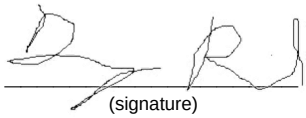
PETROLIA DRINKING WATER SYSTEM
2701 OLD LAKESHORE RD, PETROLIA, ON, N0N 1C0

Inspection Report

System Number:	220002903
Entity:	ONTARIO CLEAN WATER AGENCY CORPORATION OF THE TOWN OF PETROLIA
Inspection Start Date:	12/13/2022
Inspection End Date:	02/03/2023
Inspected By:	Dwayne Reid
Badge #:	1421



(signature)

NON-COMPLIANCE/NON-CONFORMANCE ITEMS

The following item(s) have been identified as non-compliance/non-conformance, based on a "No" response captured for a legislative or best management practice (BMP) question (s), respectively.

Question Group: Other Inspection Findings

Question ID	MRDW1038001	**Question Type**	Legislative
Question: Is continuous monitoring equipment that is being utilized to fulfill O. Reg. 170/03 requirements 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?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 6-5 | (1)1-4;		
Observation/Corrective Action(s)			
Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was not performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and/or was not recording data with the prescribed format. According to the information provided, gaps in turbidity data greater than 15 minutes occurred sporadically from January 23 - February 1, 2022 and were reported to the Ministry upon discovery. The data was available at the time and was reviewed by operators every 72 hours, as required according to the logbook and confirmed by the Operating Authority. Section 6-5(1)1 of O. Reg. 170/03 states that if a drinking water system uses continuous monitoring equipment for sampling and testing that is required under this Regulation, or under an approval, drinking water works permit, municipal drinking water licence or order, for a parameter set out in the Table to this section, the owner of the system and the operating authority for the system shall ensure that the following standards are met: The continuous monitoring equipment must, except when no water is being directed to users of water sampled by the equipment, i. test for the parameter with at least the minimum frequency specified in the Table for the parameter, and ii. record the date, time, sampling location and result of every test for the parameter with at least the minimum frequency referred to in subparagraph i. The Operating Authority addressed the issue by upgrading the data historian storage, and installing new turbidimeters. There is also a data historian alarm in place to alert operators of data storage issues.			

Data storage issues for January 1 and 2, 2022 were documented in the previous inspection report for the facility.

There was also missing turbidity and residual chlorine data on March 1, 2022. This was due to data storage upgrades and there was no flow at the time.

No large continuous gaps in data were observed during review of the turbidity and residual chlorine data after March 1, 2022. There were still missing/blank data points for the minute to minute turbidity data however the missing data points did not appear to be continuous for more than 15 minutes, and decreased from over 3000/month (for the Rack 1 turbidimeter) to less than 100 in October, 2022 this was due to installation of the new turbidimeters.

INSPECTION DETAILS

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

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

Question ID	MRDW1001001	**Question Type**	Information
Question: What was the scope of this inspection?			
Legislative Requirement	Not Applicable		
Observation			

The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) legislation as well as evaluating conformance with ministry drinking water 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 Bright's Grove Water Treatment Plant is a Class 2 membrane filtration surface water treatment facility and supplies potable water to the Petrolia Water Supply System, which provides water to approximately 11,200 residents in the Town of Petrolia and surrounding areas including the Township of Enniskillen, Village of Oil Springs and the Township of Dawn-Euphemia.

The treatment plant, primary transmission line, Mandaumin Booster Pumping Station, Petrolia Tower and distribution system are owned by the Town of Petrolia and operated by the Ontario Clean Water Agency.

The Bright's Grove Water Treatment Plant, originally constructed in 1896, draws its supply of raw water from Lake Huron through a screened intake pipe extending out approximately 430 m into the lake.

The treatment plant is equipped with three low lift vertical turbine pumps. Sodium

hypochlorite for pre-chlorination is injected directly into the low lift suction header. Chlorinated raw water is pumped through two parallel, automatic, self-cleaning strainers on the low lift discharge header to remove larger debris from the raw water and to prevent damage to the membrane filtration system.

After pre-filtration, treatment begins with three microfiltration membrane trains to remove fine particulates, sediment, algae, protozoa and bacteria. Associated equipment includes two reverse filtration pumps for backwashing, two air compressors for air scouring, integrity testing and valve actuation, two pumps for circulating cleaning solution and two drain pumps. An excess recirculation line directs feed water that did not filter through the membranes back to the low lift pumps to prevent build-up of solids on the filters.

Further equipment associated with cleaning the filters includes:
• citric acid storage tanks and transfer pumps for inorganic fouling removal during the clean-in-place process;
• sodium hypochlorite tanks and transfer pumps for organic fouling removal during the clean-in-place process and chemically enhanced backwash process;
• sodium hydroxide storage tanks and transfer pumps for organic fouling removal during the clean-in-place process;
• calcium thiosulphate tanks and transfer pumps for de-chlorination of the sodium hypochlorite after cleaning; and
• a neutralization tank for exhausted chemical cleaning solution storage and neutralization prior to discharge into the wastewater settling tank.

The distribution system is a Class 2 distribution system and consists of the Mandaumin Booster Station/Water Tanks, Petrolia Tower and a network of watermains, hydrants and chambers. Two pumps supply water from the Mandaumin Booster Station to a 2,290 m3 water tower in Petrolia. Water from the elevated tank supplies water to the Town of Petrolia and to the Township of Enniskillen service area. An emergency connection between the Petrolia Drinking Water System and the Lambton Area Water Supply System allows access to an alternate supply of water. This connection can supply the reservoir at the Mandaumin Booster Pump Station, or if need be, it can supply water directly to the Petrolia Tower.

This announced inspection of the Petrolia Drinking Water System was conducted on January 20, 2023 and included the Petrolia Tower and Mandaumin Booster Pumping Station. The review period for this inspection was November 1, 2021 to October 31, 2022.

Question ID	MRDW1000001	**Question Type**	Information
Question: Does this drinking water system provide primary disinfection?			
Legislative Requirement	Not Applicable		
Observation			

This Drinking Water System provides for both primary and secondary disinfection and distribution of water.

Chlorine gas provides primary disinfection at this facility.

Question ID	MRDW1018001	Question Type	Legislative

Question:

Has the owner ensured that all equipment is installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit?

Legislative Requirement	SDWA | 31 | (1);

Observation

The owner had ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.

During the review period new turbidimeters were installed on each membrane filter rack. Data storage upgrades were also completed.

Previous upgrades were completed on the treatment plant in 2019-2020 to replace aging infrastructure and equipment. There were no changes to the rated capacity or any of the treatment processes. The upgrades included the following: construction of new chlorine contact tanks and clearwells to ensure adequate chlorine contact time and disinfection of the water; construction of a new high lift pumping station to meet current building code and safety standards, including replacing existing high lift pumps, piping, controls, and electrical system; installation of a back-flushing system for prevention of frazil ice on the intake screen; installation of a zebra mussel chemical control system for the intake pipe; installation of a new electrical room, SCADA computers and associated equipment; and removal of existing process piping, equipment, and controls replaced by upgrades.

A Director's Notification Form was submitted to the MECP on May 6, 2020 indicating that the upgrades were completed and commissioned. Treated water started being supplied from the upgraded system on April 14, 2020.

These upgrades were incorporated into the new Drinking Water Works Permit No. 034-201, Issue No. 5. Upgrades to the fluoride dosing system (like for like) were completed in March 2021. Two new 3,500 m3 bolted steel water tanks, water mixing system, associated valve chambers, piping and components were installed at the Mandaumin Booster Pumping Station in 2016 along with demolition of the existing 2,272 m3 concrete reservoir.

Question ID	MRDW1020001	Question Type	Legislative

Question:

Is the owner/operating authority able to demonstrate that, when required during the inspection period, Form 1 documents were prepared in accordance with their Drinking Water Works Permit?

Legislative Requirement	SDWA | 31 | (1);

Observation

The owner/operating authority was in compliance with the requirement to prepare Form 1 documents as required by their Drinking Water Works Permit during the inspection period.

Form 1's were provided for the following projects:

1. Replacement of the watermain on Third St. from Fourth St. to Mutual St., replacement of watermain on Mutual St., and replacement of watermain on Kentail St. in Petrolia, including all appurtenances (dated June 9, 2022).

2. Phase 1 construction of the Greenwood Acres subdivision including watermains and all appurtenances (dated June 22, 2022).

Question ID	MRDW1021001	**Question Type**	Legislative

Question:

Is the owner/operating authority able to demonstrate that, when required during the inspection period, Form 2 documents were prepared in accordance with their Drinking Water Works Permit?

Legislative Requirement	SDWA | 31 | (1);

Observation

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

The Form 2 for the replacement of the turbidimeters was provided by the Operating Authority upon request.

Question ID	MRDW1025001	**Question Type**	Legislative

Question:

Were all parts of the drinking water system that came in contact with drinking water (added, modified, replaced or extended) disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit?

Legislative Requirement	SDWA | 31 | (1);

Observation

All parts of the drinking water system were disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit.

The records indicated that watermain repairs were conducted and documented in accordance with the 2020 Watermain Disinfection Procedure.

Three watermain commissioning forms were provided for the review period. A temporary watermain was installed for the Third St. watermain project in Petrolia. The first set of samples taken on June 22, 2022 failed for total coliform. The second set of samples taken on June 23, 2022 passed for E. coli and total coliform. Upon receiving the failed results for June 22, 2022, another set of samples were taken June 25, 2022 as required and passed for E. coli and total coliform. The disinfectant residual after flushing and put in service, and the date and time watermain was placed into service was not found in the documentation provided. The Operating Authority is reminded to ensure that all information required by the 2020 Watermain Disinfection Procedure is documented.

The new watermains for the Third St. project were installed in August, 2022. The first set of samples taken on Aug 11, 2022 failed for total coliform and E. coli. The second set of samples taken on Aug 12, 2022 passed for E. coli and total coliform. Another set of samples were taken Aug 15, 2022 as required and passed for E. coli and total coliform.

Question ID	MRDW1024001	Question Type	Legislative

Question:

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

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

Observation

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.

Free chlorine residuals of 0.30 mg/L (September 6, 2022) and 0.44 mg/L (April 19, 2022) were the lowest measurements during the inspection period. Free chlorine residual was 2.07 mg/L and turbidity was 0.049 NTU at the Mandaumin Booster Station during the inspection.

Question ID	MRDW1038001	Question Type	Legislative

Question:

Is continuous monitoring equipment that is being utilized to fulfill O. Reg. 170/03 requirements 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?

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

Observation

Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was not performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and/or was not recording data with the prescribed format.

According to the information provided, gaps in turbidity data greater than 15 minutes occurred sporadically from January 23 - February 1, 2022 and were reported to the Ministry upon discovery. The data was available at the time and was reviewed by operators every 72 hours, as required according to the logbook and confirmed by the Operating Authority.

Section 6-5(1)1 of O. Reg. 170/03 states that if a drinking water system uses continuous monitoring equipment for sampling and testing that is required under this Regulation, or under an approval, drinking water works permit, municipal drinking water licence or order, for a parameter set out in the Table to this section, the owner of the system and the operating authority for the system shall ensure that the following standards are met:
The continuous monitoring equipment must, except when no water is being directed to users of water sampled by the equipment,
i. test for the parameter with at least the minimum frequency specified in the Table for the parameter, and
ii. record the date, time, sampling location and result of every test for the parameter with at least the minimum frequency referred to in subparagraph i.

The Operating Authority addressed the issue by upgrading the data historian storage, and installing new turbidimeters. There is also a data historian alarm in place to alert operators of data storage issues.

Data storage issues for January 1 and 2, 2022 were documented in the previous inspection report for the facility.

There was also missing turbidity and residual chlorine data on March 1, 2022. This was due to data storage upgrades and there was no flow at the time.

No large continuous gaps in data were observed during review of the turbidity and residual chlorine data after March 1, 2022. There were still missing/blank data points for the minute to minute turbidity data however the missing data points did not appear to be continuous for

more than 15 minutes, and decreased from over 3000/month (for the Rack 1 turbidimeter) to less than 100 in October, 2022 this was due to installation of the new turbidimeters.

Question ID	MRDW1035001	**Question Type**	Legislative
Question: Are operators examining continuous monitoring test results and are they examining the results within 72 hours of the test?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 6-5 | (1)1-4; SDWA | O. Reg. 170/03 | 6-5 | (1)5-10;		
Observation			
Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test. Operators review the trending data on the SCADA at least 3 times/week, but typically it is checked daily, except on weekends when there is no operator on-site.			

Question ID	MRDW1037001	**Question Type**	Legislative
Question: Are all continuous monitoring equipment utilized for sampling and testing required by O. Reg. 170/03, or MDWL or DWWP or order, equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 6-5 | (1)1-4; SDWA | O. Reg. 170/03 | 6-5 | (1)5-10; SDWA | O. Reg. 170/03 | 6-5 | (1.1);		
Observation			
All continuous monitoring equipment utilized for sampling and testing required by O. Reg. 170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6. The on-call operator is notified by a phone call when a regulatory continuous monitoring analyser alarm set point has been reached. The treatment equipment associated with primary disinfection and filtration alarms are interlocked to automatically shut down water production until the operator acknowledges the alarm, troubleshoots the situation and responds accordingly. Elevated fluoride concentrations at the clearwell discharge will also trigger a shutdown of the highlift pumps when the set point is reached. The operator is notified by a phone call when an alarm set point has been reached for secondary disinfection monitored at the Mandaumin Booster Station.			

During the inspection, the free chlorine residual alarm set points for primary disinfection were set at 1.4 mg/L (low) and 1.3 mg/L (low low) for AIT-5109 and AIT-5110 (Contact Tank 1 and Contact Tank 2), which is adequate according to the worst case scenario calculations provided. The alarm set points are adjusted when only one clearwell or one contact tank is in service to ensure adequate contact time for disinfection.

The maximum alarm setting for the three turbidity analysers installed on the filter effluent lines was 90 mNTU (low) and 100 mNTU (low low) for AIT-1019-1, AIT-1019-2, and AIT-1019-3, which triggers an automatic shutoff of the filtrate flow from the rack that has elevated turbidity.

There is also a signal fail alarm that triggers an automatic shutoff for free chlorine residual at the Contact Tank 1, Contact Tank 2, and Clearwell Discharge in the event of a power outage or analyser malfunction.

Question ID	MRDW1040000	**Question Type**	Legislative

Question:

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

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

Observation

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

Schedule 6-5(1)8 of O. Reg. 170/03 states that the continuous monitoring equipment must be checked and calibrated in accordance with the manufacturer's instructions.

Schedule 6-5(1)10 of O. Reg. 170/03 states that if the manufacturer's instructions do not indicate how often to check and calibrate the continuous monitoring equipment, the equipment must be checked and calibrated as often as necessary to ensure that test results are within the following margins of error in the case of free chlorine residual: 0.05 mg/L, if the concentrations usually measured by the equipment are less than or equal to 1.0 mg/L, and proportionally higher if the concentrations usually measured are greater than 1.0 mg/L.

Flow meters were calibrated by a third party on June 14, 2022 which is less than a year from the previous calibration (June 15-16, 2021) as required. The raw and high lift flow meters were included, as well as the three filter racks, filtrate, and backwash flow meters, and the two flow meters at the Mandaumin Booster Station.

Work order summary reports were provided for the chlorine, fluoride and turbidity analysers. Chlorine analysers were verified against handheld meters quarterly, or as needed. The fluoride analyser was calibrated quarterly except when it was out of service. The three filter rack turbidimeters were inspected and calibrated quarterly, or as needed. Handheld meters were verified monthly against secondary standards.

Question ID	MRDW1108001	**Question Type**	Legislative
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, an Order, MDWL, or DWWP issued under Part V, SDWA, has triggered an alarm or an automatic shut-off, did a qualified person respond in a timely manner and take appropriate actions?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 6-5 | (1)1-4; SDWA | O. Reg. 170/03 | 6-5 | (1)5-10; SDWA | O. Reg. 170/03 | 6-5 | (1.1);		
Observation			
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. The logbook indicated that operators respond to alarms forthwith and either made adjustments remotely, or if required, attended the plant to make adjustments and monitor conditions.			

Question ID	MRDW1033001	**Question Type**	Legislative
Question: Is the secondary disinfectant residual measured as required for the large municipal residential distribution system?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 7-2 | (3); SDWA | O. Reg. 170/03 | 7-2 | (4);		
Observation			
The secondary disinfectant residual was measured as required for the large municipal residential distribution system. Seven distribution samples were analysed for free chlorine residual per week, 4 samples on the first day and then 3 samples on the second day, 48 hours apart, as required.			

Question ID	MRDW1099001	Question Type	Information
Question: Do records 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)?			
Legislative Requirement	Not Applicable		
Observation			
Records showed that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O. Reg. 169/03).			

Question ID	MRDW1081001	Question Type	Legislative
Question: For LMR systems, are all microbiological water quality monitoring requirements for distribution samples being met?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 10-2 | (1); SDWA | O. Reg. 170/03 | 10-2 | (2); SDWA | O. Reg. 170/03 | 10-2 | (3);		
Observation			
All microbiological water quality monitoring requirements prescribed by legislation for distribution samples in a large municipal residential system were being met. Five locations were sampled each week and analysed for E. coli and total coliform during the review period, which meets the requirement for the population of 11,200 served by the system (20 samples/month). Three samples per week were also analysed for heterotrophic plate count which is more than the 25% requirement.			

Question ID	MRDW1096001	Question Type	Legislative
Question: Do records confirm that chlorine residual tests are being conducted at the same time and at the same location that microbiological samples are obtained?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 6-3 | (1);		
Observation			
Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.			

Question ID	MRDW1086001	Question Type	Legislative
Question: Are all haloacetic acid water quality monitoring requirements prescribed by legislation conducted within the required frequency and at the required location?			
Legislative Requirement	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);		
Observation			
All haloacetic acid water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location. Haloacetic acids were sampled quarterly during the review period on the following dates: January 4, 2022, April 4, 2022, July 4, 2022, and October 3, 2022. The results were less than the standard of 80 ug/L. Samples were all taken at the Heritage Variety location. The Operating Authority indicated that location had the highest concentrations in past sampling.			

Question ID	MRDW1087001	Question Type	Legislative
Question: Have all trihalomethane water quality monitoring requirements prescribed by legislation been conducted within the required frequency and at the required location?			
Legislative Requirement	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);		
Observation			
All trihalomethane water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location. Trihalomethanes were sampled quarterly during the review period on the following dates: January 4, 2022, April 4, 2022, July 4, 2022, and October 3, 2022. The results were less than the standard of 100 ug/L. All samples were taken at the Heritage Variety location which the Operating Authority indicated is the location with the highest concentrations in previous sampling.			

Question ID	MRDW1094001	Question Type	Legislative
Question: Are all water quality monitoring requirements imposed by the MDWL and DWWP being			

met?	
Legislative Requirement	SDWA | 31 | (1);
Observation	
All water quality monitoring requirements imposed by the MDWL or DWWP issued under Part V of the SDWA were being met. Condition 1.5 in Schedule C of the MDWL establishes the effluent criteria for discharges from the treatment plant to Lake Huron. The annual average concentration limit for suspended solids is 25 mg/L and total chlorine is 0.02 mg/L. The MDWL requires monthly grab sampling for both suspended solids and total chlorine. The suspended solids annual average for 2021 was 13.6 mg/L. Suspended solids in samples taken between January and October, 2022 ranged from 2 - 45 mg/L, with the average over that time period of 16.8 mg/L. The total chlorine annual average for 2021 was 0.01 mg/L. Total chlorine in samples taken between January - October, 2022 ranged from 0.00 - 0.23 mg/L. The Operating Authority indicated that the total chlorine result in September, 2022 of 0.23mg/L was inaccurate and caused by using the wrong sample cell for analysis.	

Question ID	MRDW1113000	**Question Type**	Legislative
Question: Have all changes to the system registration information been provided to the Ministry within ten (10) days of the change?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 10.1 | (3);		
Observation			
All changes to the system registration information were provided within ten (10) days of the change. Contact information was updated as required.			

Question ID	MRDW1059000	**Question Type**	Legislative
Question: Do the operations and maintenance manuals contain plans, drawings and process descriptions sufficient for the safe and efficient operation of the system?			
Legislative Requirement	SDWA | O. Reg. 128/04 | 28;		
Observation			

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

However, there are areas of the distribution system where isolation valves have not been located or identified on drawings for reference.

On January 3, 2023 the Operating Authority confirmed a watermain had been leaking into Buttermilk Creek in Petrolia. Based on information from a retired operator, the Operating Authority searched for an isolation valve until January 6, 2023 when it was found. Finding the isolation valve prevented water service disruption for a nearby retirement home. On January 9, 2023 the Operating Authority confirmed that the watermain had been isolated and the flow of chlorinated water to the creek was stopped.

It is recommended that all valves in the system be located and incorporated into the valve exercising program, especially critical valves and isolation valves at water crossings.

Question ID	MRDW1060000	**Question Type**	Legislative
Question: Do the operations and maintenance manuals meet the requirements of the DWWP and MDWL issued under Part V of the SDWA?			
Legislative Requirement	SDWA | 31 | (1);		

Observation

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

The Operations Manual (2005 Petrolia Water Treatment Plant Operations Manual by KMK Consultants) for the water treatment plant provides specific procedures and detailed information to allow operators to carry out normal operation at the facility and to respond to possible abnormal operating conditions that can occur. Detailed maintenance procedures for major pieces of equipment are included in the Operations Manual. The manufacturer's manuals are available for specific operating, maintenance and troubleshooting instructions. Emergency Procedures are found in the Facility Emergency Plan Binder developed by OCWA.

CIMA Canada, the third-party engineering contractor for the clearwell, high lift pump station and zebra mussel-frazil ice control upgrades developed an Equipment Operation and Maintenance Manual (dated January 21, 2020) for use by the operators at the treatment plant. The manual contains information on normal operations, system monitoring, maintenance and emergency procedures. This manual included the minimum requirements of the MDWL Section 16.2.

SOP PET-53 is the procedure for primary disinfection and includes worst case data and

alarms. The CT worst case scenario calculation was provided separately.

SOP PET-20 was completed in January 2021 and contains the procedure to follow in the event that frazil ice is obstructing the intake. To ensure chlorinated water is not back flushed to the lake, the backflushing system cannot be operated over 25 mins (35 L/s for a max of 59.5 m3).

Question ID	MRDW1062001	**Question Type**	Legislative
Question: Do records or other record keeping mechanisms confirm that operational testing not performed by continuous monitoring equipment is being done by a certified operator, water quality analyst, or person who meets the requirements of O. Reg. 170/03 7-5?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 7-5;		
Observation			
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.			

Question ID	MRDW1071000	**Question Type**	BMP
Question: Has the owner provided security measures to protect components of the drinking water system?			
Legislative Requirement	Not Applicable		
Observation			
The owner had provided security measures to protect components of the drinking water system. The water treatment plant, Mandaumin Booster Station and the Petrolia Tower are located in gated compounds that are locked when staff are not on site. Entry doors to the facilities are locked. There were no open access points to the stored water. The distribution storage tanks are covered and the access hatches on top are covered. The overflows for the storage tanks and tower are equipped with duckbill rubber covers that were closed during the inspection. The Operating Authority indicated that the SCADA system is on a stand alone network with firewalls. A cyber security audit was conducted when the new SCADA system was installed approximately 2 years ago.			

Question ID	MRDW1073001	Question Type	Legislative
Question: Has the overall responsible operator been designated for all subsystems which comprise the drinking water system?			
Legislative Requirement	SDWA | O. Reg. 128/04 | 23 | (1);		
Observation			
The overall responsible operator had been designated for each subsystem. The ORO is identified each day at the start of each shift in the electronic logbook. The Senior Operations Manager is designated as ORO.			

Question ID	MRDW1074001	Question Type	Legislative
Question: Have operators-in-charge been designated for all subsystems for which comprise the drinking water system?			
Legislative Requirement	SDWA | O. Reg. 128/04 | 25 | (1);		
Observation			
Operators-in-charge had been designated for all subsystems which comprise the drinking water system. The OIC is identified each day at the start of each shift in the electronic logbook.			

Question ID	MRDW1075001	Question Type	Legislative
Question: Do all operators possess the required certification?			
Legislative Requirement	SDWA | O. Reg. 128/04 | 22;		
Observation			
All operators possessed the required certification. The Process & Compliance Technician was the back-up ORO during the review period. The ORO and back-up ORO hold the required certification. All operators held valid certificates.			

Question ID	MRDW1076001	Question Type	Legislative

Question:

Do only certified operators make adjustments to the treatment equipment?

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

Observation

Only certified operators made adjustments to the treatment equipment.

All operators held valid certificates. The water treatment plant is staffed by an operator during the day only, five days per week, who routinely checks all the plant equipment, performs in-house operational tasks and conducts all the necessary laboratory work to monitor the process and quality of the plant effluent. After hours an on-call operator provides emergency coverage. All operators have remote access to the plant SCADA. When alerted by an alarm, the operator can make adjustments and shutdown the plant remotely.

Question ID	MRDW1012001	Question Type	Legislative

Question:

Does the owner have a harmful algal bloom monitoring plan in place that meets the requirements of the MDWL?

Legislative Requirement	SDWA | 31 | (1);

Observation

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

A Harmful Algal Bloom (HAB) monitoring, reporting and sampling plan (SOP# PET-10) was completed on October 15, 2021, prior to the implementation date of November 24, 2021 specified in the MDWL. If a bloom is suspected or occurring within the monitoring area, notifications must be made, sampling must be initiated, and sample results must be assessed and actions taken. Monitoring includes visual assessments from the shoreline. As HABs have not historically impacted the treatment plant, sampling is not routinely conducted. The plan indicates that if a bloom is suspected (ie. visually observed, observations from others), then weekly sampling would be initiated. The plan also includes triggers to adjust treatment and protocols for when microcystin is detected in raw and treated samples. Training was conducted in May, 2022. The Operating Authority confirmed that all staff are trained on the plan prior to June each year.

Question ID	MRDW1014001	Question Type	Legislative

Question:

Is there sufficient monitoring of flow as required by the MDWL or DWWP issued under Part V of the SDWA?

Legislative Requirement	SDWA | 31 | (1);

Observation

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.

Three low lift raw water pumps (one duty, two standby), each equipped with variable frequency drives and rated at 112.85 L/s, are controlled by the level in the contact chamber. A raw water electromagnetic flowmeter is located on the low lift header. The total capacity of the high lift pumps of 12 ML/day deliver treated water to the Mandaumin Booster Pumping Station Storage Tanks which have been in use since 2016. Four new vertical turbine high lift pumps (three duty and one standby) each equipped with variable frequency drives and rated at 46.3 L/s, (4 ML/d) were commissioned in 2020 as part of the upgrades to the treatment plant. A treated water electromagnetic flowmeter is located on the high lift discharge header.

Condition 2.1 of Schedule C of MDWL No. 034-101, Issue No. 7 requires continuous flow measurement and recording for: The flow rate and daily volume of treated water that flows from the treatment subsystem to the distribution system, and the flow rate and daily volume of water that flows into the treatment subsystem.

Low lift and high lift flow rates are recorded in the SCADA Historian every second for operator trending reviews. The daily volumes of raw water and treated water are also recorded and stored in the SCADA Historian. During the inspection, the treatment plant was shutdown as there was sufficient water in the Petrolia Tower and Mandaumin Storage Tanks.

Question ID	MRDW1016001	**Question Type**	Legislative

Question:

Is the owner in compliance with the conditions associated with maximum flow rate or the rated capacity conditions in the MDWL issued under Part V of the SDWA?

Legislative Requirement	SDWA | 31 | (1);

Observation

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 maximum daily flow during the inspection period occurred on August 23, 2022 and was

6625.54 m3, or 55% of the rated capacity of 12,000 m3/day.

Question ID	MRDW1023001	Question Type	Legislative

Question:

Do records indicate that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a DWWP and/or MDWL issued under Part V of the SDWA at all times that water was being supplied to consumers?

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

Observation

Records indicated that the treatment equipment was operated in a manner that achieved the design capabilities required under O. Reg. 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.

The PALL Microza UNA-620A membrane filters were operated to meet the credit assignment criteria for membrane filtration during the inspection period. An air scour and backwash occurred on each rack every 90,000 L, or as necessary. An automatic air scour and backwash are programmed into the system for each rack. During the inspection all three racks had more than 30,000 L of flow remaining before the next air scour and backwash.

An integrity test was conducted on each rack daily, the filtrate turbidity of each of the three racks was continuously monitored and interlocks were in place to shut down the individual rack if turbidity exceeded 90 mNTU (high) and 100 mNTU (high high) or if the daily integrity test failed. Operators assessed filter effluent turbidities during the review of the SCADA trending. Monthly compliance reports are also reviewed for each filter effluent line to ensure monthly turbidity requirements are met (less than or equal to 0.1 NTU in 99% of the measurements each month for each filter train). Turbidity results of each membrane rack were reviewed for the inspection period to ensure the monthly requirement was met.

During the inspection period, the primary disinfection equipment was operated to meet the credit assignment criteria for chlorination while treated water was being delivered to consumers. The free chlorine residual for primary disinfection was continuously monitored immediately upstream of each contact tank weir (AIT-5109, AIT-5110) and interlocks are in place to shut down the high lift pumps if the free chlorine residual level does not meet the worst-case scenario for CT.

In addition, the alarm set points for winter mode (worst-case scenario) are used all year long, as an added precaution. Operators also manually calculate the CT worst-case scenario for each month using the worst-case readings from all days of the month. As per

SOP PET-53, the CT will be met after the contact tanks in most cases. However, when there is only one train in operation or operational issues lead to low CT values, the contact time in the clearwell must be used to meet CT requirements. Operators are required to re-calculate CT in these instances using the exact day values to ensure that Operational CT was met for the day. Operators are also required to review the continuous monitoring data and if there are any values that would cause CT values to approach those required by the Procedure for Disinfection of Drinking Water in Ontario, CT must be re-calculated to ensure compliance. Manual CT calculations were requested for several days (January 23, February 28 -March 3, July 4, and August 16, 2022) when there was operational issues and the required CT was met.

Question ID	MRDW1030000	**Question Type**	Legislative
Question: Is primary disinfection chlorine monitoring being conducted at a location approved by MDWL and/or DWWP issued under Part V of the SDWA, or at/near a location where the intended CT has just been achieved?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 7-2 | (1); SDWA | O. Reg. 170/03 | 7-2 | (2);		
Observation			
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. A chlorine gas solution is fed into the membrane filtrate header, prior to entry into the contact tanks. Sampling and testing for primary disinfection free chlorine residual is conducted by continuous monitoring equipment at a point where contact time has just been completed, immediately upstream of each contact tank weir (AIT-5109 for Contact Tank 1 and AIT-5110 for Contact Tank 2). During the inspection the free chlorine residual at AIT-5109 was 2.05 mg/L and at AIT-5110 was 2.15 mg/L. The free chlorine residual at the Clearwell Discharge (AIT-5101) was 1.99 mg/L.			

Question ID	MRDW1032001	**Question Type**	Legislative
Question: If the drinking water system obtains water from a surface water source and provides filtration, is continuous monitoring of each filter effluent line being performed for turbidity?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 7-3 | (2);		
Observation			
Continuous monitoring of each filter effluent line was being performed for turbidity.			

Continuous monitoring of turbidity is conducted on the filtrate from the 3 membrane racks as well as the combined filtrate. The filtration system was not in operation during the inspection as the plant was shutdown. New turbidimeters were installed in October, 2022 which reduced the number of missing data points for the analysers.

Instances of elevated distribution turbidity (downstream of the regulated turbidimeters) were attributed to inaccurate readings due to air bubbles and water not draining out of the analyser.

Question ID	MRDW1083001	**Question Type**	Legislative
Question: For LMR systems, are all microbiological water quality monitoring requirements for treated samples being met?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 10-3;		
Observation			
All microbiological water quality monitoring requirements prescribed by legislation for treated samples were being met.			

Question ID	MRDW1084001	**Question Type**	Legislative
Question: Are all inorganic water quality monitoring requirements prescribed by legislation conducted within the required frequency?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 13-2;		
Observation			
All inorganic water quality monitoring requirements prescribed by legislation were conducted within the required frequency. Treated water samples were last collected for the analysis of the parameters in Schedule 23 of O. Reg. 170/03 on January 24, 2022. As per Sch. 13.2 of O.Reg. 170/03, these samples were taken within the prescribed 12-month time period. All results were less than half of the O. Reg. 169/03 standard.			

Question ID	MRDW1088000	**Question Type**	Legislative
Question: Are all nitrate/nitrite water quality monitoring requirements prescribed by legislation conducted within the required frequency for the DWS?			

Legislative Requirement	SDWA | O. Reg. 170/03 | 13-7;

Observation

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

Quarterly nitrate sampling was conducted on January 4, 2022, April 4, 2022, July 4, 2022, and October 3, 2022. Nitrate results ranged from 0.269 to 0.531 mg/L, which is below the standard of 10 mg/L. Nitrite samples were all less than 0.003 mg/L and the standard of 1 mg/L.

Question ID	MRDW1089000	Question Type	Legislative

Question:

Are all sodium water quality monitoring requirements prescribed by legislation conducted within the required frequency?

Legislative Requirement	SDWA | O. Reg. 170/03 | 13-8;

Observation

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

According to last years' inspection report, the last sodium sample was collected on January 20, 2020, within 60 months or 5 years of the previous sample (January 19, 2015), as required. The sodium concentration was 4.72 mg/L, well below the aesthetic objective of 200 mg/L.

Question ID	MRDW1091000	Question Type	Legislative

Question:

Where fluoridation is practiced, are the required daily samples being taken at the end of the fluoridation process?

Legislative Requirement	SDWA | O. Reg. 170/03 | 7-4;

Observation

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

Fluoride is measured by a continuous analyser (AIT-5102) and the daily concentrations are included in the monthly SCADA reports. Review of those reports showed that fluoride concentrations during the review period were less than the standard of 1.5 mg/L (O.Reg. 169/03). The fluoride injector was out of service from March 4 - April 11, 2022 at which time it was replaced. On August 31, 2022 a new fluoride transmitter, probe and electrode

were installed. The fluoride system was again taken out of service from September, 2022 - early January, 2023 due to analyser issues. During the inspection fluoride was being dosed at 0.2 mg/L. Normal operating concentrations should range betwen 0.5 and 0.8 mg/L (Technical Support Document for ODWQS).

Question ID	MRDW1085001	**Question Type**	Legislative
Question: Are all organic water quality monitoring requirements prescribed by legislation conducted within the required frequency?			
Legislative Requirement	SDWA | O. Reg. 170/03 | 13-4 | (1); SDWA | O. Reg. 170/03 | 13-4 | (2); SDWA | O. Reg. 170/03 | 13-4 | (3);		
Observation			
All organic water quality monitoring requirements prescribed by legislation were conducted within the required frequency. Treated water samples were last collected for the analysis of the parameters in Schedule 24 of O. Reg. 170/03 on January 24, 2022. As per Sch. 13-4 of O.Reg. 170/03, these samples were taken within the prescribed 12-month time period. All results were less than half of the O. Reg. 169/03 standard.			