Ministry of the Environment, Conservation and Parks

Drinking Water and Environmental Compliance Division, Northern Region
Thunder Bay District Office
435 James Street South
Suite 331
Thunder Bay ON P7E 6S7
Tel.: 807-475-1205

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

Division de la conformité en matière d'eau potable et d'environnement, Région du Nord
Bureau du district de Thunder Bay
435, rue James Sud
Bureau 331
Thunder Bay ON P7E 6S7
Tél. : 807-475-1205

Ontario

December 17, 2024

Sent by email

Town of Marathon
4 Hemlo Drive, PO Box "TM"
Marathon, ON
P0T 2E0

Re: Marathon Drinking Water System, DWS No. 220000255
2024-25 Inspection Report, Report No. 1-325247624

Enclosed is the report on the 2024-25 inspection of the Marathon Drinking Water System and the corresponding Inspection Rating Report (IRR) and Risk Methodology document. This report provides an assessment of compliance and conformance based on observations and information available during the inspection review period only.

One (1) instance of non-compliance was identified during the inspection. Required corrective actions are summarized in the 'Non-Compliance' section of the report. Please note that corrective actions are linked to incidents of non-compliance with regulatory requirements contained within an Act, a Regulation, or site-specific approvals, orders or instructions. Such violations could result in the issuance of mandatory abatement instruments including orders, tickets, penalties, or referrals to the Ministry's Environmental Investigations and Enforcement Branch.

Several best management practices are also included in the 'Inspection Details' section of the report. Specifically, several recommendations are provided in the response for Question ID DWMR1117001. Items which appear as recommendations do not, in themselves, constitute violations.

The IRR included as an appendix is a summarized quantitative measure of the drinking water system's annual inspection and is published in the Ministry's Chief Drinking Water Inspector's Annual Report. The Risk Methodology document describes the risk rating methodology which has been applied to the findings of the Ministry's municipal residential drinking water system inspection results.

Finally, section 19 of the Safe Drinking Water Act (Standard of Care) creates a number of obligations for individuals who exercise decision-making authority over municipal drinking water systems. Please be aware that the ministry has encouraged such individuals, particularly municipal councillors, to take steps to be better informed about the drinking water systems over which they have decision-making authority. These steps could include asking for a copy of this inspection report and a review of its findings. Further information about Section 19 can be found in "Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils" on the Drinking Water Ontario website at https://www.ontario.ca/environment-and-energy/taking-care-your-drinking-water-guide-members-municipal-councils.

Should you have any questions regarding the content of the enclosed report, please do not hesitate to contact me.

Sincerely,

Nicholas Kyle
Water Compliance Officer
Drinking Water and Environmental Compliance Division
Ministry of the Environment, Conservation & Parks

ec: Town of Marathon – 4 Hemlo Drive, PO Box "TM", Marathon, ON P0T 2E0
Attn: Marc Paris, Works, Operations, Facilities and Parks Manager – worksmanager@marathon.ca
Attn: Mike Duhaime, Works, Operations, Facilities and Parks Supervisor – supervisor@marathon.ca

Northern Waterworks Inc. – 14 Hwy 105, PO Box 1160, Red Lake, ON P0V 2M0
Attn: Rodger Betts, Operations Manager – rodger.betts@nwi.ca
Attn: Jessica Happl, Manager, QMS & Compliance – jessica.happl@ssmpuc.com

Thunder Bay District Health Unit – 999 Balmoral St., Thunder Bay, ON P7B 6E7
Attn: Lee Sieswerda, Manager of Environmental Health – lee.sieswerda@tbdhu.com

Ministry of Natural Resources – 5 Wadsworth Drive, PO Box 970 Nipigon, ON P0T 2J0
Attn: Chris Magee, District Manager – chris.magee@ontario.ca

Ministry of the Environment, Conservation & Parks
Attn: Carolyn Lacroix, Water Compliance Supervisor – carolyn.lacroix@ontario.ca

Ontario

MARATHON DRINKING WATER SYSTEM
Physical Address: 41 HOWE ST, MARATHON, ON P0T 2E0

INSPECTION REPORT

System Number:	220000255
Entity:	THE CORPORATION OF THE TOWN OF MARATHON NORTHERN WATERWORKS INC.
Inspection Start Date:	October 25, 2024
Site Inspection Date:	November 04, 2024
Inspection End Date:	December 06, 2024
Inspected By:	Nicholas Kyle
Badge #:	2104

(signature)

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INTRODUCTION

Purpose

This announced, focused inspection was conducted to confirm compliance with Ministry of the Environment, Conservation and Parks' (MECP) legislation and conformance with ministry drinking water policies and guidelines.

Scope

The ministry utilizes a comprehensive, multi-barrier approach in the inspection of drinking water systems that focuses on the source, treatment and distribution components as well as the management and operation of the system.

The inspection of the drinking water system included both the physical inspection of component parts of the system and the review of data and documents associated with its operation. 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.

Facility Contacts and Dates

The Marathon Drinking Water System (DWS) is owned by the Corporation of the Town of Marathon. The treatment subsystem is operated by Northern Waterworks, Inc. (NWI) and the distribution subsystem is operated by the Town of Marathon. The system serves an estimated population of 3,300 and is categorized as a Large Municipal Residential DWS.

Information reviewed for this announced, focused inspection covered the time period of February 13, 2024, to November 4, 2024. The field portion of the inspection was conducted on November 4 & 5, 2024.

Systems/Components

All locations associated with primary disinfection were visited as part of this inspection. The following sites were visited as part of the inspection of the drinking water system:

- Wells 2, 3, 4, 5 & 6;
- Industrial Park booster station

- Penn Lake Heights reservoir and booster station

Permissions/Approvals

This drinking water system was subject to specific conditions contained within the following permissions and/or approvals at the time of the inspection, in addition to the requirements of the SDWA and its regulations:

- Municipal Drinking Water Licence No. 230-101 (Issue No. 3)
- Drinking Water Works Permit No. 230-201 (Issue No. 3)
- Permit to Take Water No. 3061-C5TQNS

NON-COMPLIANCE

The following item(s) have been identified as non-compliance, based on a "No" response captured for a legislative question(s). For additional information on each question see the Inspection Details section of the report.

Ministry Program: DRINKING WATER | **Regulated Activity:** DW Municipal Residential

Item	Question	Compliance Response/Corrective Action(s)
NC-1	**Question ID:** DWMR1025001 Were all parts of the drinking water system that came in contact with drinking water disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit?	All parts of the drinking water system were not disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit. CORRECTIVE ACTION(S): The owner and operating authority shall ensure that all parts of the drinking water system in contact with drinking water that are added, modified, replaced or extended are disinfected in accordance with the relevant procedure listed in Schedule B of the Drinking Water Works Permit. Adherence to a disinfection procedure is also required where an activity has occurred that could introduce contamination, including but not limited to repair, maintenance or physical/video inspection. No further actions are required at this time. Where a contractor is responsible for adhering to a disinfection protocol, it is recommended that the owner and operating authority review the protocol with the contractor before the work begins.

RECOMMENDATIONS

This should not be construed as a confirmation of full conformance with all potential applicable BMPs. These inspection findings are limited to the components and/or activities that were assessed, and the legislative framework(s) that were applied. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

If you have any questions related to this inspection, please contact the signed Provincial Officer.

INSPECTION DETAILS

This section includes all questions that were assessed during the inspection.

Ministry Program: DRINKING WATER | **Regulated Activity:** DW Municipal Residential

Question ID	DWMR1007001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 1-2 | (1)1;

Question:
Was the owner maintaining the production well(s) in a manner sufficient to prevent entry into the well of surface water and other foreign materials?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner was maintaining the production well(s) in a manner sufficient to prevent entry into the well of surface water and other foreign materials.

OBSERVATIONS:

The drinking water for the system is sourced from five drilled wells, identified as Wells 2, 3, 4, 5, and 6. Details for each well are as follows:

- Well 2: Installed in 1954, this well has a 550 mm diameter outer steel casing set to a depth of 16.5 m, with a 300 mm diameter inner casing extending to 18.65 m. A 300 mm diameter stainless steel screen is installed from 18.65 m to approximately 23 m.

- Well 3: Installed in 1963, this well has a 550 mm diameter outer steel casing set to a depth of 13.4 m, with a 300 mm diameter inner casing extending to 22.8 m. A 300 mm diameter stainless steel screen is installed from 22.8 m to approximately 29 m.

- Well 4: Installed in 1984, this well has a 600 mm diameter outer steel casing set to a depth of 14.6 m, with a 300 mm diameter inner casing extending to 18.2 m. A 300 mm diameter stainless steel screen is installed from 18.2 m to approximately 24 m.

- Well 5: Also installed in 1984, this well has a 600 mm diameter outer steel casing set to a depth of 15.3 m, with a 300 mm diameter inner casing extending to 18.1 m. A 300 mm diameter stainless steel screen is installed from 18.1 m to approximately 25 m.

- Well 6: Installed in 1990, the well has a 600 mm diameter outer steel casing set to a depth of 22.2 m, with a 300 mm diameter inner casing extending to 24.6 m. A 300 mm diameter stainless steel screen is installed from 24.6 m to approximately 29 m.

All wells are housed in secure buildings. A physical inspection of the above-ground components confirmed that the wells are being properly maintained to prevent the entry of surface water and foreign materials.

Question ID	DWMR1009001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were measures in place to protect the groundwater and/or GUDI source in accordance with the Municipal Drinking Water Licence and Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Measures were in place to protect the groundwater and/or GUDI source.

OBSERVATIONS:

The Municipal Drinking Water Licence requires an inspection schedule for all production wells, as well as procedures for inspecting and maintaining the entire structure of each well. Additionally, remedial action plans must be in place for situations where inspections reveal non-compliance with regulatory requirements or pose a risk to water quality. The system owner is required to implement appropriate risk management measures to address potential threats to drinking water resulting from the operation of the system.

Certified operators conducted daily checks of the production wells throughout the inspection period.

Below-ground components are inspected approximately every 10 years by a licensed well contractor. Well 2 was last inspected in 2013. The inspection indicated satisfactory performance at that time, but recommended rehabilitation to address screen and casing fouling during the next 10-year inspection. Well 2 is scheduled for inspection and rehabilitation in 2025, with additional planning required due to the location of the well building and nearby utilities. Wells 3 & 5 were inspected and rehabilitated in 2021, Well 4 was inspected and rehabilitated in 2024, and Well 6 underwent inspection and rehabilitation in 2022. Rehabilitation efforts for all wells included the removal of screen and casing fouling and cleaning of pumping equipment. Post-rehabilitation testing confirmed that all wells were performing adequately.

Contingency plans are in place to manage potential threats to the groundwater source, such as spills and contamination events. The "Source Water Contamination" contingency plan outlines actions for handling spills, including isolating affected wells, notifying appropriate parties, conducting special monitoring, and initiating containment and cleanup protocols. The risk to water quality is mitigated by the presence of multiple production wells, allowing one or more wells to be isolated in an emergency while still meeting system demand.

Question ID	DWMR1014001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Was flow monitoring performed as required by the Municipal Drinking Water Licence or Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Flow monitoring was performed as required.

OBSERVATIONS:

The MDWL requires continuous measurement and recording of the flow rate and daily volume of treated water flowing from the treatment subsystem to the distribution system, as well as the raw water flow into the treatment subsystem. Since there is no process wastewater stream at any of the wells, the treated water flow rate and daily volume closely reflect the raw water flow rate and daily volume. A negligible volume of water (i.e., <1 m^3) is directed to the soak away pit upon each well pump start up.

At each well, a regulatory electromagnetic flow meter is installed on the discharge piping to measure treated water flow. Additionally, two process flow meters are located at the distribution pumping stations. The continuity of treated water flow monitoring during the inspection period was verified by reviewing trends from the SCADA system and videographic chart recorders.

Question ID	DWMR1016001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Was the owner in compliance with the conditions associated with maximum flow rate or the rated/operational capacity in the Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner was in compliance with the conditions associated with maximum flow rate and/or the rated/operational capacity conditions.

OBSERVATIONS:

The rated capacities for the wells are provided in Schedule C, Condition 1.1 of the Municipal Drinking Water Licence. The rated capacity represents the maximum daily volume of water that can be transferred from the treatment subsystem to the distribution subsystem. Currently, there are no regulated maximum flow rates (in L/s) or operational capacities (in m^3/day) specified for any of the wells.

During the inspection period, the highest daily volumes of treated water transferred to the distribution subsystem were as follows:

- Well 2: 12 m^3 on May 7, 2024, which is approximately 0.6% of its rated capacity (1,961.28 m^3/day).

- Well 3: 1,513 m³ on February 19, 2024, which is approximately 91% of its rated capacity (1,662.36 m³/day).

- Well 4: 1,890 m³ on October 17, 2024, which is approximately 83% of its rated capacity (2,289.6 m³/day).

- Well 5: 1,617 m³ on June 4, 2024, which is approximately 71% of its rated capacity (2,289.6 m³/day).

- Well 6: 310 m³ on March 6, 2024, which is approximately 11% of its rated capacity (2,764.8 m³/day). This result for Well 6 is due to erroneous flow monitoring data collected while the well was offline.

Note that flow totals are not calculated based on a calendar day but over an approximate 24-hour period. Specifically, operators take flow totalizer readings each morning, at roughly the same time, from each well.

Question ID	DWMR1018001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the owner ensure that equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner ensured that equipment was installed as required.

OBSERVATIONS:

No significant changes were made to the water treatment subsystem during the inspection period. Modifications to the system description that were previously reported to the ministry through the Director Notification process (e.g., the removal of chlorine analyzers at the booster stations) will be included in the DWWP during the next scheduled renewal of the Licence and DWWP in 2025/2026. The owner and operating authority should ensure that draft approvals are thoroughly reviewed during the renewal process.

Question ID	DWMR1021001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were Form 2 documents prepared as required?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Form 2 documents were prepared as required.

OBSERVATIONS:

During the inspection period, one (1) Form 2 document was prepared for the installation of the water level indicators at Wells 2, 3, 4 & 5. The configuration of Well 6 prevented the installation of the water level indicator at that location, but the manual method of monitoring the water level remains. These instruments are being integrated with the new SCADA system, allowing continuous monitoring and recording of water levels at the four wells.

Although outside of the inspection period, a preliminary Form 2 document was also prepared for the upcoming automation upgrades. These upgrades include replacing the programmable logic controllers at all outstations and implementing a new SCADA system. Cellular modems are being installed at all outstations to communicate data and alarms to the SCADA system at the wastewater treatment plant via the cellular network. This will replace the current radio communications system, which has caused operational disruptions. For more information, refer to Question ID DWMR1117001.

Question ID	DWMR1025001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were all parts of the drinking water system that came in contact with drinking water disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
All parts of the drinking water system were not disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit.

CORRECTIVE ACTION(S):

The owner and operating authority shall ensure that all parts of the drinking water system in contact with drinking water that are added, modified, replaced or extended are disinfected in accordance with the relevant procedure listed in Schedule B of the Drinking Water Works Permit. Adherence to a disinfection procedure is also required where an activity has occurred that could introduce contamination, including but not limited to repair, maintenance or physical/video inspection.

No further actions are required at this time. Where a contractor is responsible for adhering to a disinfection protocol, it is recommended that the owner and operating authority review the protocol with the contractor before the work begins.

OBSERVATIONS:

During the inspection period, work that required adherence to a disinfection protocol included the inspection and rehabilitation of Well 4, which took place from May 24 to May 30, 2024.

The well was required to be disinfected following inspection and rehabilitation in accordance with AWWA C654 (Standard for Disinfection of Wells). However, upon reviewing the logbook and disinfection records prepared by the licensed well contractor, it was determined that disinfection was not performed in compliance with AWWA C654 requirements. Key issues identified include the following:

- Sterilene, which is a sodium-based, granular form of chlorine, is not one of the approved forms of chlorine for disinfection. AWWA C654 requires the use of liquid chlorine, sodium hypochlorite (liquid form), or calcium hypochlorite.
- There was no record that the well was surged three times after chlorine was added on May 29, 2024.
- Chlorine concentrations were measured using test strips. While AWWA C654 does not specify a measurement method for high-range chlorine, O. Reg. 170/03 requires the use of electronic direct-readout colorimetric or amperometric chlorine analyzers for required chlorine tests.
- AWWA C654 requires a minimum of two water samples to be collected, at least 30 minutes apart, after disinfection while the well is being continuously pumped. Only one sample was collected and tested for bacteriological analysis on May 30, 2024.

Despite these discrepancies, it is important to note that initial and final chlorine concentrations were within acceptable limits, and the raw water sample tested negative for total coliforms and E. coli.

Regarding the distribution subsystem, no activities involving watermain extensions, replacements, relining, or temporary watermains took place during the inspection period. There were also no emergency watermain repairs. A disinfection protocol was followed for the repair of a 3/4-inch copper service connection on October 24, 2024. For this repair, which involved a pipe less than 100 mm in diameter, sanitary conditions were maintained and flushing was conducted before the pipe was returned to service. All required information was properly documented on the "Watermain Maintenance & Repair Form."

Question ID	DWMR1023001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 1-2 | (2);

Question:
Did records indicate that the treatment equipment was operated in a manner that achieved the design capabilities prescribed by O. Reg. 170/03, Drinking Water Works Permit and/or Municipal Drinking Water Licence at all times that water was being supplied to consumers?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records indicated that the treatment equipment was operated in a manner that achieved the design capabilities prescribed.

OBSERVATIONS:

For a secure groundwater source and in accordance with Schedule E of the Municipal Drinking Water Licence, primary disinfection must be capable of achieving 99% removal or inactivation of viruses. Both primary and secondary disinfection at the system is achieved using sodium hypochlorite. The following criteria must be met at each well to achieve effective pathogen inactivation:

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.

Concerning item 1, refer to Question ID DWMR1030001 and Question ID DWMR1038001. Note that monitoring for the free chlorine residual at each well is not conducted in real-time. The chlorine measurement delay must be considered when responding to a low chlorine event, including factoring the delay into CT calculations and determinations about whether improperly disinfected water has been directed to users. Refer to Question ID DWMR1117001 for more information.

Concerning item 2, a review of continuous treated water chlorine data, the water treatment subsystem worksheet, and the water treatment subsystem logbooks confirmed that, throughout the inspection period, the CT provided was greater than or equal to the CT required to achieve the assigned pathogen inactivation when water was being directed to users.

Notably, the water treatment subsystem worksheet includes fields for recording the daily minimum chlorine residual at each well. Operators have been recording the daily minimum value regardless of whether the well was in production. It is recommended that operators continue to record the daily minimum value, but only for periods when the well is in production. Capturing this information would provide a more accurate assessment of whether primary disinfection was achieved at all times. Additionally, the information recorded in these fields should be consistent with logbook entries, especially during low chlorine events (i.e., the daily minimum chlorine residual recorded in this field will be the same as the chlorine residual that is used for an event-driven CT calculation, and recorded in the logbook, when there is a low chlorine lockout). The implementation of this best management practice will be assessed at the next annual inspection.

Question ID	DWMR1024001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 1-2 | (2);

Question:
Did records confirm that the water treatment equipment which provides chlorination or chloramination for secondary disinfection was operated as required?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection was operated as required.

OBSERVATIONS:

The lowest recorded free chlorine residual taken in the distribution system during the inspection period was 0.77 mg/L, collected at the wastewater treatment facility on July 8, 2024.

Question ID	DWMR1033001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 7-2 | (3); SDWA | O. Reg. 170/03 | 7-2 | (4);

Question:
Was secondary disinfectant residual tested as required for the large municipal residential distribution system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Secondary disinfectant residual was tested as required.

OBSERVATIONS:

For a large municipal residential system, and if continuous monitoring equipment is not used, sampling must be conducted daily or on two different days of the week (in accordance with several other requirements). All distribution residual measurement locations and sampling dates/times must be documented.

To comply with secondary disinfectant residual testing requirements, the operating authority has chosen to collect samples daily, ensuring at least one distribution sample is taken each day. During the inspection period, operators consistently tested the free chlorine residual at three distribution points daily: the wastewater treatment plant, the Industrial Park Booster Station, and the Penn Lake Heights Reservoir and Booster Station. These sampling locations are positioned at the distal ends of the water distribution system. All required information was recorded in the "2024 Marathon Well Supply System" worksheet (i.e., the treatment subsystem worksheet).

Question ID	DWMR1030001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 7-2 | (1); SDWA | O. Reg. 170/03 | 7-2 | (2);

Question:
Was primary disinfection chlorine monitoring being conducted at a location approved by Municipal Drinking Water Licence and/or Drinking Water Works Permit or at/near a location where the intended CT had just been achieved?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Primary disinfection chlorine monitoring was conducted as required.

OBSERVATIONS:

Groundwater pumped from each well is injected with sodium hypochlorite before being directed to a chlorine contact loop. At each well, the loop has been designed to provide a minimum of 15 minutes of chlorine contact at peak flow rates. Primary disinfection is achieved at the end of each chlorine contact loop, from where water enters the distribution system. According to the "Disinfection Summary" document, actual hydraulic detention times at peak flow rates range from a minimum of 12.7 minutes at Well 6 to a maximum of 15.8 minutes at Wells 4 and 5.

At each well, primary disinfection is continuously monitored at the end of a sample line that extends from the end of the contact loop back to the well building. Due to the length of the sample lines, there is a slight delay between the actual and measured chlorine concentrations (i.e., chlorine is not monitored in real-time). Specifically, the chlorine concentration at the end of the contact loop is only measured by the analyzer after the water has passed through the sample line. These delays typically range from 30 seconds to 2 minutes and are determined by the sample line's dimensions and the flow rate through it. The flow rate through the sample line is routinely monitored by operators at Wells 3, 4 and 5, as the measurement delay may have implications for adverse incident reporting. Additionally, conservative low-chlorine alarm set points are in place at all wells to mitigate any potential risks associated with the delay. Refer to Question ID DWMR1117001 for more information about the chlorine monitoring delay.

During the field inspection, it was confirmed that there had been no changes to the contact loops, sample lines and chlorine measurement.

Question ID	DWMR1035001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)1-4;

Question:
Were operators examining continuous monitoring test results and did they examine the results within 72 hours of the test?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Operators were examining continuous monitoring test results as required.

OBSERVATIONS:

Certified operators reviewed test results from continuous monitoring equipment on a daily basis throughout the inspection period. Using the SCADA trending application, operators examined the data and documented their findings in the treatment subsystem worksheet as well as in the logbook. The reviewed parameters included free chlorine residuals related to

primary disinfection and flow rates.

As part of their daily data review, operators typically record the minimum chlorine levels and maximum flow rates in the corresponding fields of the treatment subsystem worksheet. This worksheet also includes fields for noting any unusual or abnormal conditions observed during the review. Due to the ongoing SCADA system communication issues, the minimum chlorine levels were not obtained and recorded for Wells 2 and 6 during their weekly run up. Due to scaling problems, minimum chlorine levels also could not be accurately obtained from the videographic chart recorders. Several best management practices pertaining to these observations are provided in Question ID DWMR1117001.

Question ID	DWMR1038001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)1-4;

Question:
Was continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements performing tests for the parameters with at least the minimum frequency and recording data with the prescribed format?

Compliance Response(s)/Corrective Action(s)/Observation(s):
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 and recording data with the prescribed format.

OBSERVATIONS:

Continuous monitoring equipment is required to test and record, at a minimum, the free chlorine residuals associated with primary disinfection every 5 minutes. The chlorine residual must be monitored and recorded whenever water is being directed to users. At each well, the free chlorine residual required for primary disinfection is monitored and recorded every second, with results logged in the SCADA system's trending application.

During the field inspection, the continuity of chlorine data for Wells 3, 4, and 5 was reviewed. Additionally, data continuity for Well 6 was examined for the period from February 13, 2024, to June 24, 2024. Due to ongoing radio communication issues, continuous monitoring data for Well 2 and Well 6 (from June 25, 2024, to the end of the inspection period) were not recorded in the SCADA system. For more information, refer to Question ID DWMR1117001.

When data are not recorded in the SCADA system, continuous monitoring results are captured on a videographic chart recorder at each well. For Wells 2 and 6, data files were eventually exported from the chart recorders, but the necessary software to view these files was unavailable during and immediately after the field inspection. It is strongly recommended that the owner and operating authority ensure that historical data stored on the videographic chart recorders can be exported and viewed. The ability to export and view chart recorder data will be evaluated at the next inspection. Concerning videographic chart recorder scaling

issues and their impact on real-time trends, refer to Question ID DWMR111700.

Question ID	DWMR1037001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)5-10; SDWA | O. Reg. 170/03 | 6-5 | (1.1);

Question:
Were 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, equipped with alarms or shut-off mechanisms that satisfied the standards described in Schedule 6?

Compliance Response(s)/Corrective Action(s)/Observation(s):
All required continuous monitoring equipment utilized for sampling and testing were equipped with alarms or shut-off mechanisms that satisfied the standards

OBSERVATIONS:

Alarm configurations, shut-off mechanisms and methods of alarm transmission were verified during the field inspection.

Regarding primary disinfection chlorine monitoring, all wells are equipped with both shut-off mechanisms and alarms. If the chlorine concentration falls below a set threshold, the well pump automatically shuts off, stopping water production. Additionally, a backflush is activated, causing water to flow from the distribution system back through the contact loop and into a soak-away pit. This backflush process can only be manually stopped by operators and typically lasts between 6 to 24 hours, depending on the well. Alongside the shut-off mechanism, a remote alarm is immediately transmitted.

At the time of the field inspection, the low chlorine alarm and automatic shut-off setpoint was 0.7 mg/L at all wells (i.e., chlorine concentrations below this value result in the transmission of an alarm and automatic shutdown). This value is greater than the minimum alarm standards for the wells, which range from 0.28 mg/L to 0.37 mg/L under worst-case operating conditions. In accordance with Schedule 6 subsection 6-5.(2), the regulatory alarm standard must be 0.1 mg/L less than the concentration of free chlorine that is required to achieve primary disinfection. Importantly, the next renewal of the Municipal Drinking Water Licence may require that the regulatory alarm standard be 0.1 mg/L greater than the concentration of free chlorine that is required to achieve primary disinfection. In either case, the current regulatory alarm set point of 0.7 mg/L would be sufficient for worst-case operating conditions.

A review of the treatment subsystem worksheet, continuous monitoring data and the treatment subsystem logbook confirmed that all low chlorine events (i.e., a treated water free chlorine residual less than 0.7 mg/L while a well was in production) during the inspection period resulted in the automatic shutdown and/or the transmission of an alarm. Due to ongoing communication problems, there were also multiple times where water production at a well was completed only while a certified operator was onsite. Notably, while a

communication failure with the SCADA system at the wastewater treatment plant would impact alarm transmission, it does not impact the automatic shut-off feature.

The alarms and shut-off mechanisms were not tested during the inspection due to the practice of allowing an extended backflush following a low chlorine event. Testing of the low chlorine setpoint may be conducted during the next inspection. Notably, the new SCADA system will have a feature that allows operators to simulate alarm conditions, as well as a feature to remotely stop the backflush process.

Where CT has not been achieved and the automatic shut-off feature fails to engage, a low chlorine event is a reportable adverse water quality incident. Where CT has not been achieved but the automatic shut-off feature has engaged and a backflush initiated, a low chlorine event is reportable if improperly disinfected water may have been directed to users. These and other scenarios are described in the "Low or Adverse Chlorine Residual" contingency plan.

Question ID	DWMR1040001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)1-4; SDWA | O. Reg. 170/03 | 6-5 | (1)5-10;

Question:
Were all continuous analysers calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation?

Compliance Response(s)/Corrective Action(s)/Observation(s):
All continuous analysers were calibrated, maintained, and operated as required.

OBSERVATIONS:

Regulatory water quality continuous analysers include the free chlorine residual analyzers installed at each well. Certified operators verified the accuracy of the chlorine analyzers daily by conducting a comparative test using a handheld colorimeter. Both the analyzer readings and the comparative test results are documented in the water treatment subsystem worksheet. If the results fall outside the regulatory margin of error, a reactive calibration is performed. A review of the data confirmed that the chlorine analyzers were consistently maintained within the required margin of error.

Throughout the inspection period, all chlorine analyzers were calibrated monthly, regardless of whether the results fell outside the regulatory margin of error. All reactive and scheduled calibrations are documented on the "Instrument Calibration & Maintenance Records" worksheet, which also includes fields for logging other maintenance activities.

During the field inspection, a water sample was collected from each well and distribution outstation and tested for free chlorine using both a ministry unit and the on-site colorimeter. All results obtained were comparable between the colorimeters and analyzer, where applicable.

Question ID	DWMR1108001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)5-10; SDWA | O. Reg. 170/03 | 6-5 | (1.1);

Question:
Where continuous monitoring equipment used for the monitoring of free chlorine residual, total chlorine residual, combined chlorine residual or turbidity, required by O. Reg. 170/03, Municipal Drinking Water Licence, Drinking Water Works Permit, or order triggered an alarm or an automatic shut-off, did a qualified person respond as required and take appropriate actions?

Compliance Response(s)/Corrective Action(s)/Observation(s):
A qualified person responded as required and took appropriate actions.

OBSERVATIONS:

During the inspection period, there were approximately 20 instances where a low chlorine residual triggered an alarm and automatic shut-off, with the majority occurring at Wells 3 and 4. On each occasion, a certified operator responded promptly and took appropriate actions.

Logbook entries for these low chlorine events consistently included details such as the time the alarm was received, when the operator arrived on site and/or took action, the cause of the event, confirmation of the well shutdown, initiation of backflushing, and any corrective measures taken. Additionally, the logbook entries consistently included event-driven CT calculations to verify whether primary disinfection was achieved. However, due to the delay in measuring chlorine concentration at the end of the contact loop, the accuracy of these CT calculations could be improved. For further details, refer to Question ID DWMR1117001. Operators should continue making the logbook entries as they have been for low chlorine events.

Question ID	DWMR1099001	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Do records show that water provided by the drinking water system met the Ontario Drinking Water Quality Standards?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records showed that all water sample results met the Ontario Drinking Water Quality Standards.

OBSERVATIONS:

Quarterly sampling and testing for hydrocarbons in raw water from Well 3 continued to be

conducted throughout the inspection period following a diesel fuel spill and subsequent remediation in late 2020. Notably, a raw water sample collected on December 14, 2022, significantly exceeded the Ontario Drinking Water Quality Standard for benzene. However, since this sample was not from treated or distribution water, adverse water quality incident reporting and corrective action protocols were not triggered. Since there is no treatment for contaminant removal at any of the wells, it can be assumed that the concentrations of a chemical parameter are identical in both raw and treated water samples.

Where additional water quality monitoring is conducted to assess the impacts of suspected or confirmed contamination of the water supply for any well, it is recommended that treated water samples be collected. The collection of treated water samples will better protect public health by ensuring that any exceedance of a chemical water quality standard will be appropriately managed as an adverse water quality incident. Collecting treated water samples will also ensure that any exceedances of half the standard will initiate increased sampling frequency as per Schedule 13-5. Finally, the collection of treated water samples would be consistent with the "Source Water Contamination" contingency plan.

Question ID	DWMR1083001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 10-3;

Question:
Were treated microbiological sampling requirements prescribed by Schedule 10-3 of O. Reg. 170/03 for large municipal residential systems met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Treated microbiological sampling requirements were met.

OBSERVATIONS:

A treated water sample must be collected and tested for E. coli, total coliforms and HPC every week and within 5 to 10 days after the sample was taken in the previous week. The sample must be taken prior to treated water entering the distribution system.

During the inspection period, treated water samples were collected from each operational well at the required frequency and location. All samples tested negative for E. coli and total coliforms. HPC results varied from 0 to 6 CFU/1mL.

Question ID	DWMR1081001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 10-2 | (1); SDWA | O. Reg. 170/03 | 10-2 | (2); SDWA | O. Reg. 170/03 | 10-2 | (3);

Question:
Were distribution microbiological sampling requirements prescribed by Schedule 10-2 of O. Reg. 170/03 for large municipal residential systems met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Distribution microbiological sampling requirements were met.

OBSERVATIONS:

Systems that serve 100,000 people or fewer must collect a minimum of 8 distribution microbiological samples every month, plus 1 sample for every 1,000 population served. At least one of the samples must be collected each week. All samples must be tested for E. coli and total coliform bacteria and at least 25% of the required samples must be tested for general bacteria populations using heterotrophic plate counts (HPC).

Given the population served by the DWS (approximately 3,300), at least 11 distribution samples must be collected every month. Between 12 and 18 routine distribution samples were collected in every month during the inspection period, with at least 1 sample collected each week. All samples tested absent for E. coli and total coliform parameters. HPC tests were conducted on between 27% to 45% of required samples in the calendar months covered by the inspection period. HPC results ranged from 0 to 5 CFU/1mL.

Question ID	DWMR1096001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-3 | (1);

Question:
Did records confirm that chlorine residual tests were conducted at the same time and location as microbiological samples?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records confirmed that chlorine residual tests were conducted as required.

OBSERVATIONS:

The purpose of collecting chlorine residual samples alongside microbiological samples for both treated and distribution water is to provide disinfection data in the event of a positive bacteriological result. A review of the logbooks, operator worksheets, and selected chains of custody verified that chlorine residual tests were conducted at the same time and location as the microbiological samples.

Question ID	DWMR1084001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-2;

Question:
Were inorganic parameter sampling requirements prescribed by Schedule 13-2 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Inorganic parameter sampling requirements were met.

OBSERVATIONS:

At least one treated water sample must be collected and tested for inorganic parameters every 36 months and within 60 days before or after the third anniversary of the day the previous sample was taken.

Treated water samples were most recently collected from each well for inorganic parameter analysis between March 23 and March 31, 2022. All required parameters were analyzed and all test results were below the respective maximum acceptable concentrations. At least one treated water sample from one of the wells must be collected for inorganic parameter analysis within 60 days before or after March 31, 2025.

Question ID	DWMR1085001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-4 | (1); SDWA | O. Reg. 170/03 | 13-4 | (2); SDWA | O. Reg. 170/03 | 13-4 | (3);

Question:
Were organic parameter sampling requirements prescribed by Schedule 13-4 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Organic parameter sampling requirements were met.

OBSERVATIONS:

At least one treated water sample must be collected and tested for organic parameters every 36 months and within 60 days before or after the third anniversary of the day the previous sample was taken.

Treated water samples were most recently collected from each well for organic parameter analysis between March 23 and March 31, 2022. All required parameters were analyzed and all test results were below the respective maximum acceptable concentrations. At least one treated water sample from one of the wells must be collected for organic parameter analysis within 60 days before or after March 31, 2025.

Question ID	DWMR1086001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-6.1 | (1); SDWA | O. Reg. 170/03 | 13-6.1 | (2); SDWA | O. Reg. 170/03 | 13-6.1 | (3); SDWA | O. Reg. 170/03 | 13-6.1 | (4); SDWA | O. Reg. 170/03 | 13-6.1 | (5); SDWA | O. Reg. 170/03 | 13-6.1 | (6);

Question:
Were haloacetic acid sampling requirements prescribed by Schedule 13-6 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Haloacetic acid sampling requirements were met.

OBSERVATIONS:

A sample must be collected and tested for total haloacetic acids (HAAs) every calendar quarter and within 60 to 120 days after the sample was collected in the previous calendar quarter. Samples must be collected from the distribution system or plumbing that is connected to the system that is likely to have an elevated potential for the formation of HAAs.

Quarterly samples were most recently collected for total HAA analysis on November 14, 2023, February 20, 2024, May 15, 2024, and August 14, 2024. All samples were collected at the distal end of the distribution system and all results were below the lower analytical detection limit of 5.0 µg/L. The running annual average at the time of the inspection was 5.0 µg/L, which is below the Ontario Drinking Water Quality Standard of 80 µg/L (expressed as a running annual average).

Question ID	DWMR1087001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-6 | (1); SDWA | O. Reg. 170/03 | 13-6 | (2); SDWA | O. Reg. 170/03 | 13-6 | (3); SDWA | O. Reg. 170/03 | 13-6 | (4); SDWA | O. Reg. 170/03 | 13-6 | (5); SDWA | O. Reg. 170/03 | 13-6 | (6);

Question:
Were trihalomethane sampling requirements prescribed by Schedule 13-6 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Trihalomethane sampling requirements were met.

OBSERVATIONS:

A sample must be collected and tested for total trihalomethanes (TTHMs) every calendar quarter and within 60 to 120 days after the sample was collected in the previous calendar quarter. Samples must be collected from the distribution system or plumbing that is connected to the system that is likely to have an elevated potential for the formation of TTHMs.

Quarterly samples were most recently collected for TTHM analysis on November 14, 2023, February 20, 2024, May 22, 2024, and August 14, 2024. All samples were collected at the distal end of the distribution system. The running annual average at the time of the inspection was 6.7 µg/L, which is below the Ontario Drinking Water Quality Standard of 100 µg/L

(expressed as a running annual average).

Question ID	DWMR1088001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-7;

Question:
Were nitrate/nitrite sampling requirements prescribed by Schedule 13-7 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Nitrate/nitrite sampling requirements were met.

OBSERVATIONS:

At least one treated water sample must be collected and tested for nitrate and nitrite every 3 months and within 60 to 120 days after the previous sample was collected.

Treated water samples were most recently collected, from each well, for this purpose on November 14, 2023, February 20, 2024, May 15, 2024, and August 14, 2024. All test results were below the respective maximum acceptable concentrations for nitrate and nitrite.

Question ID	DWMR1089001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-8;

Question:
Were sodium sampling requirements prescribed by Schedule 13-8 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Sodium sampling requirements were met.

OBSERVATIONS:

At least one treated water sample must be collected and tested for sodium every 60 months and within 90 days before or after the fifth anniversary of the day the previous sample was taken.

The most recent routine treated water samples for sodium analysis were collected on February 20, 2024. Samples were taken from each well, with results ranging from 16.4 mg/L to 23.0 mg/L. Samples were previously collected for sodium analysis on February 12 and February 19, 2019. Reporting and corrective actions are required if the sodium concentration exceeds 20 mg/L, and the sodium results from February 2024 are associated with an adverse water quality incident. For more information, refer to Question ID DWMR1101001.

Question ID	DWMR1090001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-9;

Question:
Where fluoridation is not practiced, were fluoride sampling requirements prescribed by Schedule 13-9 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Fluoride sampling requirements were met.

OBSERVATIONS:

Where fluoridation is not practiced, at least one treated water sample must be collected and tested for fluoride every 60 months and within 90 days before or after the fifth anniversary of the day the previous sample was taken.

The most recent treated water samples were collected for fluoride analysis on February 20, 2024. Samples were collected from each well, and all results were below the maximum acceptable concentration for fluoride (1.5 mg/L). Samples were previously collected for fluoride analysis on February 12, 2019.

Question ID	DWMR1104001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 16-6 | (1); SDWA | O. Reg. 170/03 | 16-6 | (2); SDWA | O. Reg. 170/03 | 16-6 | (3); SDWA | O. Reg. 170/03 | 16-6 | (3.1); SDWA | O. Reg. 170/03 | 16-6 | (3.2); SDWA | O. Reg. 170/03 | 16-6 | (4); SDWA | O. Reg. 170/03 | 16-6 | (5); SDWA | O. Reg. 170/03 | 16-6 | (6);

Question:
Were immediate verbal notification requirements for adverse water quality incidents met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Immediate verbal notification requirements for adverse water quality incidents were met.

OBSERVATIONS:

Immediate notifications regarding adverse water quality are communicated by speaking in person with appropriate representatives at both the local health unit and the Ministry's Spills Action Centre. The obligation to immediately report adverse results and observations helps to ensure that public health is protected.

Immediate notifications were provided for the initial adverse water quality incident pertaining to a sodium concentration greater than 20 mg/L. Importantly, if any sodium reports have been made from the drinking water system in the last 57 months, no further reports are necessary, regardless of sample locations or the number of exceedances. If a licensed laboratory continues to report sodium exceedances during this period, the owner and operating authority

are not required to take additional reporting actions. Refer to Question ID DWMR1101001 for more information.

Question ID	DWMR1101001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 17-1; SDWA | O. Reg. 170/03 | 17-10 | (1); SDWA | O. Reg. 170/03 | 17-11; SDWA | O. Reg. 170/03 | 17-12; SDWA | O. Reg. 170/03 | 17-13; SDWA | O. Reg. 170/03 | 17-14; SDWA | O. Reg. 170/03 | 17-2; SDWA | O. Reg. 170/03 | 17-3; SDWA | O. Reg. 170/03 | 17-4; SDWA | O. Reg. 170/03 | 17-5; SDWA | O. Reg. 170/03 | 17-6; SDWA | O. Reg. 170/03 | 17-9;

Question:
For large municipal residential systems, were corrective actions, including any steps directed by the Medical Officer of Health, taken to address adverse conditions?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Corrective actions were taken to address adverse conditions.

OBSERVATIONS:

During the inspection period, there were three adverse water quality incidents related to sodium concentrations exceeding 20 mg/L in water samples. When a reportable sodium incident occurs, corrective actions must include resampling and testing as soon as reasonably possible. If a resample also shows sodium concentrations above 20 mg/L, further actions must be taken as directed by the medical officer of health.

On February 29, 2024, notification from the licensed lab was received that the sodium concentration exceeded 20 mg/L in treated water samples from 4 of the 5 wells, with samples collected on February 20, 2024. Resample sets collected on March 5 and March 19, 2024, confirmed that the sodium concentration exceeded 20 mg/L in water samples collected from multiple wells and from a location in the distribution system. On March 11, 2024, following the first resample results, the Thunder Bay District Health Unit issued a 'Drinking Water Advisory Notice' for individuals on sodium-restricted diets. This advisory will remain in effect until test results confirm that sodium concentrations are below 20 mg/L. Refer to Question ID DWMR1117001 for a best management practice concerning advisory renotification.

Question ID	DWMR1113001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 10.1 | (3);

Question:
Were changes to the system registration information provided to the ministry within ten (10) days of the change?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Changes to the system registration information were provided as required.

Question ID	DWMR1060001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the operations and maintenance manual(s) meet the requirements of the Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The operations and maintenance manual(s) met the requirements of the Municipal Drinking Water Licence.

Question ID	DWMR1062001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 7-5;

Question:
Did records or other record keeping mechanisms confirm that operational testing not performed by continuous monitoring equipment was done by a certified operator, water quality analyst, or person who met the requirements of Schedule 7-5 of O. Reg. 170/03?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was done by a certified operator, water quality analyst, or person who met the requirements of Schedule 7-5 of O. Reg. 170/03.

OBSERVATIONS:

Continuous monitoring equipment was used to test for regulated operational parameters, except for secondary disinfectant residual and raw water turbidity.

Certified operators conducted testing for secondary disinfectant residual and raw water turbidity throughout the inspection period, with results documented in the treatment subsystem worksheet. Raw water turbidity was tested weekly at each production well during the inspection period, exceeding the regulatory requirement of testing at least once per month.

Question ID	DWMR1071001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Did the owner provide security measures to protect components of the drinking water

system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner provided security measures to protect components of the drinking water system.

OBSERVATIONS:

The drinking water system includes five well buildings, one pumping station, and one reservoir and pumping station. The SCADA system's computer terminal is located at the wastewater treatment facility. Appropriate signage with emergency contact information is posted at all facilities.

All buildings are secured with locks, and both the wastewater treatment facility and Well 5 are fenced. Security measures include surveillance cameras and intrusion alarms at all facilities. Operators conduct daily physical inspections of all outstations, and no signs of unauthorized access or vandalism were noted during the field inspection.

During the inspection, it was reported that the operating authority plans to enhance cybersecurity for the SCADA network by entering into a cybersecurity contract with an automation service provider.

Question ID	DWMR1073001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 23 | (1);

Question:
Was an overall responsible operator designated for all subsystems which comprise the drinking water system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
An overall responsible operator was designated for all subsystem.

OBSERVATIONS:

The Marathon water treatment subsystem is a Class I subsystem and the distribution subsystem is a Class II subsystem. NWI provides overall responsible operator (ORO) coverage for the treatment subsystem, while the Town of Marathon provides ORO coverage for the distribution subsystem.

During the inspection period, three (3) appropriately certified operators were designated as the ORO for the water treatment subsystem. One (1) appropriately certified operator was designated as the ORO for the water distribution subsystem. ORO designations were recorded in the respective subsystem logbooks.

The owner and operating authority are reminded that recordkeeping mechanisms must demonstrate who is designated as ORO at any given time (e.g., per shift, per 24-hour period,

etc.), including on those days when no operating and maintenance activities are completed (e.g., weekends, statutory holidays, etc.). The purpose of the ORO position is to ensure that a knowledgeable and experienced person is available at all times both to direct other operators on system operations and to respond immediately and effectively to emergencies. ORO designation methods for the distribution subsystem will be evaluated at the next inspection.

Question ID	DWMR1074001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 25 | (1);

Question:
Were operators-in-charge designated for all subsystems which comprise the drinking water system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Operators-in-charge were designated for all subsystems.

OBSERVATIONS:

NWI provides operator-in-charge (OIC) coverage for the treatment subsystem, while the Town of Marathon provides OIC coverage for the water distribution subsystem.

During the inspection period, three (3) appropriately certified operators were designated as the OIC for the water treatment subsystem. Operators designated as OIC were recorded in the electronic logbook.

During the inspection period, four (4) appropriately certified operators were designated as OIC for the water distribution subsystem. OIC designations were recorded in the hardcopy logbook (i.e., the "Daily Log of Activities Relating to the Municipal Water Distribution System".

Question ID	DWMR1075001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 22;

Question:
Were all operators certified as required?

Compliance Response(s)/Corrective Action(s)/Observation(s):
All operators were certified as required.

OBSERVATIONS:

During the inspection period, three (3) operators possessing the required certification worked and/or provided oversight in the treatment subsystem.

A total of five (5) operators possessing the required certification worked in the distribution

subsystem, including 1 operator possessing an operator-in-training certificate.

Question ID	DWMR1076001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 1-2 | (2);

Question:
Were adjustments to the treatment equipment only made by certified operators?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Adjustments to the treatment equipment were only made by certified operators.

OBSERVATIONS:

All adjustments made to treatment equipment in the treatment subsystem were made by certified operators. Process adjustments were recorded in the facility logbooks. Examples of such process adjustments included, but were not limited to, starting and stopping water production at the wells, chlorine analyzer calibrations and maintenance, and changing alarm set points. Where process adjustments were completed by an OIT during the inspection period, records demonstrated that the OIT received either prior or real-time OIC instruction.

Note that in very rare circumstances, an OIT may set operational parameters or make process adjustments based on specific instructions outlined in a SOP rather than direct instruction from an OIC. However, this allowance is provided for systems dealing with limited numbers of operators and/or staffing issues and should not be incorporated as a routine practice within a DWS. The following criteria should be met for an SOP to be deemed equivalent to receiving direction from an OIC:

- The SOP must 1) be regularly reviewed and updated as needed to meet current operating conditions, 2) provide clear and specific guidance on when and how to set an operational parameter, including the specific values, and 3) indicate when the OIT should contact an OIC for direction (e.g., if following the SOP does not result in the desired outcome).
- Records must clearly indicate that the OIT has received adequate training on the SOP.
- A properly certified and designated OIC must always be available and able to respond if contacted by the OIT.

Question ID	DWMR1117001	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Were there any other items related to the drinking water system that should be recognized in the report?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The following items were noted as being relevant to the drinking water system:

OBSERVATIONS:

ONGOING RADIO COMMUNICATION ISSUES AND IMPACTS ON OPERATIONS

Each production well and booster station is equipped with a combination remote terminal unit and programmable logic controller, which control substation operations and communicate with the master SCADA system at the Marathon Wastewater Treatment Plant via radio. The radio repeater at Well 4 relays data and alarm signals from all remote stations to the master SCADA system. A failure in radio communication disrupts the transmission of alarms and data, though local data continues to be recorded on the videographic chart recorder.

Due to the ongoing radio communication issues, water takings were prioritized from Well 4, and to a lesser extent from Wells 3 and 5, during the inspection period. Wells 2 and 6 were typically only operated for short periods (10 to 20 minutes) on a weekly basis, coinciding with the collection of microbiological water samples and water quality testing, and only when a certified operator was on site. The communication problems also had a significant impact on the operation of Wells 3 and 5, limiting their frequency and duration of operation. These wells were often only operated under the direct supervision of a certified operator due to the lack of reliable communication. Forthcoming SCADA system upgrades that will address the communications issues are described in Question ID DWMR1021001.

CHLORINE CONCENTRATION MEASUREMENT DELAYS AND IMPACTS

The chlorine level at each well is not measured in real time while the well is in production due to the time it takes for water to travel through the sample line extending from the end of the contact loop to the analyzer. In the case of Wells 2 and 6, water likely reaches the first user before the chlorine concentration is measured. For Wells 3, 4, and 5, the measurement delay is typically 30 seconds to 2 minutes, depending on sample line flow rates.

Additionally, the chlorine concentration typically continues to decrease during a low chlorine event until the well pump shuts down. For example, while the analyzer may measure a chlorine concentration of 0.7 mg/L, the actual concentration at the end of the contact loop may be lower. Notably, if the measurement delay was the same as the minimum regulatory recording frequency (i.e., every 5 minutes), water could reach the first user at all wells before the chlorine concentration is measured.

These measurement delays have implications for shut-off mechanisms, event-driven CT calculations, and adverse incident reporting. Regarding the shut-off mechanism, the delay means the well pump shuts down when the chlorine concentration at the end of the contact loop is lower than 0.7 mg/L. For event-driven CT calculations, best efforts should be made to determine the lowest chlorine concentration while the well pump was still operating. This concentration, combined with the pump flow rate before the shutdown, should be used for CT calculations. If CT was not achieved, an incident must be reported if improperly disinfected water was directed to users.

During the next renewal of the Municipal Drinking Water Licence, the measurement delay and methods for calculating CT should be reviewed by the ministry's Water and Wastewater

Permissions section, including confirming the information in the "Low or Adverse Chlorine Residual" contingency plan. One option for real-time measurement is the use of a simulation loop (e.g., a coiled length of tubing that approximates the hydraulic detention time in the chlorine contact loop). Real-time measurement would ensure that the well pump shuts down when the chlorine concentration is actually 0.7 mg/L at the end of the contact loop.

IMPROVEMENTS TO VIDEOGRAPHIC CHART RECORDER SCALING

Videographic chart recorders are installed at all wells to provide a backup system for continuously monitored data, including chlorine and flows. However, the current scale on all chart recorders is inadequate, making it difficult for operators to interpret the data effectively. The scale causes data to appear flattened, hindering trend analysis and meaningful interpretation. It is recommended that the scaling be reviewed and adjusted as soon as possible to improve data clarity and accuracy. The scaling on the chart recorders will be evaluated at the next inspection.

RECORDING MINIMUM CHLORINE CONCENTRATIONS WHEN SCADA DATA ARE NOT AVAILABLE

During the inspection period, and due to ongoing SCADA communication issues and problems with the scaling on the videographic chart recorders, the minimum chlorine concentrations for Wells 2 and 6 were not recorded while they were in operation. Where SCADA data are not available, it is recommended that operators continue to record the minimum chlorine residual while a well is in production by obtaining the data from the chart recorders. Note that readily obtaining this data from the chart recorders may require addressing the aforementioned scaling problem.

SODIUM HEALTH ADVISORY RENOTIFICATION AND THE PROVISION OF SUPPORTING INFORMATION

On March 11, 2024, the Thunder Bay District Health Unit issued a 'Drinking Water Advisory Notice' for individuals on sodium-restricted diets due to sodium concentrations exceeding 20 mg/L. This advisory will remain in effect until testing confirms that sodium levels are below 20 mg/L. During this period, the owner and operating authority should work with the Thunder Bay District Health Unit to determine the appropriate frequency for renotification. To ensure proper communication of risks, it is recommended that any additional or supporting information provided to the public be reviewed and approved by the health unit as a best management practice.

Stakeholder Appendix

February 2, 2023

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 below or use your web browser to search for their titles. Contact the Ministry if you need assistance or have questions at 1-866-793-2588 or waterforms@ontario.ca.
For more information on Ontario's drinking water visit www.ontario.ca/page/drinking-water

Click on the publication below to access it

- Drinking Water System Profile Information Form - 012-2149E
- Laboratory Services Notification Form – 012-2148E
- Adverse Test Result Notification Form – 012-4444E
- Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils
- Procedure for Disinfection of Drinking Water in Ontario
- Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids
- Filtration Processes Technical Bulletin
- Ultraviolet Disinfection Technical Bulletin
- Guide for Applying for Drinking Water Works Permit Amendments, & License Amendments
- Certification Guide for Operators and Water Quality Analysts
- Training Requirements for Drinking Water Operator
- Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption
- Drinking Water System Contact List – 7128E01
- Ontario's Drinking Water Quality Management Standard - Pocket Guide
- 2020 Watermain Disinfection Procedure
- List of Licensed Laboratories

Inspection Summary Rating Record & Risk Methodology

DWS Name:	MARATHON DRINKING WATER SYSTEM
DWS Number:	220000255
DWS Owner:	THE CORPORATION OF THE TOWN OF MARATHON
Municipal Location:	MARATHON
Regulation:	O.REG. 170/03
DWS Category:	DW Municipal Residential
Type of Inspection:	Focused
Compliance Assessment Start Date:	Oct-25-2024
Ministry Office:	Thunder Bay District Office

Maximum Risk Rating: 489

Inspection Module	Non Compliance Risk (X out of Y)
Capacity Assessment	0/30
Certification and Training	0/42
Logbooks	0/14
Operations Manuals	0/14
Reporting & Corrective Actions	0/70
Source	0/14
Treatment Processes	21/193
Water Quality Monitoring	0/112
Overall - Calculated	**21/489**

Inspection Risk Rating:	**4.29%**

Final Inspection Rating:	**95.71%**

DWS Name:	MARATHON DRINKING WATER SYSTEM
DWS Number:	220000255
DWS Owner Name:	THE CORPORATION OF THE TOWN OF MARATHON
Municipal Location:	MARATHON
Regulation:	O.REG. 170/03
DWS Category:	DW Municipal Residential
Type of Inspection:	Focused
Compliance Assessment Start Date:	Oct-25-2024
Ministry Office:	Thunder Bay District Office

Non-Compliance Question(s)	Non Compliance Risk
Treatment Processes	
Were all parts of the drinking water system that came in contact with drinking water disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit?	21
Overall - Total	**21**

Maximum Question Rating: 489

Inspection Risk Rating:	**4.29%**
FINAL INSPECTION RATING:	**95.71%**

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 to account for legislative and societal changes that affect acceptable risk levels. As a result of the most recent review, the methodology has been modified to present an improved metric for the evaluation of the risk/safety of MRDWS operations.

The Ministry's Municipal Residential Drinking Water Inspection Protocol contains up to 14 inspection modules and consists of approximately 120 regulatory questions. Those protocol questions are also linked to definitive guidance that

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ministry inspectors use when conducting MRDWS inspections. The questions address a wide range of regulatory issues, from administrative procedures to drinking water quality monitoring. Additionally, the inspection protocol contains a number of non-regulatory questions.

A team of drinking water specialists in the ministry have 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 that is less than 100 per cent does not mean that the drinking water from the system is unsafe. It shows areas where a system's operation can improve. To that end, 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 that relate to regulatory compliance and input their responses as "yes", "no" or "not applicable" 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).

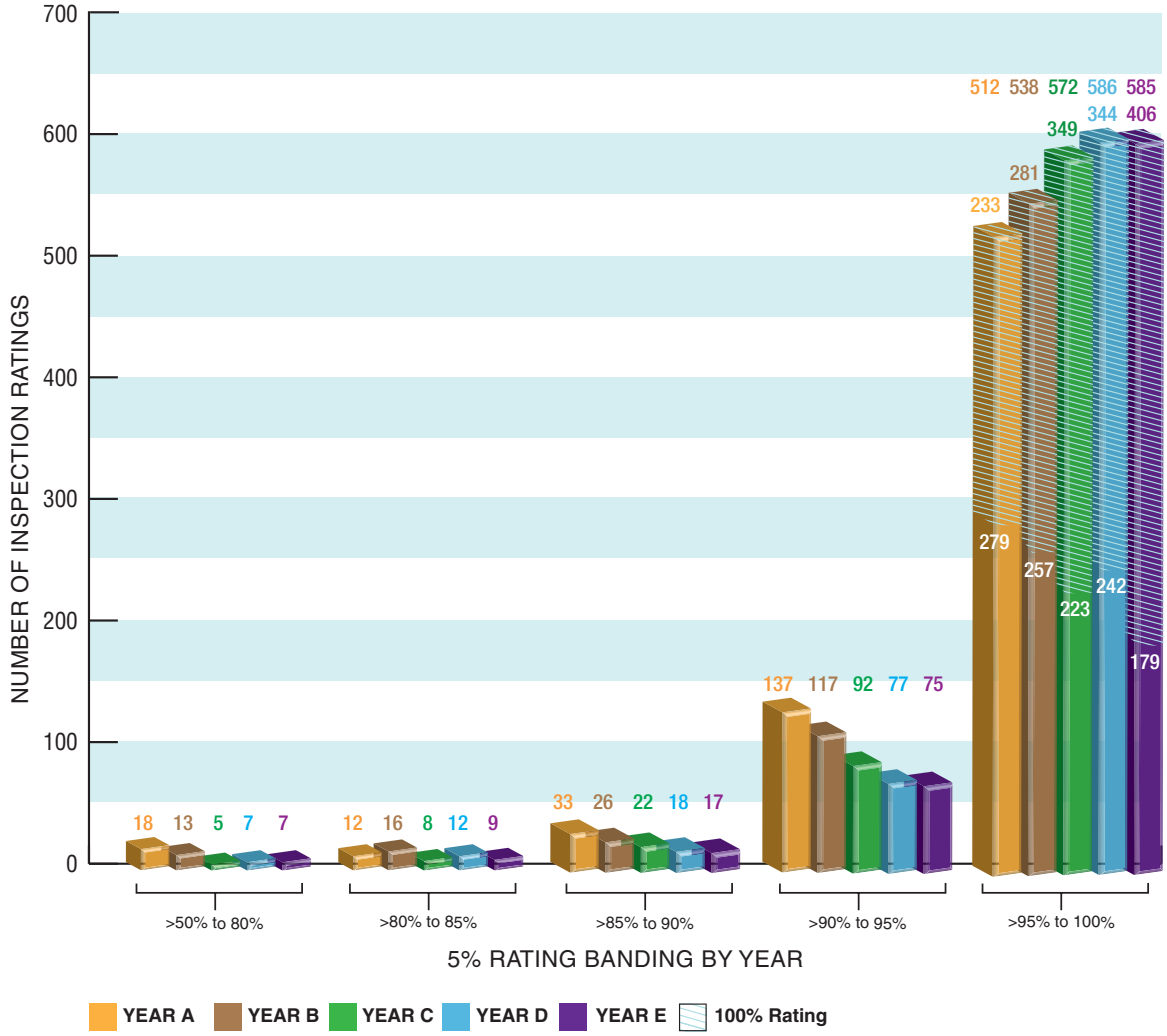
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

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 14 possible modules of the inspection protocol, which would provide the system owner/operator with information on the areas where they need to improve. The 14 modules are:

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

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