



South Huron Distribution System

Inspection Report

Ministry ID Number: 220001520
Inspection Start Date: 09/01/2021
Inspection End Date: 10/14/2021
Inspection By: Paul TerSteege

(signature)

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Inspection Background

Name: South Huron Distribution System
ID Number: 220001520
Entity Inspected: South Huron
Local Ministry Office: Sarnia
Local Supervisor: Marc Bechard
Date Inspected: 9/1/2021 **Previously Inspected:** 08/18/2020
Review Period: Aug 2020 to Aug 2021

Facility Description

The South Huron Distribution System obtains its drinking water supply via 5 connections to the donor's system – the Lake Huron Primary Water Supply System (LHPWSS). The donor's water treatment plant is located within South Huron, as are over 40 km of trunk mains, a secondary reservoir and booster pumping station, and a number of chambers housing valves and other appurtenances. Note: The donor's infrastructure is subject to separate inspections.

The South Huron Distribution System supplies water to approximately 8,200 residents. Further, the system supplies some of Bluewater's residents along the Municipality's northern boundary. Some consumers along the Municipality's southern boundary are supplied by the North Middlesex Distribution System (which also obtains its drinking water from the LHPWSS).

The system consists of ~200 km of distribution watermains ranging in size from 50mm to 400mm diameter. The 50mm mains are polyethylene (PE); the 100mm to 300mm mains are polyvinylchloride (PVC) and the larger mains are mix of cast iron, ductile iron, and steel reinforced concrete pressure pipe.

There are seven pressure zones within the South Huron Distribution System. (The Municipality's Annual Drinking Water Reports typically contain a detailed description of the zones, the connections between them, and the supply of zones during normal and emergency feed situations.)

Inspection Observations

Introduction

- **The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) legislation as well as evaluating conformance with ministry drinking water policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment, and distribution components as well as management practices. This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O.Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA. This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.**

The inspection had regard for events since the date of the last inspection; however, within that review period, the scope and depth of the Officer's review varied based upon subject matter, and upon whether he identified indicators suggesting a need for a more detailed review.

- **This Drinking Water System provides for only secondary disinfection and distribution of water. Primary disinfection is undertaken by another regulated Drinking Water System which provides treated water to this Drinking Water System.**

Treatment Processes

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

Data provided for review indicated the disinfectant residual in the distribution system was conducted as required by Section 7-2(3) of O. Reg. 170/03 by means of several continuous analysers at key points in the distribution system. Further testing is also performed on grab samples.

Note: The Municipality indicated it was looking to install chlorination and monitoring equipment at the MacNaughton Drive Reservoir/Pumping Station to facilitate efforts by operators to maintain the chlorine residual in water leaving this facility.

Treatment Processes

- **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.**

Where continuous monitoring equipment is used to fulfil chlorine or turbidity testing requirements, Subsections 6-5 (1) and 6-5 (1.1)1 in O. Reg. 170/03 requires the use of alarms and/or interlocks to safeguard consumers from inadequately disinfected water. In the event of a malfunction, loss of power, etc., the intent of Section 6-5 is to enable operators to take prompt and appropriate action to resolve the concern, and/or to cause the flow of water to consumers to be stopped.

The South Huron Water Distribution system is monitored and controlled by a PLC based Supervisory, Control and Data Acquisition system (SCADA), which communicates through a fibre optic system to a dedicated server in the Municipal Office. The system can be monitored by a computer at the Municipality's Environmental Services Operations Centre and remotely by tablets. Further, the system is equipped with numerous alarms in order to notify operators of a variety of operational concerns.

- **Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and recording data with the prescribed format.**

Where continuous monitoring equipment is used to fulfil regulatory testing requirements for chlorine or turbidity, Subsection 6-5 (1) in O. Reg. 170/03 prescribes minimum testing and recording intervals. Where monitoring equipment tests more frequently, the monitoring equipment may record the minimum, maximum, and the mean results for periods equal to the prescribed intervals.

The SCADA system captures measurements at a frequency exceeding the minimum standard required by Subsection 6-5 (1). To facilitate a review of the system's performance, the Municipality provides a series of files containing 4-minute averages of over two dozen chlorine residual, water level, flow and pressure measurements.

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

Where continuous monitoring equipment is used to fulfil chlorine or turbidity testing requirements, Section 6-5 in O. Reg. 170/03 requires an examination of results within 72 hours of the tests. Records provided for review indicated operators usually document their weekday checks in the "Daily SCADA Reading" worksheet. In the event of a long weekend, an operator will perform a check during the weekend if required.

Treatment Processes

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

Where continuous monitoring equipment is used to fulfil chlorine or turbidity testing requirements, Subsection 6-5 (1) in O. Reg. 170/03 requires owners to assess the accuracy of the equipment in accordance with the manufacturer's instructions, or if not indicated, as frequently as required to ensure the equipment remains within acceptable tolerances.

The Officer understands operators ensure the accuracy of their handheld units using gel standards. The handheld units are then used to assess the continuous analysers during checks and maintenance.

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

The Municipality discussed changes that were completed, were in progress, and were being considered in the future. These included changes to the chlorination and monitoring equipment at the Huron Park Water Tower (which was documented in a Director Notification dated October 8, 2020); changes to the monitoring station in the North of Exeter; the proposed addition of chlorination and monitoring equipment at the MacNaughton Drive Reservoir/Pumping Station; and the proposed addition of a pressure-reducing valve in the main supplying shoreline development in the northwest corner of the distribution system.

Note: The Municipality's Water and Wastewater Master Plan identifies additional water servicing issues and capital project proposals.

- **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.**
- **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.**

Treatment Processes

- **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.**

Regardless of whether owners provide secondary disinfection themselves, Section 1-5 in O. Reg. 170/03 requires them to ensure the provision of treatment capable of providing a free chlorine residual of 0.2 mg/L at all locations within the distribution system. Further, Section 1-2 requires the free chlorine residual to be ≥ 0.05 mg/L.

Note: In limited cases, such as in South Huron, point-of-entry UV disinfection systems have been installed in parts of the distribution system in exchange for relief from these regulatory requirements.

The Officer did not note any adverse results amongst the data captured by the continuous monitoring equipment, nor the results of grab samples tested by operators.

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

Equipment that is new, altered and/or subject to potential contamination is to be disinfected per a procedure listed in Schedule B of the Drinking Water Works Permit. To ensure operators and contractors are following minimum record keeping requirements, the Municipality continues to use a "Watermain Failure Report" form to document repairs to both watermains in the distribution system and to services supplied by the distribution system.

Under their current Drinking Water Works Permit, the Municipality was to transition on August 1, 2021 from use of the Ministry's 2015 Watermain Disinfection Procedure to the 2021 Procedure. The forms provided for review predated this transition period.

Note: Updates to the current form are pending as the Municipality considering switching to an electronic reporting system, e.g., for both their logs and worksheets. A timetable for completing these changes is subject to available resources.

Operations Manuals

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

Logbooks

- **Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.**

Pursuant to Section 7-5 in Schedule 7 of O. Reg. 170/03, only qualified personnel (e.g., certified operators or water quality analysts) appear to be performing operational tests.

- **Logbooks were properly maintained and contained the required information.**

Pursuant to Subsection 27 (1) of O. Reg. 128/04, logs and other record-keeping mechanisms are available for use by operators to document the operation of the subsystem. Further, pursuant to Subsection 27 (5), operators appear to be documenting information regarding the system's operation including the date and time of their entries, the names of the operators on duty, and details regarding equipment problems, unusual events and/or departures from normal operating procedures.

Given the number of facilities within the distribution system, numerous records are being generated over the course of each month. As with other owners and operating authorities, the Municipality is hoping electronic recordkeeping will facilitate the aggregation and use of this information.

Security

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

Operators did not report any incidents or concerns suggesting a need for additional security measures; however, they are prepared to respond should concerns arise. E.g., in response to concerns at one of their sewage facilities, the Municipality installed video surveillance equipment.

Certification and Training

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

As required by Subsection 23 (1) of O. Reg. 128/04, the Municipality has designated an "overall responsible operator" (ORO).

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

The Officer understands that in order to create a more robust and resilient workforce, the Municipality discontinued the use of a static set of geographic work assignments. Currently, they use a schedule whereby operators' responsibilities will rotate over time through a series of geographic zones. Every qualified operator is encouraged to act as an operator-in-charge.

Certification and Training

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

Each of the operators identified by the Municipality holds a drinking water certificate or a conditional drinking water certificate.

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

The Municipality advised all appropriately certified operators are permitted to adjust their treatment equipment.

Water Quality Monitoring

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

Sampling records indicate operators test the chlorine residual at the same time and location they are collecting microbiological samples, as prescribed by Subsection 6-3 (1) in O. Reg. 170/03.

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

Per the summary of reported laboratory results appended to this report, operators are performing the microbiological sampling required Section 10-2 of O. Reg. 170/03 for a system of this type and size.

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

Per the summary of reported laboratory results appended to this report, operators have been collecting samples quarterly for testing haloacetic acids as required Section 13-6.1 of O. Reg. 170/03. Records indicate the samples have been collected from the outlet from the Huron Park Water Tower, a point where operators believe could have the highest potential for the formation of haloacetic acids.

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

Per the summary of reported laboratory results appended to this report, operators have been collecting samples quarterly for testing trihalomethanes as required Section 13-6 of O. Reg. 170/03. Operators have purposefully rotated sample collection from various points in the distribution system. Four quarterly samples are collected from one location. The following year, a different location is used.

The most recent sets of samples have been collected from the shoreline in the northwestern corner of distribution system.

Water Quality Assessment

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

The summary of reported laboratory sample results appended to this report identifies 1 result that exceeded the applicable limits.

Note: Isolated adverse microbiological results can be indicative of sampling error, and they should not prompt undue concern regarding the supply and/or the operation of the water system.

Reporting & Corrective Actions

- **Where required continuous monitoring equipment used for the monitoring of chlorine residual and/or turbidity triggered an alarm or an automatic shut-off, a qualified person responded in a timely manner and took appropriate actions.**

Where continuous chlorine residual monitoring equipment alarms, the Ministry requires prompt and appropriate action. This is true of both "regulatory analysers" indicating a duty to report under Section 18 of the Act (i.e., per Section 16-3 of O. Reg. 170/03) and of "process analysers" that may be indicating a duty to report other observations per Section 16-4 of O. Reg. 170/03.

The Officer did not note any concerns with the operators' responses, i.e., as most of the anomalies in the chlorine residual data stemmed from interruptions while operators were on site servicing an analyser. There were also some SCADA communications issues.

- **There were reportable adverse/exceedances during the inspection period.**

During the review period, a distribution sample collected on January 19, 2021, came back with a Total Coliform result of 1 CFU/100mL. (The chlorine residual for that sample was reported as 1.0 mg/L.)

- **Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.**

Schedule 17 of O. Reg. 170/03 prescribes generic corrective actions in response to adverse test results and/or indicators of improper disinfection – including consulting with, and taking any additional measures prescribed by the Medical Officer of Health (Health Unit). (If applicable, adverse lead results are discussed under a separate bullet in this section of the inspection report.)

Paperwork submitted by operators indicated that upon becoming aware of the adverse result, additional samples were collected both at and upstream of the location that had yielded the adverse result. The Total Coliform results for both samples was 0 CFU/100mL. The free chlorine residual at the two locations was 0.94 mg/L and 0.97 mg/L respectively.

Reporting & Corrective Actions

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

Schedule 16 of O. Reg. 170/03 requires an immediate verbal report of adverse water quality incidents to the local Medical Officer of Health (or on-call designate) and to the Ministry's Spills Action Centre. Paperwork submitted by operators indicated the required notifications were made.

Other Inspection Findings

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

The Officer has noted during the past and current inspection that the Director of Infrastructure and Development, and the Manager of Environmental Services have worked collaboratively to address needs and concerns in the distribution system. One challenge that was noted, which is not necessarily unique to the Municipality, is that field operators have found they have encountered extra work arising from the current pandemic and from the installation of fiberoptic infrastructure.

The additional workload can make it challenging to move ahead on other core objectives (e.g., the development of more effective management systems, etc.)

Inspections do not always lend themselves to determining the degree to which owners and operating authorities have appropriately staffed the drinking water system. Nor do they lend themselves to identifying options for addressing staffing pressures.

Per the Ministry's Guide for Members of Municipal Councils, ideally Councils develop an informed understanding of their water system by reviewing questions with municipal staff. If necessary, they may wish to solicit advice from those with subject matter expertise.

Appendix 1

Area Maps and Water Infrastructure

Appendix 2

Summary of Reported Sample Results

Appendix 3

Drinking Water System Dossier (Excerpts)

Appendix 4

Key Reference and Guidance Material