution system, usually just after the chlorination process. Health Canada studies performed in 2002 and 2003 indicated that concentration of HAAs peaked in the distribution system closer to the chlorine addition point and decreased in the extremities of the system. Furthermore, the location of peak HAA values in a distribution system tends to change throughout the year, it is likely to be closer to the chlorine addition point in the summer and fall and further away from the point in the winter and spring. Precipitation and runoff events can also affect DBPs.

Sampling Points for HAAs

The ministry has recognized that more than one sampling location may be needed to characterize the HAAs levels throughout a municipal distribution system. HAA concentrations can vary within and between distribution systems and so monitoring samples should be taken at points in the "middle" of the distribution system (i.e. an average water age, post re-chlorination).
In light of the recently introduced HAAs standard of 80 µg/L, which will come in to force on January 1, 2020, the following guidance should be used in developing your monitoring program:
1. As a general rule, all samples described below should be obtained from a sampling point where the free (combined) chlorine residual concentration is maintained over 0.2 mg/L (1.0 mg/L) respectively.
2. First year of sampling: A system's established THM sampling point may be appropriate provided the chlorine concentrations are as described in item 1. If the residual is below the concentrations listed, use a nearby sampling point that meets the recommended residual.
3. Second year of sampling (recommended order of selection):
a. Where a system re-chlorinates via a booster station, samples should be obtained in the distribution system after the booster station.
b. If the system does not have booster stations, but has storage facilities where re-chlorination occurs, the sampling should be at points after the storage facilities.
c. If the system does not re-chlorinate, but has storage the sampling should be at points after the storage facilities.
d. If the system does not re-chlorinate nor have storage, obtain the sample from another point in the distribution system.
4. Third year of sampling:
a. If neither of the running annual averages for HAAs calculated (after year one and two) were higher than one-half of the standard (40 µg/L), the sampling point used in the first year of sampling can be used for compliance in future years.
b. If one of the running annual averages is over 40 µg/L, the municipality is required to choose a third sampling

Water Quality Monitoring

point using the same criteria as the second year, and obtain samples from this sampling point for the third year. The municipality will then be required to sample from the point which had the highest individual sample result for future years.
The outlined sampling plan is intended to be flexible and recognizes that municipalities have been sampling for HAAs since 2017.

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

  Trihalomethanes (i.e., THMs) are required to be collected from the distribution system and tested once every three months, in accordance with Schedule 13, section 13-6 of O. Reg. 170/03.

  Subsection 6-1.1(4) of O. Reg. 170/03 states that when samples are required to be taken at least once every three months, the owner and operating authority for the system shall ensure that the samples are taken at least 60 days and not more than 120 days after a sample was taken for that purpose in the previous three-month period.

  Collection dates and values for this inspection period are as follows:
  July 10, 2017 – 23.3 µg/L
  October 10, 2017 – 26.8 µg/L
  January 17, 2018 – 12.5µg/L
  April 9, 2018 – 13.6 µg/L

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

  Treated water samples must be collected at least once every three months for analysis of nitrate and nitrite in accordance with Schedule 13, section 13-7 of O. Reg. 170/03.

  Subsection 6-1.1(4) of O. Reg. 170/03 states that when samples are required to be taken at least once every three months, the owner and operating authority for the system shall ensure that the samples are taken at least 60 days and not more than 120 days after a sample was taken for that purpose in the previous three-month period.

  Collection dates for this inspection period are as follows:
  July 10 and October 10, 2017, January 17 and April 9, 2018.

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

  Sodium must be tested at least once every 60 months from the point of entry to the distribution system as per the requirements of Schedule 13, section 13-8 of O. Reg. 170/03.

  Sodium samples were last collected on January 12, 2015.

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

  Fluoride must be tested at least once every 60 months from the point of entry to the distribution system as per the requirements of Schedule 13, section 13-9 of O. Reg. 170/03.

  Fluoride samples were last collected on January 12, 2015.

- **The owner ensured that water samples were taken at the prescribed location.**

Water Quality Monitoring

- **All water quality monitoring requirements imposed by the Municipal Drinking Water Licence and/or Drinking Water Works Permit were not being met.**

  Sampling to monitor the effectiveness of the corrosion control plan is listed in Schedule C of MDWL.

  The current MDWL sampling regime mirrors the recommended sampling regime specified in the corrosion control plan with one exception, that being, the frequency for lead analysis from the point of entry location. The CCP recommends this analysis to be conducted semi-annually; the MDWL requires this analysis to be conducted quarterly.

  Currently all monitoring is conducted following the CCP recommendation. The point of entry lead analysis was conducted semi-annually, as opposed to the MDWL requirement of quarterly.

- **All sampling requirements for lead prescribed by schedule 15.1 of O. Reg. 170/03 were being met.**

  Sampling was conducted for the summer and winter sampling periods. Each sample period consisted of 20 private residential, 2 non-private and 4 distribution sampling locations.

  The dates sampled were October 4 and 5, 2017 and April 11 and 12, 2018.

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

- **The drinking water system owner submitted written notices to the Director that identified the laboratories that were conducting tests for parameters required by legislation, Order, Drinking Water Works Permit or Municipal Drinking Water Licence.**

- **The owner indicated that the required records are kept and will be kept for the required time period.**

Water Quality Assessment

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

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.**

  On November 29, 2017, a failure of the orthophosphate (corrosion inhibitor) pump occured. Orthophosphate was not added for approximately one hour.

  It was determined that the cause of the pump failure was due to a computer programming upgrade, whereby all set points were reset to "0".

  During plant rounds it was discovered that the orthophosphate pump was not running. The PLC setpoints were reset and the pump started functioning as normal. Orthophosphate was not added for a total of 57 minutes.

- **Corrective actions as directed by the Medical Officer of Health had been taken by the owner and operating authority to address exceedances of the lead standard.**

  The Thunder Bay District Health Unit does not require resampling following adverse results of elevated lead in either the standing or flushed plumbing samples. The Township of Terrace Bay provides information to residents at

Reporting & Corrective Actions

the locations of elevated lead results.

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

  All verbal notifications were provided as required.

- **All required written notices of adverse water quality incidents were provided as per O. Reg. 170/03 16-7.**

  All written notifications were provided as required.

- **In instances where written notice of issue resolution was required by regulation, the notice was provided as per O. Reg. 170/03 16-9.**

  All resolution notices were provided as required.

- **All reporting requirements for lead sampling were complied with as per schedule 15.1-9 of O. Reg. 170/03.**

  Letters with the required information and sample results are provided by the Township of Terrace Bay to the occupants of the premises where lead sampling has taken place.

- **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.**

  For the primary sodium hypochlorite system, if the duty chemical feed pump fails, the standby chemical feed pump is automatically initiated. An alarm is activated at the plant but not remotely to call-in an operator. If both the duty and standby chemical feed pumps fail, the water treatment plant stops producing water, initiates an alarm and continues to supply the distribution system from the treated water in the clearwell.

  During times when an operator is scheduled to work and an alarm requires an operator to be notified, the first call is to the water treatment plant, the next call is to the operator's cell phone and the third call is to the home of the operator.

  The calling sequence for alarms outside of work hours is first to the home of the operator on call, next to the operators cell phone, and then to the water treatment plant.

- **The Annual Report containing the required information was prepared by February 28th of the following year.**

  The annual report is prepared for the Township by the operating authority. The 2017 report was submitted to council of February 7, 2018.

- **Summary Reports for municipal council were completed on time, included the required content, and were distributed in accordance with the regulatory requirements.**

  The summary report is prepared for the Township by the operating authority. The 2017 report was submitted to council on March 2, 2018.

Other Inspection Findings

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

  FILTER SHEEN
  Since the last inspection, the walls on filters no. 2, 3 and 4 have been cleaned. The sheen is not as obvious, but still present. The owner/operator are advised to continue to monitor the condition of the sheen on each filter.

Other Inspection Findings

FILTER NO. 1
The sand is to be replenished in filter no. 1. The operating authority was awaiting one more load of sand before starting the work. At the time of writing this report, the operator advised that the sand was replenished the week of June 18, 2018.

MUNICIPAL DRINKING WATER LICENCE (MDWL) AND DRINKING WATER WORKS PERMIT (DWWP) ADMINISTRATIVE AMENDMENT
An administrative amendment to both the MDWL and DWWP is underway to:
- capture previously omitted definitions,
- mirror the CCP lead sampling regime,
- change the UV flow rate of 45 L/s to the manufacturer's rated flow rate of 52.54 L/s, and
- modify the infiltration pond description to remove mention of the emergency pressure filtration system.

GROUNDWATER WELL PUMP NO. 2
This pump has been off-line for over one year. The operator indicated that water pumped by the well comes out "dirty". The operator advised that the pump was taken off-line and will remain so, until a thorough inspection of the well and pump can be undertaken to assess the cause of the dirty water issue. The Township will be budgeting for this work in the future.

WET WELL
The wet well was inspected and cleaned out in September 2017.

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.

1. **The owner was not in compliance with all conditions of the PTTW.**

   The Permit allows the taking of water from the four groundwater wells as an alternate source for a period of 10 days per year. A review of records indicates that for calendar year 2017, groundwater wells 1, 3 and 4 were each used in excess of the permitted 10 days.

   Action(s) Required:

   The owner must ensure that the groundwater wells are operated in accordance with the Permit to Take Water when being used as an alternative source (maximum of 10 days per calendar year). If it is anticipated that the wells will be used as an alternate source more frequently than what is currently permitted, then an application to seek approval to amend the PTTW must be submitted.

   By no later than August 12, 2018, the undersigned inspector must be advised whether application to amend the PTTW will be made.

2. **All water quality monitoring requirements imposed by the Municipal Drinking Water Licence and/or Drinking Water Works Permit were not being met.**

   Sampling to monitor the effectiveness of the corrosion control plan is listed in Schedule C of MDWL.

   The current MDWL sampling regime mirrors the recommended sampling regime specified in the corrosion control plan with one exception, that being, the frequency for lead analysis from the point of entry location. The CCP recommends this analysis to be conducted semi-annually; the MDWL requires this analysis to be conducted quarterly.

   Currently all monitoring is conducted following the CCP recommendation. The point of entry lead analysis was conducted semi-annually, as opposed to the MDWL requirement of quarterly.

   Action(s) Required:

   No action required. The MDWL is the process of undergoing an administrative amendment. This amendment will mirror the CCP monitoring plan.

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. **Trends in source water quality were not being monitored.**

   Recommendation:

   This is a best management practice recommendation. Raw water source is Lake Superior. There are no significant fluctuations with raw water quality other than turbidity. Raw water turbidity is monitored at the pumphouse.

2. **There is no backflow prevention program, policy and/or bylaw in place.**

   Recommendation:

   Consideration should be given to the development of a cross-connection/backflow prevention policy and/or bylaw. Refer to the following documents for guidance:
   - MOECC document "A Guide for Drinking Water System Owners Seeking To Undertake a Backflow Prevention Program",
   - the OWWA for additional guidance,
   - the CAN/CSA standards associated with backflow (B64.10.01 / B64.10.1-01 Manual for the Selection and Installation of Backflow Prevention Devices / Manual for the Maintenance and Field Testing of Backflow Prevention Devices), and
   - the InfraGuide Methodology for Setting a Cross-Connection Control Program available at www.fcm.ca.

3. **The owner had not implemented a program for the flushing of watermains as per industry standards.**

   Recommendation:

   This is a best management practice recommendation. Some flushing is involved with hydrant operation and inspection.

4. **A program for inspecting and exercising valves did not exist.**
   Valves are being used as little as possible due to problems with the age of the valves and the packing. Valves have been unreliable and have resulted in larger areas having to be isolated to complete repairs of the distribution system. Approximately three to four valves are replaced each year, or if a rehabilitation project is undertaken, valves are replaced in conjunction with the project. For example, four valves will be replaced with the Kenogami Road watermain replacement project scheduled to commence in June 2018.

   Recommendation:

   This is a best management practice recommendation. The Township should continue to work towards identifying and replacing defective valves.

SIGNATURES

Inspected By:

Maria Lesschaeve

Signature: (Provincial Officer)

Reviewed & Approved By:

Dave Manol

Signature: (Supervisor)

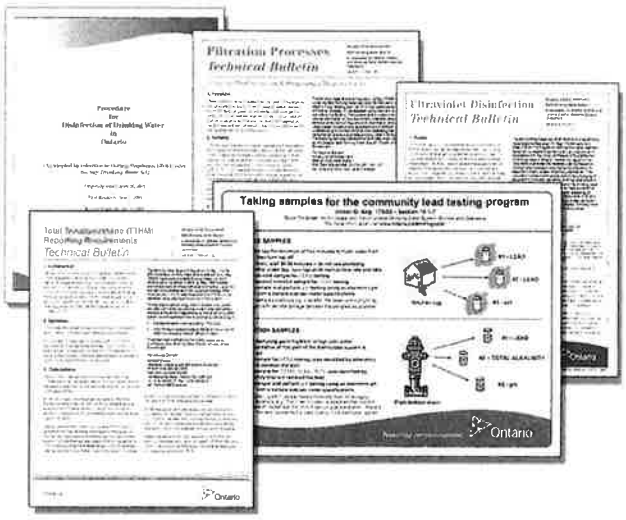
Review & Approval Date: 17/07/2018

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.

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

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



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

For more information on Ontario's drinking water visit **www.ontario.ca/drinkingwater** and email **drinking.water@ontario.ca** to subscribe to drinking water news.

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

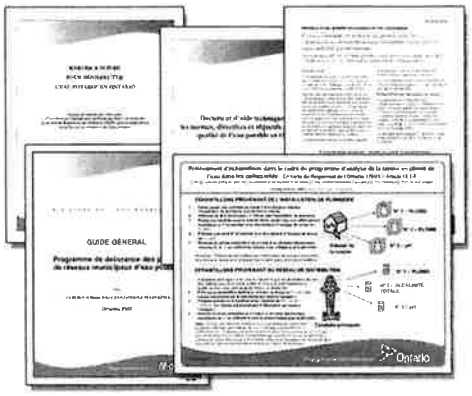
PIBS 8990b01

Ontario

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

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

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



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

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

PIBS 8990b01

Ontario

Inspection Rating Record

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2018-2019)

DWS Name:	TERRACE BAY DRINKING WATER SYSTEM
DWS Number:	250001769
DWS Owner:	Terrace Bay, The Corporation Of The Township Of
Municipal Location:	Terrace Bay
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Detailed
Inspection Date:	May 29, 2018
Ministry Office:	Thunder Bay District

Maximum Question Rating: 685

Inspection Module	Non-Compliance Rating
Permit To Take Water	12 / 12
Capacity Assessment	0 / 42
Treatment Processes	0 / 68
Process Wastewater	0 / 10
Distribution System	0 / 25
Operations Manuals	0 / 42
Logbooks	0 / 30
Certification and Training	0 / 57
Water Quality Monitoring	12 / 152
Reporting & Corrective Actions	0 / 106
Treatment Process Monitoring	0 / 141
TOTAL	**24 / 685**

Inspection Risk Rating	**3.50%**

FINAL INSPECTION RATING:	**96.50%**

Inspection Rating Record Generated On 16-JUL-18 (Inspection ID: 1-I4X13).

Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2018-2019)

DWS Name:	TERRACE BAY DRINKING WATER SYSTEM
DWS Number:	250001769
DWS Owner:	Terrace Bay, The Corporation Of The Township Of
Municipal Location:	Terrace Bay
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Detailed
Inspection Date:	May 29, 2018
Ministry Office:	Thunder Bay District

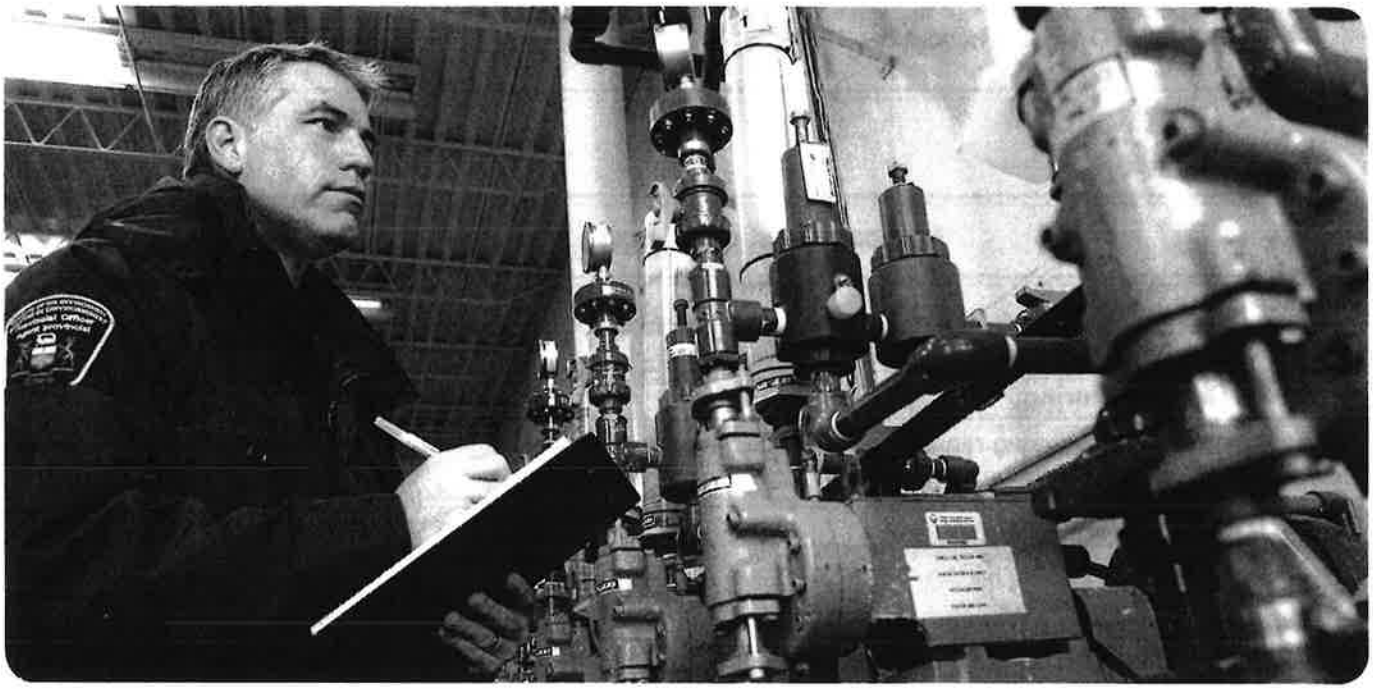
Non-compliant Question(s)	Question Rating
Permit To Take Water	
Is the owner in compliance with all conditions of the PTTW?	12
Water Quality Monitoring	
Are all water quality monitoring requirements imposed by the Municipal Drinking Water Licence and Drinking Water Works Permit being met?	12
TOTAL QUESTION RATING	24

Maximum Question Rating: 685

Inspection Risk Rating	**3.50%**
FINAL INSPECTION RATING:	**96.50%**

Inspection Rating Record Generated On 16-JUL-18 (Inspection ID: 1-I4X13).

APPLICATION OF THE RISK METHODOLOGY USED FOR MEASURING MUNICIPAL RESIDENTIAL DRINKING WATER SYSTEM INSPECTION RESULTS



The Ministry of the Environment (MOE) has a rigorous and comprehensive inspection program for municipal residential drinking water systems (MRDWS). Its objective is to determine the compliance of MRDWS with requirements under the Safe Drinking Water Act and associated regulations. It is the responsibility of the municipal residential drinking water system owner to ensure their drinking water systems are in compliance with all applicable legal requirements.

This document describes the risk rating methodology, which has been applied to the findings of the Ministry's MRDWS inspection results since fiscal year 2008-09. The primary goals of this assessment are to encourage ongoing improvement of these systems and to establish a way to measure this progress.

MOE reviews the risk rating methodology every three years.

The Ministry's Municipal Residential Drinking Water Inspection Protocol contains 15 inspection modules consisting of approximately 100 regulatory questions. Those protocol questions are also linked to definitive guidance that ministry inspectors use when conducting MRDWS inspections.

PIBS 6707e

Ontario

The questions address a wide range of regulatory issues, from administrative procedures to drinking water quality monitoring. The inspection protocol also contains a number of non-regulatory questions.

A team of drinking water specialists in the ministry assessed each of the inspection protocol regulatory questions to determine the risk (not complying with the regulation) to the delivery of safe drinking water. This assessment was based on established provincial risk assessment principles, with each question receiving a risk rating referred to as the Question Risk Rating. Based on the number of areas where a system is deemed to be non-compliant during the inspection, and the significance of these areas to administrative, environmental, and health consequences, a risk-based inspection rating is calculated by the ministry for each drinking water system.

It is important to be aware that an inspection rating less than 100 per cent does not mean the drinking water from the system is unsafe. It shows areas where a system's operation can improve. The ministry works with owners and operators of systems to make sure they know what they need to do to achieve full compliance.

The inspection rating reflects the inspection results of the specific drinking water system for the reporting year. Since the methodology is applied consistently over a period of years, it serves as a comparative measure both provincially and in relation to the individual system. Both the drinking water system and the public are able to track the performance over time, which encourages continuous improvement and allows systems to identify specific areas requiring attention.

The ministry's annual inspection program is an important aspect of our drinking water safety net. The ministry and its partners share a common commitment to excellence and we continue to work toward the goal of 100 per cent regulatory compliance.

Determining Potential to Compromise the Delivery of Safe Water

The risk management approach used for MRDWS is aligned with the Government of Ontario's Risk Management Framework. Risk management is a systematic approach to identifying potential hazards, understanding the likelihood and consequences of the hazards, and taking steps to reduce their risk if necessary and as appropriate.

The Risk Management Framework provides a formula to be used in the determination of risk:

RISK = LIKELIHOOD × CONSEQUENCE
(of the consequence)

Every regulatory question in the inspection protocol possesses a likelihood value (L) for an assigned consequence value (C) as described in **Table 1** and **Table 2**.

TABLE 1:

Likelihood of Consequence Occurring	Likelihood Value
0% - 0.99% (Possible but Highly Unlikely)	L = 0
1 – 10% (Unlikely)	L = 1
11 – 49% (Possible)	L = 2
50 – 89% (Likely)	L = 3
90 – 100% (Almost Certain)	L = 4

TABLE 2:

Consequence	Consequence Value
Medium Administrative Consequence	C = 1
Major Administrative Consequence	C = 2
Minor Environmental Consequence	C = 3
Minor Health Consequence	C = 4
Medium Environmental Consequence	C = 5
Major Environmental Consequence	C = 6
Medium Health Consequence	C = 7
Major Health Consequence	C = 8

The consequence values (0 through 8) are selected to align with other risk-based programs and projects currently under development or in use within the ministry as outlined in **Table 2**.

The Question Risk Rating for each regulatory inspection question is derived from an evaluation of every identified consequence and its corresponding likelihood of occurrence:

- All levels of consequence are evaluated for their potential to occur
- Greatest of all the combinations is selected.

The Question Risk Rating quantifies the risk of non-compliance of each question relative to the others. Questions with higher values are those with a potentially more significant impact on drinking water safety and a higher likelihood of occurrence. The highest possible value would be 32 (4×8) and the lowest would be 0 (0×1).

Table 3 presents a sample question showing the risk rating determination process.

TABLE 3:

Does the Operator in Charge ensure that the equipment and processes are monitored, inspected and evaluated?

Risk = Likelihood × Consequence

C=1	C=2	C=3	C=4	C=5	C=6	C=7	C=8
Medium Administrative Consequence	**Major** Administrative Consequence	**Minor** Environmental Consequence	**Minor** Health Consequence	**Medium** Environmental Consequence	**Major** Environmental Consequence	**Medium** Health Consequence	**Major** Health Consequence
L=4 (Almost Certain)	L=1 (Unlikely	L=2 (Possible)	L=3 (Likely)	L=3 (Likely)	L=1 (Unlikely	L=3 (Likely)	L=2 (Possible)
R=4	**R=2**	**R=6**	**R=12**	**R=15**	**R=6**	**R=21**	**R=16**

Application of the Methodology to Inspection Results

Based on the results of a MRDWS inspection, an overall inspection risk rating is calculated. During an inspection, inspectors answer the questions related to regulatory compliance and input their "yes", "no" or "not applicable" responses into the Ministry's Laboratory and Waterworks Inspection System (LWIS) database. A "no" response indicates non-compliance. The maximum number of regulatory questions asked by an inspector varies by: system (i.e., distribution, stand-alone); type of inspection (i.e., focused, detailed); and source type (i.e., groundwater, surface water).

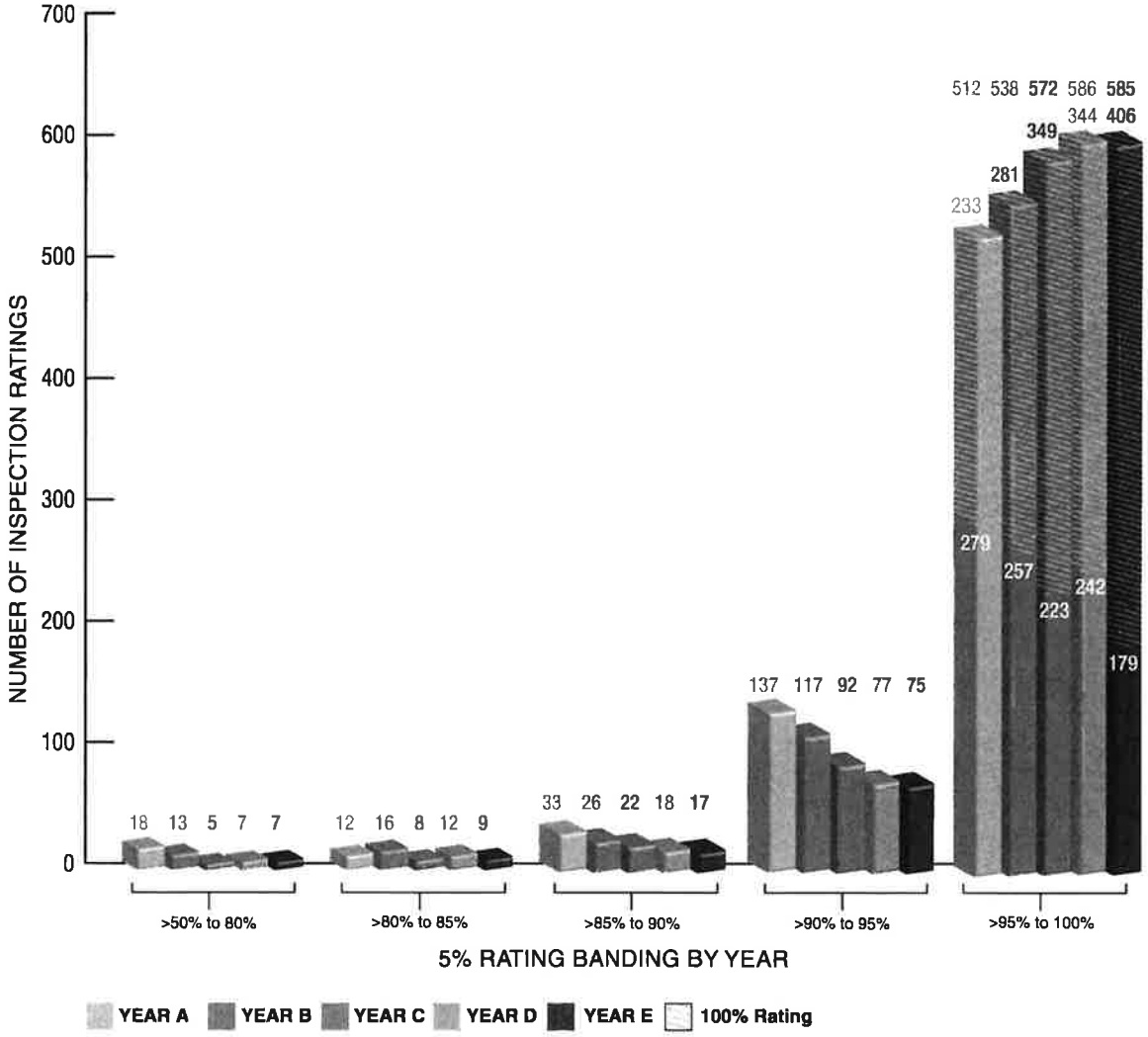
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

Application of the Methodology for Public Reporting

The individual MRDWS Total Inspection Ratings are published with the ministry's Chief Drinking Water Inspector's Annual Report.

Figure 1 presents the distribution of MRDWS ratings for a sample of annual inspections. Individual drinking water systems can compare against all the other inspected facilities over a period of inspection years.

Figure 1: Year Over Year Distribution of MRDWS Ratings



Reporting Results to MRDWS Owners/Operators

A summary of inspection findings for each system is generated in the form of an Inspection Rating Record (IRR). The findings are grouped into the 15 possible modules of the inspection protocol, which would provide the system owner/operator with information on the areas where they need to improve. The 15 modules are:

1. Source
2. Permit to Take Water
3. Capacity Assessment
4. Treatment Processes
5. Treatment Process Monitoring
6. Process Wastewater
7. Distribution System
8. Operations Manuals
9. Logbooks
10. Contingency and Emergency Planning
11. Consumer Relations
12. Certification and Training
13. Water Quality Monitoring
14. Reporting, Notification and Corrective Actions
15. Other Inspection Findings

For further information, please visit **www.ontario.ca/drinkingwater**