Ministry of the Environment and Climate Change

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Ministère de l'Environnement et de l'Action en matière de changement climatique

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March 19, 2018

File #: SI-LA-KI-540

Union Water Supply System
1615 Union Avenue
Ruthven, ON N0P 2G0

Attention: Mr. Rodney Bouchard, Manager

Re: Union Water Supply System (DWS#210000853) Inspection Report

Please find enclosed the Drinking Water System Inspection Report for the inspection that was conducted at the Union Water Supply System (DWS#210000853) on January 16, 2018.

A summary of **Non-Compliance with Regulatory Requirements and Actions Required** are found on page 16.

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 council" found under "Resources" on the Drinking Water Ontario website at www.ontario.ca/drinkingwater.

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal/external risk experts. The Inspection Summary Rating Record (IRR), included as Appendix B of the inspection report, provides the Ministry, the system owner and the local Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance.

IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspectors' Annual Report. If you have any questions or concerns regarding the rating, please contact Marc Bechard, Drinking Water Program Supervisor, at 519-383-3778.

If you have any questions or concerns regarding this report, please call me at (519) 948-2467.

Yours truly,

Emily Awad
Water Inspector, Provincial Officer #1823
Safe Drinking Water Branch, Windsor Area Office

Encl.
cc: Ken Penney, Process & Compliance Technician and Dale Dillen, Operations Manager, Union Water Supply System;
Dr. Wajid Ahmed, Acting Medical Officer of Health; Theresa Marentette, Director of Health Protection; Mike Tudor, Manager, Health Inspection Department; Phil Wong, Manager, Health Inspection Department; WECHU
Katie Stammler, Source Water Protection Manager, Essex Region Conservation Authority
Marc Bechard, Supervisor, Ministry of Environment and Climate Change

Ontario

Ministry of the Environment and Climate Change

UNION AREA WATER SUPPLY SYSTEM

Inspection Report

Site Number:	210000853
Inspection Number:	1-F93SZ
Date of Inspection:	Jan 16, 2018
Inspected By:	Emily Awad

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OWNER INFORMATION:

Company Name: UNION WATER SYSTEM JOINT BOARD OF MANAGEMENT (LEAMINGTON, KINGSVILLE, ESSEX, LAKESHORE)
Street Number: 1615 **Unit Identifier:**
Street Name: UNION Ave
City: RUTHVEN
Province: ON **Postal Code:** N0P 2G0

CONTACT INFORMATION

Type: Main Contact **Name:** Ken Penney
Phone: (519) 326-4447 **Fax:**
Email: kpenney@ocwa.com
Title: Ontario Clean Water Agency - Process & Compliance Technician

Type: Owner **Name:** Rodney Bouchard
Phone: (519) 326-1668 **Fax:** (519) 326-3490
Email: rbouchard@unionwater.ca
Title: Manager, UWSS Joint Board Management

Type: Operating Authority **Name:** Dale Dillen
Phone: (519) 326-4447 **Fax:** (519) 326-0450
Email: ddillen@ocwa.com
Title: Operations Manager, OCWA

INSPECTION DETAILS:

Site Name: UNION AREA WATER SUPPLY SYSTEM
Site Address: 1615 UNION AVE RUTHVEN ON N0P 2G0
County/District: Kingsville
MOECC District/Area Office: Windsor Area Office
Health Unit: WINDSOR-ESSEX COUNTY HEALTH UNIT
Conservation Authority: Essex Region Conservation Authority
MNR Office: Chatham Regional Office
Category: Large Municipal Residential
Site Number: 210000853
Inspection Type: Announced
Inspection Number: 1-F93SZ
Date of Inspection: Jan 16, 2018
Date of Previous Inspection: Jan 26, 2017

COMPONENTS DESCRIPTION

Site (Name): Union AWSS
Type: Other **Sub Type:** Other
Comments:

The Union Area Water Supply System (Union WSS) is located in Ruthven, Ontario. The drinking water system is owned by, and supplies water to, the municipalities of Kingsville, Leamington, Essex and Lakeshore via the Union Water System Joint Board of Management. Each of these respective municipalities forms part of the board, but each also owns and operates a separate standalone distribution system receiving water from the Union WSS. According to the drinking water system registration profile, this results in a total serviced population of approximately 60,000 persons. The Union WSS system is considered a "large municipal residential system" under O. Regulation 170/03. The communities of Kingsville, Leamington, Essex are equipped with elevated tanks. Other than the reservoirs on-site at the Union treatment plant, there is also a reservoir/booster station in the village of Cottam which serves the Town of Essex.

Site (Name): Union AWSS Low Lift Building
Type: Source **Sub Type:** Surface Water
Comments:
The treatment facility in Ruthven, receives water from Lake Erie via a low lift pumping station. Seven low lifts pumps can draw water through two intake pipes and another emergency intake channel if needed. The low lift station is equipped with a zebra mussel control system consisting of two sodium hypochlorite chemical feed pumps to pre-chlorination lines retrofitted through both the #1 and 2 intake, extending to a diffuser within each intake crib. The low lift pumping station consists of a two cell interconnected pump-well, equipped with manually removed bar screens and automatic travelling screens. Low lift pump well #1 houses five low lift pumps and low lift pump well #2 houses the remaining two pumps. The low-lift also houses two surge tanks for pump pressure surges.
Raw water flows through 24 inch and 36 inch raw transmission mains to the treatment plant approximately one kilometre inland.

Site (Name): Union AWSS WTP
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
The Union WSS treatment plant is currently rated at 124,588 m3/d approved capacity. It is a conventional water treatment plant consisting of contact clarification via four solids upflow clarifiers after coagulant, coagulant aid (polymer) and activated carbon addition. Clarified water flows into eight dual media-type filters (sand and anthracite). Filter aid can be dosed on a contingency basis. The filters are equipped with backwash facilities via two backwash pumps. Sedimentation sludge and backwash from the filters is directed to a residue management pump station and is transferred to two settling/storage ponds. Supernatant overflow from the ponds is discharged into a storm sewer which discharges to Lake Erie.
Primary disinfection is provided via chlorine gas solution injection into the clarified effluent water (pre) and filtered effluent water (post) locations. Chlorine contact is achieved in two on-site reservoirs, operated in series. Interconnecting piping and valves allow taking individual reservoirs out of service. Free and total chlorine is monitored after the reservoirs to properly meter and inject aqueous ammonia into the treated water stream for secondary disinfection before the high-lift pump station. The high-lift pump station consists of two wells. High-lift pump well #1 houses seven high lift pumps and high-lift pump well #2 houses two pumps. There is also an emergency diesel-drive for one of the high-lift pumps. The high-lift also houses two surge tanks for pump pressure surges.

INSPECTION SUMMARY:

Introduction

- **The primary focus of this inspection is to confirm compliance with Ministry of the Environment and Climate Change (MOECC) legislation as well as evaluating conformance with ministry drinking water related policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment and distribution components as well as management practices.**

  This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O.Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.

  This report is based on a "focused" inspection of the system. Although the inspection involved fewer activities than those normally undertaken in a detailed inspection, it contained critical elements required to assess key compliance issues. This system was chosen for a focused inspection because the system's performance met the ministry's criteria, most importantly that there were no deficiencies as identified in O.Reg. 172/03 over the past 3 years. The undertaking of a focused inspection at this drinking water system does not ensure that a similar type of inspection will be conducted at any point in the future.

  This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

  Specifically, this review includes an assessment of compliance/conformance in relation to the following:
  • Drinking Water Systems Regulation (O. Reg. 170/03);
  • Drinking Water Operator and Water Quality Analyst Certification Regulation (O. Reg. 128/04) with respect to facility certification, operator licensing and operating standards;
  • Drinking Water System Licence 041-101, Issue Number 5, issued June 9, 2017, related to Performance, Monitoring and Recording, Operations and Maintenance requirements;
  • Drinking Water Works Permit 041-201, Issue Number 4, issued June 9, 2017;
  • Permit to Take Water Number 0816-9T9SVT, related to compliance with permitted taking limits and special conditions;
  • Ontario Drinking Water Quality Standards based on water quality data generated since the previous inspection, and
  • required actions and recommendations in the previous ministry inspection report dated April 6, 2017.

  The inspection was conducted on an announced basis on January 16, 2018. It included:
  1. a physical inspection of the low and high lift pumping facilities, water treatment equipment, and residual waste management facilities, as well as the Cottam Booster Station;
  2. testing free and combined chlorine residuals in the laboratory water (treated);
  3. collection of relevant operational documents and owner's sampling results;

  A follow-up visit was conducted on February 15, 2018 to review SCADA data gaps.

  The inspection covers the period from January to December 2017.

Capacity Assessment

- **There was sufficient monitoring of flow as required by the Municipal Drinking Water Licence or Drinking Water Works Permit issued under Part V of the SDWA.**

  Condition 2.0 of Schedule C of Drinking Water Licence #041-101, Issue #5 requires the owner to undertake continuous flow measurement and recording for:
  2.1.1 The flow rate and daily volume of treated water that flows from the treatment subsystem to the distribution system.
  2.1.2 The flow rate and daily volume of water that flows into the treatment subsystem.

  Two differential pressure type (Clarifiers 1 & 2) and two magnetic type (Clarifiers 3 & 4) meters are installed on the raw inlet supply to each upflow clarifier, four in total. The metered flow piping to clarifiers 1 and 2 are inter-connected with each other. Magnetic type meters are installed on each filter effluent line.
  Magnetic type meters are also installed on the high-lift discharge headers to the distribution system. Additionally flow meters are installed to measure filter backwash. A flow meter is also in operation at the Cottam booster pumping station on the station effluent/bypass header.

  It was observed during the physical inspection that flow was being measured at all operating filter effluent line meters as well as meters 1A and 1B, the two primary flow meters at the high lift (from the treatment subsystem to the distribution system). During the inspection, the on-site SCADA system indicated a total raw flow of 4458 gallons/minute (into the treatment subsystem) and a total treated flow of 5826 gallons/minute going out to the distribution system. The primary flow meters at the high lift read the following flows during the inspection: 1A = 2850.36 and 1B = 3501.84 gallons per minute.

  Section 3.2 of Permit to take Water #0816-9T9SVT states that the maximum daily water takings shall not exceed 163,656 m3/d. During 2017, the daily maximum volume of water pumped into the plant ranged from 21,396 to 83,305 m3/d, the maximum of which was 51% of the authorized water takings.

- **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.**

  Condition 1.0 of Schedule C of the Drinking Water System Licence states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 124,588 m3/day. During the period of review, the maximum daily flow of treated water was 75,568 m3, or approximately 61% of the approved rated capacity.

Treatment Processes

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

  A recent update to Drinking Water Works Permit #041-201, Issue #4 (June 9, 2017) included the addition of the missing components, identified in previous inspections, to Schedule A. No further changes to the treatment equipment were noted during the physical inspection. A microstrainer that was formerly used in the treatment process was removed from the maintenance garage and there are plans to relocate the laboratory to this area. The other microstrainer will also be replaced to provide more space in the maintenance garage.
  At the time of the inspection, only two clarifiers were online and filters #5 and 7 were out of service; Filters #1 and 2 were online but not being used.

- **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.**

  Form 2 documents must be prepared for any works falling within the scope of sections 4.1, 4.2 and 4.3 of the Drinking Water Works Permit. Required Form 2 documents were prepared for 17 projects undertaken in 2017:
  - Change in treatment coagulant chemical from DelPAC 2020 to Hyperion 1090 in order to reduce aluminum

Treatment Processes

residual (September 2)
- Change in treatment coagulant chemical from Hyperion 1090 to DelPAC 2020 (November 11)
- Addition of new turbidimeter on Low lift intake #1 (April 6)
- Replacement of 6 filter turbidimeters with HACH TU5300sc turbidimeters (Filter #1: March 13, #2: May 1, #3: November 22, #6: February 23, #7: March 2, and #8: March 2)
- Replacement of HACH turbidimeter on clarifier #1 with SWAN AMI TURBIWELL turbidimeter (November 20)
- Replacement of turbidimeter on clarifier #2 (January 19)
- Replacement of Channel #1 (combined filter) ABB turbidimeter (November 15)
- Replacement of 2 filter flow meters (February 15 and 16)
- Replacement of low lift pump #2 (October 27)
- Replacement of plant effluent ABB turbidimeter (November 15)
- Replacement of TMC-2 combined filter turbimeter with Rosemount Emerson model Clarity II (February 6)

The Operating Authority is reminded that, as per Schedule B, section 4 of the Permit, any minor modifications or replacements to the drinking water system must be documented on a Form 2 prior to the modified or replaced components being placed into service.

- **Records indicated that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a Drinking Water Works Permit and/or Municipal Drinking Water Licence issued under Part V of the SDWA at all times that water was being supplied to consumers.**

  Operating logs and continuous trends from January to December 2017 were reviewed. Turbidity measurements from each filter and chlorine measurements from CRA-7 and the Cottam Booster effluent were provided by the Operating Authority in 2 minute intervals.

  The Disinfection Procedure requires that in order to be considered conventional filtration and meet or exceed the 2.5 log Giardia cyst removal, the 2.0 log Cryptosporidium oocyst removal and 2.0 log virus removal credits, the filtration process must use a chemical coagulant at all times when the treatment plant is in operation. On October 10, 2017 there was a loss of coagulant for 1 hour, six minutes due to coagulant pump failure. The operator could not repair it so had to call in off-site service to conduct the repair. Data review indicated that filter effluent turbidity did not increase during this time.

  Turbidity levels from filters #1-8 ranged from 0 to 0.92 NTU, with the exception of 3 instances, each lasting only 2 minutes, where the turbidity spiked above 1 NTU. In two of these instances, maintenance on the filter turbidity units was being conducted. Performance must meet filtered water turbidity of less than or equal to 0.3 NTU in 95% of the turbidity measurements each month. This performance standard was met at each filter in each month. Summaries assessed for the review period show that turbidity values on all filters were less than 0.3 NTU 100% of the time in March, May, July, November and December, and ranged between 99 and 100% in all other months except for August, when it dropped to 98.7%. This corresponds to increased algae detections in the raw water in August and the corresponding filter turbidity spikes.

  On May 1, 2017, operators began conducting more frequent plant walk-throughs and equipment checks (every 4 hours) as recommended in the last inspection report. Rounds sheets are completed each day and signed off by the operator.

- **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.**

  Distribution monitoring programs for combined chlorine residuals in each of the respective municipalities fed by the Union WSS are included within the scope of inspections for each of the stand-alone distribution systems for those

Treatment Processes

drinking water systems. The Union WSS is responsible for operation of the remote sites including Cottam Booster Station and the elevated tank and tower sites, and must maintain adequate combined chlorine residuals at those locations to ensure acceptable residuals are maintained throughout the entire system.

A review of the combined chlorine residuals at the outlet of the Cottam Booster Station showed the majority of total chlorine residuals above 0.25mg/L, ranging from 0.49 to 2.94mg/L, with an average concentration of 1.63mg/L. There were a few exceptions where values were recorded as "(null)" or zero. In all cases, these exceptions corresponded to notations of maintenance activities or power outages in the Facility Logbooks. There were also a handfull of results that exceeded 3mg/L that did not have a corresponding notation in the logbook. In these cases, the chlorine residual only spiked for a two minute interval and is not a concern.

During the inspection, the chlorine residual was measured in the laboratory water (treated) and showed a free chlorine residual of 0.11mg/L and a total chlorine residual of 2.08mg/L, for a combined chlorine residual of 1.97mg/L.

Treatment Process Monitoring

- **Primary disinfection chlorine monitoring was conducted at a location approved by Municipal Drinking Water Licence and/or Drinking Water Works Permit issued under Part V of the SDWA, or at/near a location where the intended CT has just been achieved.**

  A ProMinent D1C continuous chlorine monitor/controller with CLE probe (designated as CRA-7) measures free chlorine on the second reservoir outlet line for measuring primary disinfection CT, consistent with the ministry's "Procedure for Disinfection of Drinking Water in Ontario". This location is prior to addition of aqueous ammonia for the creation of chloramine for secondary disinfection. Free chlorine residuals from this monitor generally ranged between 1.03 to 3.0mg/L, with a few outliers (high values: >3mg/L and low values: <1mg/L) which corresponded to notations of maintenance in the Facility Logbook. The average free chlorine residual during the inspection period was 1.9mg/L.

- **Continuous monitoring of each filter effluent line was not being performed for turbidity.**

  Filter effluent turbidity values are measured by Hach TU5300sc analysers on all filters lines except for filter #4, which has a Rosemount Clarity II analyser. Measured results are recorded by SCADA. Alarm and filter-to-waste set-points are established in SCADA to respond to measured tests from these analysers.

  O. Reg.170/03, Schedule 7, Section 7(3)(2) requires continuous monitoring equipment of each filter effluent line. Continuous monitoring for turbidity is required only of the filter effluent that is directed to the next treatment process/stage (and eventually to the distribution system). On March 13, 2017, an "air-locked" turbidimeter on filter unit #3 was reported to the Spills Action Centre (SAC). Turbidity from the SCADA Historian data indicated 0.03 NTU prior to and 0.04 NTU after the incident. During the 2.5 hour intrerruption, the turbidity readings remained at 0.02 NTU and therefore turbidity from filter #3 was not continuously measured.

  At the inspection each operating filter effluent line had a functioning continuous turbidity meter. Filters #5 and 7 were out of service for annual maintenance and filters #1 and 2 were online but not being used.

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

  In accordance with the operating authority's policy, and as reflected in the project logs, review of continuous monitoring results via daily summary reports are completed once per day and recorded on the summary reports.

Treatment Process Monitoring

- **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.**

  Free chlorine is measured on the reservoir's outlet (CRA-7) for monitoring primary disinfection CT and each filter effluent line is equipped for continuous measurement of turbidity.

  Low and high chlorine alarm settings reviewed for CRA-7 through SCADA during the ministry's inspection were LoLo: 1.20 mg/L, Lo: 1.30 mg/L, Hi: 2.50 mg/L and HiHi: 2.60 mg/L, respectively. Alarms for secondary disinfection total chlorine levels leaving the plant (CRA-10) are similarly set.

  The plant is staffed 24 hours per day. The audible alarm can be heard through and outside the plant and the visual alarm is displayed on the SCADA terminal.

  Filter turbidity alarm setpoints reviewed through SCADA during the inspection were Hi: 0.16 NTU and HiHi: 0.18 to 0.20 NTU. At 0.20 NTU, the filter is automatically directed to waste; however, the operator can adjust this setpoint for operational purposes (i.e. to keep a filter online). Hi and hi-hi alarms are audible throughout the plant. Operational alarms for clarifier effluent turbidity prior to filtration are set at 3 NTU (hi) and 5 NTU (hi-hi).

  The alarm system is set so that if the turbidity value drops to zero or there is a power failure, it will alarm and filter to waste.

  New Hach turbidimeters have been installed on all filters except for filter #4. These Hach turbidimeters include a local alarm when flow is interrupted. The operating authority is currently exploring ways to connect this flow alarm to the SCADA system so that any flow disruptions to turbidimeters can be addressed immediately. Upgrades to the SCADA system planned for 2018 should address this issue.

  Due to the complexity of the Union WSS, the engineers designed an algorithm for SCADA to calulate CT which accounts for the current raw water conditions (temperature, pH), reservoir volume and flow rate, and free chlorine residual. The chlorine levels in the reservoirs are generally high as the chloramination system requires the chlorine at a 4:1 ratio to ammonia and alarm setpoints for CRA-7 warn the Operator if the chlorine levels are getting too low.

- **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.**

  O. Reg. 170/03, Sub-section 6-5(1) requires the continuous monitoring equipment to record the date, time, sampling location and result of every test for the parameter with at least the minimum frequency prescribed as follows:
  1. Free chlorine residual required to achieve primary disinfection: 5 minutes;
  2. Filter effluent turbidity: 15 minutes.

  A review of SCADA data confirmed that, in the majority of cases, monitoring of free chlorine residual at CRA-7 and turbidity at each filter was occurring at least every 5 minutes, with the exception of the March 13 turbidimeter air lock incident. Most instances where the frequency of measurements exceeded the minimum requirements were due to maintenance of the analyzers or filters, calibration of the analysers, software restarts, sample collection, power outages or communication losses, which were noted in the logbook. There were several instances in which the intervals between the chlorine and filter turbidity readings were greater than the required frequency. The WISKI database may have been down for maintenance during these instances, and the SCADA data provided was not complete because the current SCADA system will only record data if the percentage change in measurements meets an assigned threshold. It is recommended that SCADA record regulatory parameters at a minimum of 5 minute intervals. This issue should be addressed during the upgrade to SCADA planned for 2018-19.

Treatment Process Monitoring

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

  All continuous analysers are verified monthly and calibrated quarterly. Maintenance, checks and calibrations are documented in the operating authority's equipment maintenance recording system.

  Manufacturer's instructions for the Prominent free chlorine analyser located at CRA-7 indicates calibration should be repeated at regular intervals. Maintenance records show that the continuous chlorine analyser was verified and maintained monthly. Ongoing maintenance and calibration is conducted as necessary. Since the SCADA control system uses CRA-7 free chlorine analyser signal in a compound loop with the final plant flow signal to accurately dose aqua-ammonia to achieve a full conversion to monochloramine, CRA-7 accuracy must be frequently checked. Logs show that when the analyser was serviced the aqua-ammonia dosing pumps were temporarily shutdown. SOP OCWA-C1-03 outlines the procedure to follow for calibrating CRA-7. Upon request, this SOP was updated to include more specific directions, including placing the ammonia pump in manual and not making any adjustments to flow which would change the chlorine dosage; the updated SOP was reviewed with relevant staff.

  The HACH TU5400sc manufacturer's manual recommends that a calibration verification be done periodically to make sure that the system operates as intended and after repairs or comprehensive maintenance work. The manufacturer recommends cleaning the vial every 1 to 3 months, replacing the vial and the desiccant cartridge every 1 to 2 years, and cleaning the vial compartment and replacing tubing as necessary. Manufacturer's instructions for the Rosemount Clarity II turbidity sensor recommend calibration after maintenance of the turbidity sensor and lamp.

  Maintenance records show that all turbidimeters are verified monthly and routine calibration checks of on-line instrument versus hand-held and lab bench units is conducted as necessary. The maintenance described above is conducted at the recommended frequency. When the lamp is replaced on the Rosemount Clarity II turbidimeter, a calibration using either slope or standard calibration is conducted.

  The Operating Authority is moving away from developing additional SOPs so they have instructed staff to refer to the manufacturer's manuals for calibration instructions. Manufacturer manuals are stored on the shared drive and hard copies are filed in the office, readily available to all staff.

Operations Manuals

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

  The Union Area WSS Operations Manual contains descriptions of each of the process steps. Sections of the Operations Manual were revised in 2015, 2016, and early 2017. Standard Operating Procedure manuals for the plant and the Cottam Booster Station contain standard procedures and policies. Operators also have access to a map showing transmission mains in the Union distribution system along with as-built drawings. These are available as hard copies at the water plant.

  As indicated in the previous inspection report, plant drawings were to be updated within one year (April 13, 2017) of the re-location of the powdered activated carbon (PAC) dosing equipment as required by conditions 4.8 of the Drinking Water Works Permit and 15.2 of the Drinking Water System Licence. The owner is in the process of creating a digital library for all drawings which has taken more time than anticipated and was not completed by April 13, 2017. The owner requested an extension from the ministry and a new deadline of November 13, 2017 was approved. The owner then contacted the ministry just before the November 13th deadline to request another extension due to some additional work that is planned for the near future that should be incorporated into the drawings. Based on the scope of the project, the ministry granted them a new deadline of July 10, 2018.

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.**

  As required by Condition 16.2 under Schedule B of the Drinking Water System licence, the Union Area WSS Operations Manual contains procedures for monitoring, operating and maintaining equipment, contingency plans for emergencies, and procedures for dealing with complaints.

  It was once again noted that the Operations Manual only refers to the use of Delpac 2020 coagulant; however, Hyperion 1090 coagulant was also used from August 6 to October 27, 2016 and September 2 to November 10, 2017. The operating authority was directed to update the Operations Manual to include a description of any coagulants used in the water treatment process. This update has been completed and no further actions are required.

Logbooks

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

Security

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

  The Union WSS water treatment plant is located in a fenced compound with locked/camera monitored security entrances which must be remotely opened by the operator. All doors of the plant, with the exception of the front door, are steel security doors which are normally kept locked.

  The low lift building is in a separate windowless brick structure. It is not in a fully fenced compound, although strategic security fencing has been installed for preventing access to the roof and the electrical transformer compound. The building is equipped with lockable steel security doors, intruder door contact alarms, keycode entry and remote camera monitoring.

Certification and Training

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

  The overall responsible operator for the treatment system and distribution system is identified in SOP OCWA-C3-01. He holds a valid class IV certification for both; matching the classification of the Union water treatment plant and the Union trunk water distribution system. Three backup overall responsible operators hold class II or III certifications for both treatment and distribution sub-systems and are also identified in the SOP.

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

  Operators in charge for each shift are required to be identified in a designated field in the project log book.

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

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

  According to operating logs reviewed for the period assessed, only certified operators made adjustments to the treatment equipment.

Water Quality Monitoring

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

  O. Reg. 170/03, Schedule 10-3 requires the owner and operating authority to sample treated water once per week and analyse it for E. coli, total coliforms and heterotrophic plate count (HPC). For the period reviewed, treated water microbiological samples were taken each week.

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

  Provided that previous sample results have not exceeded one-half maximum acceptable concentration (MAC) for any parameter under Schedule 23, O. Reg. 170/03, Schedule 13-2 requires that samples must be taken and analysed for Schedule 23 parameters every 12 months for a surface water supply. The required samples were taken January 10, 2017 and then again on July 18, 2017. Previous samples for analysis of these parameters were taken January 12, 2016.

  Schedule 6-1.1 (5) states that for samples required to be taken every 12 months and tested for a parameter, the owner and the operating authority shall ensure that at least one sample that is taken during a 12-month period for the purpose of being tested for that parameter is taken not more than 30 days before or after the first anniversary of the day a sample was taken for that purpose in the previous 12-month period. The owner complied with this provision.

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

  Provided that previous sample results have not exceeded one-half maximum acceptable concentration (MAC) for any parameter under Schedule 24, O. Reg. 170/03, Schedule 13-4 requires that samples must be taken and analysed for Schedule 24 parameters every 12 months for a surface water supply. The required samples were taken January 10, 2017 and then again on July 18, 2017. Previous samples for analysis of these parameters were taken January 12, 2016.

  Schedule 6-1.1 (5) states that for samples required to be taken every 12 months and tested for a parameter, the owner and the operating authority shall ensure that at least one sample that is taken during a 12-month period for the purpose of being tested for that parameter is taken not more than 30 days before or after the first anniversary of the day a sample was taken for that purpose in the previous 12-month period. The owner complied with this provision.

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

  The drinking water system does not include any distribution systems except transmission mains. An assessment of distribution sampling compliance for haloacetic acid (HAA) is referred to within the scope of those separate stand-alone distribution system inspections. However, samples for HAA analysis were also taken at the water treatment plant quarterly and ranged from 5.3 (below detection limit) to 6.1 ug/L, which is comparable to results from 2 of the 4 distribution systems that are fed by the Union Area WSS: Leamington (all below detection, 5.3ug/L) and Kingsville (<5.3 to 5.6ug/L). HAA results were higher at the other two distribution systems fed by the Union Area WSS: Essex (<5.3 to 13.2ug/L) and Lakeshore (<5.3 to 14ug/L).

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

  The drinking water system does not include any distribution systems except transmission mains. An assessment of distribution sampling compliance for trihalomethanes (THM) is referred to within the scope of those separate stand-alone distribution system inspections. However, samples for THM analysis were also taken at the water treatment plant quarterly and the running annual average (RAA) for 2017 (13.4 ug/L) was lower than in 2016 (19.6ug/L) and

Water Quality Monitoring

also lower than the RAAs at the 4 distribution systems that are fed by the Union Area WSS (Essex=23.5ug/L, Kingsville=19.6ug/L, Lakeshore=25.2ug/L, and Leamington=21.5ug/L).

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

  As required under O. Reg. 170/03, Schedule 13-7, samples must be taken and analysed for nitrate and nitrite every 3 months. Raw and treated samples were taken weekly and analyzed for total ammonia-N, nitrate-N, nitrite-N, and nitrite+nitrate-N. Concentrations of nitrate (0.1 to 1mg/L) and nitrite (0.1-0.5mg/L) in treated samples were well below the drinking water standards (nitrate=10mg/L and nitrite=1mg/L).

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

  O. Reg. 170/03, Schedule 13-8 requires sampling and analysis of sodium every 60 months. A sample for analysis of sodium was taken on January 10 and July 18, 2017. The previous sample for analysis of this parameter was taken January 12, 2016.

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

  O. Reg. 170/03, Schedule 13-8 requires sampling and analysis of fluoride every 60 months. A sample for analysis of fluoride was taken on January 10 and July 18, 2017. The previous sample for analysis of this parameter was taken January 12, 2016.

- **All water quality monitoring requirements imposed by the Municipal Drinking Water Licence and Drinking Water Works Permit were being met.**

  Only sampling for Environmental Discharge Parameters are required under Schedule C, Condition 4.0 of the Municipal Drinking Water Licence. A monthly composite sample was collected from the point of discharge from the waste management settling pond and analyzed for total suspended solids (TSS). Concentrations ranged from below detection to 6mg/L. No additional monitoring for potable water was included in the Licence.

  SOP #OCWA-C3-34 provided during the inspection included instructions for the weekly TSS sample collection but no guidance on how the monthly composited sample is to be taken to ensure a thoroughly mixed sample. The operating authority has now updated the SOP to include detailed guidance on this and reviewed the update with relevant staff.

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

  Review of all chain of custody forms sent to the laboratory confirmed that chlorine residuals were measured with the microbiological samples each week, with the exception of August 8, 2017. The operating authority is reminded to ensure that chlorine residuals are measured along with each microbiological sample and recorded on the chain of custody sheet that is sent to the laboratory.

Water Quality Assessment

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

  All regulatory water sample results consistently met Ontario Drinking Water Quality Standards.

  The following water quality is also noted from the owner's results for samples collected from January to December 2017:
  (i) Aluminum residual samples of treated water from the plant were taken weekly. Concentrations were elevated

Water Quality Assessment

above the operational guideline (100ug/L) from April 24 to September 5, 2017, and was highest on August 24th (513ug/L). The operating authority switched coagulants (from DelPAC to Hyperion) from September to November to address the elevated aluminum residuals. Shortly after this switch (September 11, 2017), there was a marked decrease in aluminum residuals. This decrease may have been due to the switch to Hyperion and/or the decrease in raw water temperatures.
(ii) Samples of raw and filtered water for Clostridium perfringens were taken weekly; there were no detections in the filtered water.
(iii) Samples of raw and treated water for nitrites, nitrates, and ammonia were taken weekly.
(iv) Samples of Geosmin and MIB from raw and treated water were taken weekly; detections were generally only in the raw water, but there were a handful of detections of Geosmin in the treated water in July and August and one detection of MIB in the treated water in July.
(v) Samples of raw and treated water were taken weekly for chloride, sulphate, TOC , DOC and alkalinity for operational purposes.
(vi) As part of the corrosion study, water samples from each of the four distribution systems (Essex, Kingsville, Lakeshore and Leamington) were collected monthly and tested for lead, chloride, sulphate, pH, alkalinity, Langelier's Index as well as other parameters to monitor corrosivity potential in the distribution system. As in 2016, the chloride to sulphate mass ratio (CSMR) values in the treated water were around 1 and the Langelier's Index values were below 0 in the 2017 data, indicating that corrosion may occur. The owner stated that the raw water CSMR is also high, and therefore this is not due to the plant process, but to the raw water conditions. It is believed that the elevated alkalinity and pH buffer the treated water and prevent corrosion of lead pipes. For this reason, the owner has stated that corrosion monitoring will continue indefinitely. The lead concentrations in 2017 were all very low (0.04 to 1.65ug/L), indicating that corrosion is not occurring in the distribution system. No plumbing samples are currently being sampled for lead as the UWSS is exempt from this monitoring. However, due to the water conditions, it is recommended that monthly plumbing samples be added to the corrosion study to assess how the water conditions affect lead service lines and/or solder.
(vii) As part of UWSS internal algal toxin monitoring program, samples were taken weekly from the end of June to mid-August and then biweekly until November. Raw water was analyzed and if there was a detection, then the treated water was subsequently analyzed. Between August 14 and 30th, raw samples had low detections of total microcystins (0.14-0.50ug/L) but there were no detections in the treated water. Results from the ministry's Drinking Water Surveillance Program (DWSP) also showed detections of total microcystins in the raw water between August 8th and October 2nd which ranged from 0.2 to 2.4ug/L. There were no detections in the treated water. Samples collected between July 4 and October 24th were analyzed for several microcystin variants by Liquid Chromatography (Electrospray Ionization) Tandem Mass Spectrometry [LC-(ESI)MS/MS], including Microcystin-LR, which has a drinking water standard of 1.5ug/L (O. Reg. 169/03). Microcystin-LR results ranged from 0.083 to 0.42ug/L in the raw water between August 8th and 28th but were not detected in the other samples collected.

Reporting & Corrective Actions

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

  Forms 2A and 2B were submitted on time for the adverse event that took place on October 10, 2017 (loss of coagulant). After being unable to repair the coagulant pump, the operator called in a technician to complete the repair. The Medical Officer of Health was satisfied with these corrective actions.

- **All required notifications of adverse water quality incidents were not immediately provided as per O. Reg. 170/03 16-6.**

  The coagulant pump failure that occurred on October 10, 2017 was not reported to SAC immediately. The operating authority was directed to review the relevant SOPs with operators to ensure the required notifications are made.

- **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**

Reporting & Corrective Actions

took appropriate actions.

The water plant is staffed 24 hours per day, 365 days per year, therefore an operator is always on site and the operating authority has an expectation of an immediate response to alarms. Water plant operating logs indicate that appopriate actions were taken in a timely manner to regulatory equipment alarms.

Other Inspection Findings

- **The following issues were also noted during the inspection:**

1. Throughout August 2017, there was a plant upset at UWSS which included filter turbidity spikes likely caused by algal infiltration. Notes in the facility log indicate that on the morning of August 14th, an algal sheen was observed in the clarifiers and the sodium hypochlorite at the intake (for zebra mussel control) was turned off to prevent the breakage and release of toxins from the algae. However, in the early afternoon that same day, in the midst of this plant upset, the sodium hypochlorite at the intake was turned back on because the raw sample results from the previous week were free of total microcystin. The plant was still undergoing increased turbidity and struggling to keep the filters functioning (i.e. filtering to reservoir). Thus it seems that the sodium hypochlorite was switched back on prematurely. Especially since the raw samples collected that same day had a total microcystin detection of 0.22ug/L (UWSS sample) and 0.55ug/L (DWSP) and a microcystin-LR detection of 0.22ug/L (DWSP). It is recommended that during a known or suspected algal bloom where algae have infiltrated the plant, that the sodium hypochlorite at the low lift remains off as long as possible or until it can be determined that the algae infiltration has been cleared. Further recommendations on operational modifications during a blue green algal bloom are included in Appendix C. Appendix C also includes a letter sent to Ontario Municipal Drinking Water System Owners/Operators from the Deputy Chief Drinking Water Inspector dated May 3, 2017. In this letter, it is recommended that facilities routinely affected by Harmful Algal Blooms (HAB) should begin weekly monitoring from June 1st to the end of October in addition to notifying the ministry, the local Medical Officer of Health and the local Conservation Authority that a bloom has been observed. If the owner/operator observes a HAB in their area of responsibility, the monitoring plan should be increased to daily sampling. It is recommended that SOP OCWA-C6-12 be updated to include this more recent guidance from the ministry. In addition, all operational staff should review the updated SOP as well as the guidance in Appendix C so they are prepared for the next algal bloom. During this plant upset, the plant filter aid supply could not keep up with demand. The operating authority has since put a protocol in place to keep more filter aid on hand and to place an order as soon as the supply drops to six jugs.

2. During the physical inspection, the solids residue pile was observed on the north end of the property, adjacent to the waste residual settling/storage ponds. Operating Authority staff indicated that the solid residue had been dredged from the ponds over approximately the past 20 years and mainly consists of carbon and aluminum sulphate from filter backwash and clarifier blow off. Elevation profiles of the residual pile indicate that surface runoff would predominantly flow to the south into a ditch that drains into the Union Water Drain. This municipal drain flows to an inlet catch basin and then underground and outlets into a natural waterway, the Albert Gunning Drain, and then to Lake Erie. As recommended in the last inspection report, UWSS began monitoring TSS in the Union Water Drain at the north end of the residual pile on a monthly basis in March 2017. TSS ranged from below detection in June to 28mg/L in April. No samples could be collected in July and December as the drain was dry and/or frozen. During the inspection, a black substance was visible on the ground (under the snow) adjacent to the residual pile. The owner confirmed that they were storing unused activated carbon on the site for use as road cover and that they were planning on disposing it in a landfill if it was not used for the road bed.The long term storage of the residual pile is of concern, as well as the potential offsite impact from the runoff. Although UWSS currently has a plan to landfill the residual material over the next number of years, and has started to do so in the past few years at a significant cost, ongoing discussions with the ministry to determine the best option for disposal are underway. UWSS is currently trying to secure a long-term, non-restrictive agreement with a landfill to take the residual material for daily cover at a reduced cost. This option was used in 2013 but they ran into capacity issues at the landfill. In the meantime, the ministry has amended the current license to include monitoring conditions for the runoff of the residual pile. This includes monthly grab samples at four sites within the surrounding drains (Influent stream of the

Other Inspection Findings

municipal Union Water Drain, Influent stream of the OCWA Drain, Point of discharge from the south end of the residual waste pile, and Point of discharge from the west end of the residual waste pile) for analysis of both TSS and aluminum (filtered and unfiltered). These samples should be collected during or after a rain or precipitation event, or when flow at these sites permits an adequate and representative sample. In addition, due to concerns with offsite impacts, it is recommended that the activated carbon currently onsite is removed and any future storage of activated carbon be limited to enclosed storage containers. Further consultation can be provided by the ministry to assess disposal options and monitoring sites.

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

  3. During previous inspections, two large cracks were observed on the floor of the maintenance shop located above the below-grade powdered activated carbon slurry tanks. It was noted during the inspection that the two cracks have been filled.

  4. UWSS has plans underway to install a carbon dioxide raw water pH adjustment system. The current raw water pH ranges from 7.06 to 8.72, with an average of 8.05. The optimal pH for both coagulants (DelPAC and Hyperion) is closer to 7, so this updgrade is being implemented to decrease the raw water pH to optimize the coagulant performance and to reduce the aluminum residual. It is anticipated that approval will be sought from the ministry in the spring of 2018 and the project could be constructed by September 2018, at which time calibration and testing can begin.

  5. To address the concerns for future residual material from the waste lagoons, UWSS is proposing to inject a polymer into the waste stream before it is discharged to the lagoon, in order to improve the settling capacity and increase the density of the sludge. This should assist with the excavation of residuals from the pond as well as the drying process of those residuals. In addition, construction of a staging and drying pad for the excavated residual materials is planned, including drains for collecting the residual liquids and redirecting them back to the waste ponds. The dried residual materials would then be transported to a disposal facility.

NON-COMPLIANCE WITH REGULATORY REQUIREMENTS AND ACTIONS REQUIRED

This section provides a summary of all non-compliance with regulatory requirements identified during the inspection period, as well as actions required to address these issues. Further details pertaining to these items can be found in the body of the inspection report.

1. **Continuous monitoring of each filter effluent line was not being performed for turbidity.**

   Action(s) Required:

   All reporting requirements were met when continuous turbidity monitoring was interrupted. No further actions are required.

2. **All required notifications of adverse water quality incidents were not immediately provided as per O. Reg. 170/03 16-6.**

   Action(s) Required:

   OCWA SOP-C7-07 Reporting Adverse Water Quality Incident and OCWA SOP-C8-03 Coagulant Feed Failure were reviewed by all staff by October 19, 2017. No further actions are required.

SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES

This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following issues and consider measures to address them.

1. The following issues were also noted during the inspection:

Recommendation:

SIGNATURES

Inspected By:

Emily Awad

Signature: (Provincial Officer)

Reviewed & Approved By:

Marc Bechard

Signature: (Supervisor)

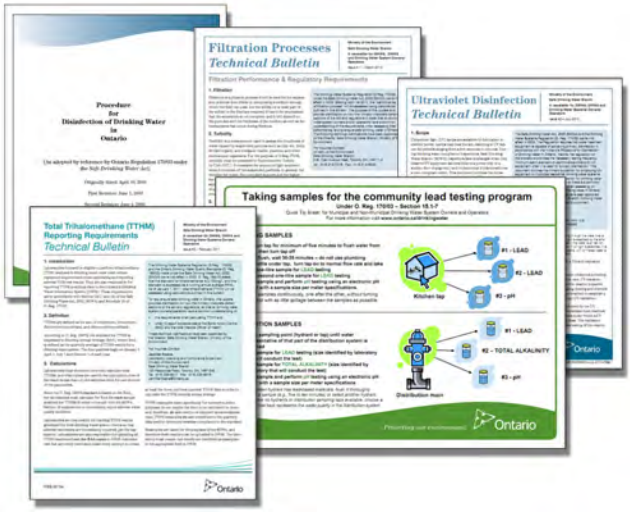
Review & Approval Date:

Note: This inspection does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they apply or may apply to this facility. It is, and remains, the responsibility of the owner and/or operating authority to ensure compliance with all applicable legislative and regulatory requirements.

Stakeholder Appendix

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

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



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

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

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

PIBS 8990b01

Ontario

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

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

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

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

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

PIBS 8990b01

Ontario

Inspection Rating Record

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2017-2018)

DWS Name:	UNION AREA WATER SUPPLY SYSTEM
DWS Number:	210000853
DWS Owner:	Union Water System Joint Board Of Management (Leamington, Kingsville, Essex, Lakeshore)
Municipal Location:	Kingsville
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	January 16, 2018
Ministry Office:	Windsor Area Office

Maximum Question Rating: 455

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 60
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 42
Water Quality Monitoring	0 / 103
Reporting & Corrective Actions	21 / 66
Treatment Process Monitoring	21 / 112
TOTAL	**42 / 455**

Inspection Risk Rating	**9.23%**

FINAL INSPECTION RATING:	**90.77%**

Inspection Rating Record Generated On 19-MAR-18 (Inspection ID: 1-F93SZ).

Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2017-2018)

DWS Name:	UNION AREA WATER SUPPLY SYSTEM
DWS Number:	210000853
DWS Owner:	Union Water System Joint Board Of Management (Leamington, Kingsville, Essex, Lakeshore)
Municipal Location:	Kingsville
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	January 16, 2018
Ministry Office:	Windsor Area Office

Non-compliant Question(s)	Question Rating
Reporting & Corrective Actions	
Were all required verbal notifications of adverse water quality incidents immediately provided as per O. Reg. 170/03 16-6?	21
Treatment Process Monitoring	
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?	21
TOTAL QUESTION RATING	42

Maximum Question Rating: 455

Inspection Risk Rating	**9.23%**
FINAL INSPECTION RATING:	**90.77%**

Inspection Rating Record Generated On 19-MAR-18 (Inspection ID: 1-F93SZ).

Harmful Algal Bloom Guidance Material

The following is a list of possible operational modifications. Any modifications should be discussed with the SDWB Approvals Engineers prior to taking place.

- Preliminary mechanical treatment such as strainers and screens must be cleaned frequently to remove any trapped algae.

- Oxidative processes applied before the filtration step has the potential to break and release toxins from algae. Therefore, consideration will be given to minimize or eliminate oxidative processes before the filtration process. The oxidative processes commonly used would include chlorination at the intake, potassium permanganate addition, ozonation, etc. These oxidative processes used after the removal of intact algae through the filtration process would help oxidise and remove dissolved algal toxins effectively.

- Dissolved air flotation (DAF) process keeps the algae intact and lifts it to the top of the surface. DAF process removes algae effectively.

- Treatment plants where solid contact clarifiers are employed, operators will consider removing floating scum (rich in algae) frequently while maintaining proper sludge blankets in the reaction compartment.

- Rapid removal of settled sludge (containing large amounts of algae) in the sedimentation process would help avoid re-suspension of the sludge and prevent the release of toxins from cell death.

- Usually, carbon with a high percentage of pores (2-50nm) is best in adsorbing algae toxins. Some treatment plants use powdered activated carbon (PAC) addition and granular activated carbon (GAC) filters seasonally for taste and odour episodes only. These plants must consider using these treatment processes for toxin removal.

- Since filters would become clogged quickly as a result of algae than the normal operations, filters need to be back washed frequently. However, due consideration must be given to back washing/ filter ripening/ filter to waste steps without compromising effluent turbidity quality and filter performance.

- Treatment plants that practice recycling effluent from filter back wash waste water treatment processes to the front end of the plant must monitor the effluent quality and ensure that toxins are not concentrated through the recycling process.

- Treatment plants that discharge filter back wash water directly into a receiver without undergoing any treatment must be monitor the discharge.

Ministry of the Environment and Climate Change

Safe Drinking Water Branch

Director's Office
2nd floor
40 St. Clair Ave West
Toronto ON M4V 1M2

Ministère de l'Environnement et de l'Action en matière de changement climatique

Direction du contrôle de la qualité de l'eau potable
Bureau du directeur
2e étage
40, avenue St. Clair Ouest
Toronto (Ontario) M4V 1M2

May 3, 2017

Ontario Municipal Drinking Water System Owners/Operators,

The Ministry of the Environment and Climate Change (MOECC) remains committed to working with you and other partners over the summer months to better understand the impact of environmental factors that contribute to harmful algal blooms (HABs) in our provincial lakes, rivers and inland waterbodies.

The purpose of this letter is to remind you of the importance of proactively monitoring your source water supplies for the presence of HABs which may contain blue-green algae (cyanobacteria). Considering that the onset of a bloom may be rapid and unexpected, it is imperative that all blooms be regarded as potentially toxic.

As such, I am requiring municipal drinking water system (MRDWS) owners/operators to be extremely diligent with:

- Ensuring that your systems are operating efficiently;
- Developing and implementing HAB Monitoring Plans (i.e. sample collection, testing, notification and reporting); and,
- Ensuring that MRDWS staff are aware and trained in HAB response at their location.

Those MRDWS that are historically affected by HABs every summer season should begin weekly monitoring from June 1st to the end of October, 2017. Monitoring actions should include, but are not limited to:

- Directly observing source water approaching and standing at system intakes for HABs;
- Assessing algal bloom movements in the Great Lakes at: https://www.glerl.noaa.gov/res/HABs_and_Hypoxia/
- Diligently collecting raw and finished water samples for total microcystin testing at a licensed laboratory;
- Notifying the Ministry, the local Medical Officer of Health (and the local Conservation Authority, if applicable) that a bloom has been observed in order that actions are taken to protect the public.

On a weekly basis (or otherwise directed from Ministry staff), MRDWS owners/operators should collect one raw water sample from the affected water body and one finished (treated) water sample from the distribution. The raw water sample should be collected at the intake or as close to it as possible to obtain a representative sample. Ideally, the finished (treated) water sample should be collected where routine THM samples are taken as free residual chlorine may reduce microcystin levels depending on the water pH. In the event that this is not possible, samples may be taken collected where convenient.

If the system owner/operator observes a HAB in their area of responsibility, the monitoring plan should change to a daily basis.

All samples must be submitted to laboratories that are licensed to perform the enzyme-linked immunosorbent assay (ELISA) test for total microcystin. If an ELISA test result for total microcystin meets or exceeds 1.5 µg/L in finished (treated) water, the hired testing laboratory shall immediately forward the samples to the Ministry's Laboratory Services Branch (LaSB) for confirmatory microcystin-LR testing. The LaSB is the only licensed laboratory to perform this complex analyses and supports this important initiative by covering the charge for testing.

Should the LaSB detect a result that meets or exceeds the Ontario Drinking Water Quality Standard (ODWQS) of 1.5 µg/L for microcystin-LR, they will immediately notify the MOECC Spills Action Centre (SAC), the drinking water system owner/operator and the local Medical Officer of Health as per the *Safe Drinking Water Act (2002)*.

Although to date, there has never been an reported microcystin-LR exceedance in Ontario drinking water, this monitoring program is precautionary in nature and serves to assess the presence of cyanobacteria and treatment efficacy of the system in the event an HAB is observed. In addition, weekly analyses of the treated water will serve to provide assurance to the public that their drinking water continues to be safe and of high quality.

Cammy L. Mack
Director/Deputy Chief Drinking Water Inspector
Safe Drinking Water Branch

cc: MOECC staff
Licensed Laboratories