

**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 27, 2019

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**

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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 8, 2019.

A summary of **Recommendations and Best Practice Issues** are found on page 20.

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](http://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; 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



**Ministry of the Environment, Conservation and Parks**

**UNION AREA WATER SUPPLY SYSTEM**

**Inspection Report**

<b>Site Number:</b>	210000853
<b>Inspection Number:</b>	1-ICRTG
<b>Date of Inspection:</b>	Jan 08, 2019
<b>Inspected By:</b>	Emily Awad

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Appendix A: Key Reference and Guidance Material

Appendix B: Inspection Summary Rating Record

**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

**INSPECTION DETAILS:**

**Site Name:** UNION AREA WATER SUPPLY SYSTEM  
**Site Address:** 1615 UNION AVE RUTHVEN ON N0P 2G0  
**County/District:** Kingsville  
**MECP 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-ICRTG  
**Date of Inspection:** Jan 08, 2019  
**Date of Previous Inspection:** Jan 16, 2018

**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 65,000 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.

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**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.

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**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 m<sup>3</sup>/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, 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.**

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 6, issued February 16, 2018, 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, issued March 6, 2015
- Ontario Drinking Water Quality Standards based on water quality data generated since the previous inspection.

The inspection was conducted on an announced basis on January 8, 2019. 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 chlorine residuals CRA-7 and at the Cottam Booster Station;
3. collection of relevant operational documents and owner's sampling results;

A follow-up visit was conducted on February 26, 2018 to review SCADA data gaps and logs.

### Source

- **Trends in source water quality were being monitored.**

Operators review and record raw water pH and temperature values (twice per day) and turbidity values hourly on the Operational Data Logsheet. Generally the Overall Responsible Operator (ORO) makes operational changes based on the raw water turbidity values; however, the operator in charge (OIC) or an operator in training (OIT) under the direction of an OIC or ORO may also make process changes. The YSI probe is also used to monitor Blue Green Algae in the source water and operational staff use this information to adjust treatment accordingly during a potential algal bloom. Operational staff are aware of the contents of the Source Protection Plan.

### Permit To Take Water

- **The owner was in compliance with all conditions of the PTTW.**

Section 3.2 of Permit to take Water #0816-9T9SVT states that the maximum water takings shall not exceed

### Permit To Take Water

163,656 m<sup>3</sup>/day and 113,650 L/min. During 2018, the daily maximum volume of water pumped into the plant was 94,256 m<sup>3</sup>, approximately 58% of the authorized water takings. The maximum taken per minute was 56,403 L/min, approximately 50% of the authorized water takings. The maximum values provided were corrected for pump spikes lasting less than 5 minutes.

### 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 #6 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.

Three differential pressure type (Clarifiers 1, 2 & 3) meters and 1 magnetic type (Clarifier 4) meter are installed on the raw inlet supply to each upflow clarifier. 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).

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

As per Condition 3.0 of Schedule C of the Licence, flow measuring devices shall be checked and calibrated in accordance with the manufacturer's instructions or within 12 months (maximum 30 days after the 12 month anniversary). All flow meters were checked and calibrated by Flowmetrix in May 2018, within twelve months of the previous calibration (May 2017).

- **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 m<sup>3</sup>/day. During the period of review, the maximum daily flow of treated water was 82,478 m<sup>3</sup>, approximately 66% of the approved rated capacity.

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

Daily maximum flow data were reviewed. The SCADA data included spikes due to pump start-up which exceeded the rated capacity. In those cases, operational staff manually reviewed the SCADA trending to remove the outliers and estimate the true maximum. It is recommended that the raw flow data from SCADA is used to remove these outliers and determine the true maximum daily flow instead. There were no exceedances during the inspection period.

### 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.**

All equipment appeared to be installed in accordance with the Permit. In 2019, the remaining microstrainer in the microstrainer room will be removed and the laboratory will be relocated to this area. In addition, a carbon dioxide system will be installed prior to coagulant dosing to decrease raw water pH which will optimize the coagulant performance and reduce the aluminum residual. There are also plans to update the chlorine building with a gas scrubber system and add an addition to the building.

- **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.**

A Form 2 "Record of Minor Modifications or Replacement to the Drinking Water System" document was prepared for:

1. New HACH turbidimeter installed on filter #4. Commissioned: March 2, 2018; Form 2 date: March 2, 2018
2. New SWAN filter backwash turbidimeter installed. Commissioned: March 20, 2018; Form 2 date: March 20, 2018
3. Change of treatment coagulant chemical from DelPac 2020 to Hyper+Ion 1090. Commissioned: June 14, 2018; Form 2 date: June 14, 2018
4. New HACH turbidimeter installed for plant effluent. Commissioned: September 14, 2018; Form 2 date: September 13, 2018
5. Change of treatment coagulant chemical from Hyper+Ion 1090 back to DelPac 2020. Commissioned: October 21, 2018; Form 2 date: October 29, 2018

The Owner/operating authority is reminded that as per Condition 4.6.1 of Schedule B of the Permit, these Form 2's need to be completed "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.**

At the time of the inspection, only two clarifiers were online and filters #2 and 3 were out of service.

Operating logs and continuous trends from January to December 2018 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. There were quite a few data gaps identified, which were likely due to SCADA communication errors. SCADA trends for all gaps were provided.

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 May 19, 2018 there was a loss of coagulant for more than 30 minutes due to a PLC failure. The operator shut down clarifier 4 after receiving a coagulant flow alarm, but due to the PLC failure, it did not actually shutdown clarifier 4. At this time, three clarifiers were online and two were operating as designed; water from the clarifiers is blended before going into the filtering stage. Review of the data did not indicate breakthrough of the filters so improperly disinfected water was not directed to users. The Standard Operating Procedure (SOP) was updated to direct operators to first put the chemical pump in manual mode if they get a loss of coagulant flow alarm. This way, coagulant will continue to flow. The updated SOP was reviewed by staff on June 12/18.

Turbidity levels from filters #1-8 ranged from 0 to 0.77 NTU during the inspection period. 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 all months except for May, July, September

### Treatment Processes

and October, where it ranged between 99.97 to 99.99%.

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

On March 1, 2018, logs indicate that power to the ammonia building was off for approximately 2 hours during maintenance. Although combined chlorine in the distribution system was low during this time, free chlorine was sufficient.

Beginning on June 4, 2018, the UWSS initiated a routine shutdown of their chloramination system for maintenance purposes. During the transition from chloramination to free chlorine secondary disinfection, as per Condition 2, Schedule D of their Licence, they were required to increase their microbiological and trihalomethane sampling in the distribution system. By June 15, 2018, the chlorine residuals in the distribution systems had stabilized and the increased sampling was no longer required. MECP has subsequently approved a request made by UWSS to extend the use of free chlorine secondary disinfection until June 4, 2019.

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 handful 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 at CRA1 and CRA2 at the Cottam Booster Station, and the concentrations were CRA1=0.97mg/L (1.11 on continuous analyzer) and CRA2=1.11 mg/L (1.22 on continuous analyzer).

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

As per Condition 14.1 of the Licence, all chemicals and materials used in the alteration or operation of the drinking water system that come into contact with water within the system shall meet all applicable standards set by both the American Water Works Association ("AWWA") and the American National Standards Institute ("ANSI") safety criteria standards NSF/60, NSF/61 and NSF/372. Documentation was provided from NSF stating that all chemicals used meet NSF/60 and that the materials not exempt from this condition (filter media and carbon), meet NSF/61, which has more stringent lead requirements than NSF/372.

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

Updated plans are available in a binder in the DWQMS cabinet at the plant. Electronic copies are also available on the shared drive.

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

### Treatment Processes

There is bypass valve for the clarifiers as well as the filters at the Union plant. All potential bypasses have been addressed by either installing blank flanges on the valves, or if this was not possible due to location, placing chains/locks on the valves.

### 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, which was in service between January 1 and June 3, 2018. Free chlorine residuals from this monitor generally ranged between 1.25 to 2.3mg/L, with a few outliers (high values: >2.3mg/L and low values: <1mg/L). Values below 1mg/L corresponded to notations of maintenance in the Facility Logbook. There were approximately 20 instances where the minimum free chlorine reading dropped to 0 for only a two minute period, which corresponded to notations of power outages or maintenance in the Facility Logbook. The average free chlorine residual during the inspection period was 1.68mg/L. The trend in free chlorine concentrations appears to begin to decline beginning in late June, likely due to the switch from chloramination. The operating authority confirmed that chlorine dosing decreased after the switch to free chlorine as a 4:1 ratio of chlorine to ammonia was no longer required.

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

Ongoing training is provided to operational staff.

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

Filter effluent turbidity values are measured by Hach TU5300sc analysers on all filters lines. 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.

At the inspection each operating filter effluent line had a functioning continuous turbidity meter. Filters #2 and 3 were out of service for annual maintenance.

- **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.

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

All portable/benchtop HACH meters were calibrated annually. In house verifications are conducted monthly and annually.

- **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.

### Treatment Process Monitoring

Chlorine alarm setpoints for CRA-7 are LoLo: 1.00, Lo: 1.15, Hi: 1.75 and HiHi: 1.85 mg/L. These alarm setpoints have been in effect since the switch from chloramination (June 4th). Prior to this, alarms for both CRA-7 and secondary disinfection total chlorine levels leaving the plant (CRA-10) were set at LoLo: 1.20, Lo: 1.30, Hi: 2.00, HiHi: 2.10mg/L. Filter turbidity alarm setpoints are Hi: 0.16 NTU and HiHi: 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 HiHi alarms are audible throughout the plant. Operational alarms for clarifier effluent turbidity prior to filtration are set at 3 NTU (Hi) and 5 NTU (HiHi).

At the inspection, the alarm setpoints were adjusted to demonstrate the audible alarms for CRA-7 and Filter 5. For both, the audible alarm was heard throughout the plant and the visual alarm was displayed on the SCADA terminal. The alarm system is set so that if the flow to the turbidity meter 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 and include a local alarm when flow is interrupted that flashes on the screen and would be noted by operators during rounds only. 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 2019 should address this issue.

Due to the complexity of the Union WSS, the engineers designed an algorithm for SCADA to calculate CT which accounts for the current raw water conditions (temperature, pH), reservoir volume and flow rate, and free chlorine residual. During the last licence renewal (2017), the CT worst case scenario was provided to the ministry's approvals engineer along with some rationale for the maximum high lift flow values that are used in winter versus summer. The CT achieved exceeded the CT required in all cases described. The ministry engineer recommended that a high flow alarm be incorporated into the system to notify operators to look more closely at the CT parameters. A combination alarm for CT based on high flow, low reservoir level and chlorine level was implemented on March 12th, 2019.

- **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 all cases, monitoring of free chlorine residual at CRA-7 was occurring at least every 5 minutes, and monitoring of turbidity at each filter was occurring at least every 15 minutes. There were quite a few data gaps identified during review, however SCADA trends for all gaps were provided. These data gaps were likely due to SCADA communication errors, which were noted in the logbook in most cases.

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

The HACH TU5300sc 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. All turbidity continuous analysers were calibrated/verified as per the scheduled preventative maintenance: monthly verifications, quarterly calibrations, and annual inspections.

Manufacturer's instructions for the Prominent free chlorine analyser located at CRA-7 indicates calibration should

### Treatment Process Monitoring

be repeated at regular intervals. All chlorine analyzers were calibrated as per the scheduled monthly inspections and annual calibrations. Maintenance, checks and calibrations are documented in the operating authority's equipment maintenance recording system.

### Process Wastewater

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

Backwash waste and clarifier sludge are automatically pumped to the wastewater station and then pumped to the waste lagoons when the level reaches a setpoint. The waste lagoons also discharge to Lake Erie based on the level.

- **The process wastewater discharge monitoring program and discharge quality complied with requirements established in the Municipal Drinking Water Licence Issued under Part V of the SDWA.**

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 8mg/L and the annual average is 3.6mg/L, well below the 25mg/L limit set out in Schedule C, Condition 1.5 of the Licence.

The recent amendment to the Licence also includes monitoring conditions for the runoff of the solids residual pile. As per Schedule C, Condition 4, monthly grab samples are required at four sites within the surrounding drains (influent stream of the Municipal 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). Sampling (grab) was conducted on a weekly basis for aluminum and a portion of that sample went into the monthly composite sample container for TSS. Sampling was logged on the lagoon sludge pile runoff logsheet and times when a sample could not be collected due to dry conditions (all of July, August and September) were documented. Total aluminum concentrations were generally below 2mg/L and dissolved aluminum concentrations were generally below 1mg/L. There was a significant increase in aluminum and TSS at the end of October at SP#1 (influent stream of the Municipal Drain). The owner indicated that the contractors were conducting some cleanup at the site after the removal of sludge from the pile, which likely caused the spike in aluminum and TSS. Monitoring shall continue in 2019 and results will be re-assessed during the next inspection.

The owner has made significant progress in removing the accumulated sludge from the residual pile. In 2018, approximately 2000 tonnes of the sludge was brought to the Essex Windsor Solid Waste Authority's (ESWA) Regional Landfill in Essex to be used as landfill cover. The owner indicated that they are anticipating the removal of 3000 tonnes in 2019. The black filter media that was observed adjacent to the residual pile last inspection has since been removed.

### Distribution System

- **There is a backflow prevention program, policy and/or bylaw in place.**

Backflow prevention is the responsibility for each of the municipal owners of the four connected municipal distribution systems. The UWSS has a program for annual checking of backflow preventers at the water treatment plant. There are two backflow preventers located at the Cottam Booster Station as well as 11 backflow preventers located within the UWSS facility.

- **The owner had a program or maintained a schedule for routine cleanout, inspection and maintenance of**

## Distribution System

### **reservoirs and elevated storage tanks within the distribution system.**

In general, AWWA standards are followed and reservoirs and storage tanks are inspected approximately every 5 years.

The Cottam reservoir was removed from service for maintenance and upgrades in 2013 and then inspected in March 2014 to investigate and address potential leakage. The 2019 inspection will investigate further any potential leakage from the reservoir. Recoating and maintenance (as per AWWA procedures) of the Leamington elevated tank was conducted in 2015 and it was inspected again in 2018. Recoating and maintenance of the Essex elevated tank was conducted in 2018. The Kingsville elevated tank is scheduled for inspection within the next few years. Reservoir #2 was inspected by Watech in February 2015. Leakage was found and temporary repairs were completed. More permanent repairs were completed in 2017. Reservoir #1 and high-lift clearwell #1 have not yet been inspected. The owner does not expect any sedimentation necessitating cleanout of the clearwell due to the high rate of flow through this chamber. In addition, this maintenance would require plant shut down. The owner is exploring the addition of another high lift pump to assist with maintenance of the high lift clearwells. A membrane has been installed around the clearwells to prevent spills from getting in.

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

Prior to returning elevated towers to service, super-chlorination, refilling and testing of the tower is first completed in accordance with AWWA procedures. Disinfection procedures are also applied to in-plant equipment that has been removed from service for repair or maintenance, including pumping and flow metering equipment, and filters as per SOP OCWA-C3-07 Filter Maintenance (Annual). Disinfection activities are documented in the Disinfection log.

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

In 2013, a program was developed with a valve turning trailer, and valves on the distribution system mains were turned in 2013 and 2014/15. There are currently plans to restart the program. When the program was initiated in 2013, stationary valves were identified and these are operated annually. All other valves within the plant are operated regularly through routine operations. In addition, valves within the plant that were installed over 30 years ago have been replaced.

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

All elevated tank, tower levels and control valve station pressures were continuously measured and logged through SCADA. Similarly, system pressure was continuously measured and logged at the water treatment plant and the Cottam Booster Station. Pressure monitors plus tower and elevated tank levels are all alarmed. Standard operating procedures exist for placing the Essex and Kingsville towers in hydraulic mode of operation, and operate high-lift pumps at the water plant to maintain Leamington pressures, in the event of loss of communications or failure of automatic electronic tower controls.

- **The donor had provided an Annual Report to the receiver stand alone distribution system(s) connected to this system.**

The 2018 Annual Reports for each of the connected stand alone distribution systems, prepared under section 11 of O. Regulation 170/03, were received by member municipal representatives on February 22, 2019 and presented at the Joint Management Board meeting on February 27, 2019.

### Operations Manuals

- **Operators and maintenance personnel had ready access to operations and maintenance manuals.**

The relevant operating manuals for the Union treatment plant are kept in the plant control room. A standard operating procedure binder, operations manual and facility emergency plan for the Cottam Booster Station is located in the HMI control room at the booster station. A set of binders, folders and reference manuals containing manufacturers' equipment manuals and information is also available at the water plant 'library' for reference.

- **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 2017 and it has not been updated since. Standard Operating Procedure manuals for the plant and the Cottam Booster Station contain standard procedures and policies. SOP OCWA-C6-12 Cyanobacterial Toxins – Microcystin-LR was updated in March 2018 to address the recommendation in the last inspection report. The SOP now states "If a sample result is received that exceeds 0.15 ug/L then sampling of the Treated water will be conducted on the next scheduled sample day along with the raw. If chlorination is occurring at the intake for zebra mussel control, it is recommended to shut down the chlorination immediately, since chlorine attacks the algal cell wall which releases the cyanobacteria toxins into the water." During a known or suspected algal bloom where algae have infiltrated the plant, it is recommended 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. It is recommended that the wording in the SOP be clarified so that chlorination at the intake is not turned back on prematurely.

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.

An extension to the deadline for plant drawing updates was approved and set for July 10, 2018. Drawings were manually updated by this new deadline. New as-built drawings will be completed for the new pH adjustment system, as well as previous changes to the microstrainer room and valve room, which will capture the removal of the carbon feed system and microstrainer #1.

- **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 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.

### Logbooks

- **Logbooks were properly maintained and contained the required information.**
- **Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.**
- **For every required operational test and every required sample, a record was made of the date, time, location, name of the person conducting the test and result of the test.**
- **The operator-in-charge ensured that records were maintained of all adjustments made to the processes within his or her responsibility.**

Any process adjustments are made by the OIC or ORO; an OIT can only make adjustments under supervision of

### Logbooks

the OIC. Logbooks get reviewed daily by operators and the Process and Compliance Technician reviews the logbook on weekly basis.

- **Logs or other record keeping mechanisms were available for at least five (5) years.**

The last five years of operational logs and records are maintained in cabinets next to the control room. Additional archived records, going back decades and possibly to the start-up of the water plant, are maintained in an international shipping container adjacent to the water treatment plant.

### Contingency/Emergency Planning

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

Chemical storage areas within the water plant and Cottam Booster Station are equipped with secondary containment curbs and structures, including for:

- Sodium hypochlorite storage and metering
- Primary coagulant, polymer and filter-aid storage, mixing and metering. Containment is formed by the chemical room itself, although there is an open floor drain that routes to the process wastewater system
- Ammonia storage, delivery and leak abatement systems

The area for secondary coagulant storage and delivery is located ovetop of floor grating within the raw header pipe gallery/valve room. The area underneath the grating is equipped with a sump pump which is normally designed to pump accumulated water to the floor drain system routed to the process wastewater system.

Generators and fuel storage within the low-lift, water plant and Cottam Booster Station are equipped with secondary containment curbs. The fuel tanks serving the low-lift generator, the Cottam Booster Station generator, the high-lift diesel driven pump, and the water plant's bulk fuel and day storage tanks serving the plant's two generators, are equipped with built-in outer secondary containment systems.

- **Clean-up equipment and materials were in place for the clean up of spills.**

A stocked spill station is located at the water plant's "pole barn". Smaller spill kits are located at the low-lift building and the Cottam Booster Station.

- **Standby power generators were tested under normal load conditions.**

Standby generator testing under load is conducted on a monthly basis as per Standard operating procedure OCWA-C6-04.

### Security

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

Reservoirs at the water plant are both covered below ground structures. The reservoir at the Cottam Booster Station is a covered partially below-grade structure.

- **Air vents and overflows associated with reservoirs and elevated storage structures were equipped with screens.**

During the inspection it was noted that the screens on the reservoir vents were corroded and holes were visible. It is recommended that these screens are inspected and repaired or replaced as required.

- **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

### Security

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. The Cottam Booster Station is in a fenced compound which is video monitored from the plant; the doors are also locked and equipped with alarms.

### Consumer Relations

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

Lawn watering restrictions from May 1 to September 30 have been adopted in a uniform by-law in each of the municipalities served by the Union WSS. An information brochure is available on the Union WSS web site indicating the restrictions. Restrictions entail even/odd house number watering days and time of day application.

### 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, and holds a valid class IV certification for both, matching the classification of the Union water treatment plant and the Union trunk water distribution system.

- **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.

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

Three adequately licenced (class 3) operators are designated to act when the ORO is unable to act.

### Water Quality Monitoring

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

O. Reg. 170/03, Schedule 10-4 requires the owner and operating authority to sample raw water once per week and analyse it for E. coli and total coliforms. For the period reviewed, raw water microbiological samples were taken each week.

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

The Drinking Water System (DWS) does not include any distribution systems except transmission mains. All services are located within the individual municipalities. An assessment of distribution sampling compliance is referred to within the scope of those separate inspections.

Due to the switch from chloramination to chlorine in June, increased microbiological sampling was required in exchange for exemption of chloramination treatment. As per Schedule D, Condition 2.2 of the Licence, on the day prior to the switch to free chlorine, 25 samples shall be taken and tested for E.coli, total coliform, and 25% of

### Water Quality Monitoring

samples tested for heterotrophic plate count (HPC). On days 1, 3, and 5, 16 samples shall be taken and tested for those parameters. If there are any detections, at least 25 samples from the entire distribution system shall be collected until two consecutive sets (24-48 hours apart) of samples are clear. For week 2, 16 samples shall be taken 3 times per week and tested for the same parameters, until the transition to free chlorine is complete (i.e. the free chlorine levels stabilize in the distribution system). This transition occurred by June 15 (week 2). All sampling was completed as required.

- **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 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 9, 2018. Previous samples for analysis of these parameters were taken January 10 and July 18, 2017.

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 9, 2018. Previous samples for analysis of these parameters were taken January 10 and July 18, 2017.

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 11.3ug/L, with a running annual average (RAA) of 6.8ug/L. The HAAs in the 4 distribution systems that are fed by the Union Area WSS were lowest at Leamington (5.3-15.1ug/L; RAA=9.7ug/L) and Kingsville (5.3-19ug/L; RAA=10.7ug/L) and highest at Essex (5.3-25.1ug/L; RAA=14ug/L) and Lakeshore (5.3-32.6ug/L; RAA=15.1ug/L). HAA concentrations in the distribution system have increased since 2017 (Essex=5.3 to 13.2ug/L, Kingsville=5.3 to 5.6ug/L, Lakeshore=5.3 to 14ug/L, and

### Water Quality Monitoring

Leamington=all below detection, 5.3ug/L). In 2018, the increase in HAAs occurred after the switch to free chlorine.

- **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 2018 (18.7 ug/L) was higher than in 2017 (13.4 ug/L) but lower than the RAAs at the 4 distribution systems that are fed by the Union Area WSS (Essex=30.5ug/L, Kingsville=26.7ug/L, Lakeshore=42.75ug/L, and Leamington=29.4ug/L). THM concentrations in the distribution system have increased since 2017 (Essex=23.5ug/L, Kingsville=19.6ug/L, Lakeshore=25.2ug/L, and Leamington=21.5ug/L). In 2018, the increase in THMs occurred after the switch to free chlorine. Although THM levels were still well below 100ug/L, the owner should continue to monitor these closely.

Due to the switch from chloramination to chlorine in June, increased THM sampling was required. As per Schedule D, Condition 2.2 of the Licence, THMs are to be sampled monthly within the distribution system. Since the switchover to chlorine only lasted two weeks, only one additional sample was taken in June.

- **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 approximately weekly until June, while the chloramine system was in operation. In June and July, monthly raw and treated samples were taken and following that, sampling changed to quarterly. Samples were analyzed for total ammonia-N, nitrate-N, nitrite-N, and nitrite+nitrate-N. Concentrations of nitrate (below method detection to 0.9mg/L) and nitrite (all below method detection (0.1mg/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 9, 2018 (7.74mg/L), well below the 20mg/L benchmark at which the local Medical Officer of Health must be notified. The previous samples were taken January 10 and July 18, 2017.

- **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 9, 2018 (0.09mg/L), well below the 1.5mg/L standard. The previous samples were taken January 10 and July 18, 2017.

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

- **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. Total chlorine residual ranged from 1.58 to 2.17mg/L during the inspection period. From June 11th on, the free chlorine residual ranged from 1.3 to 1.9mg/L.

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

### Water Quality Monitoring

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

### 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 2018:

- Aluminum residual samples of treated water from the plant were taken weekly. Concentrations were elevated above the operational guideline (100ug/L) from May 14 to July 3, 2018 with the highest concentration on June 11 (269ug/L). The operating authority switched coagulants (from DelPAC to Hyperion) from June 14 to October 21 to address the elevated aluminum residuals. Aluminum levels started to decline shortly after this switch and were below 100ug/L by July 9, 2018. As stated above, the installation of the pH adjusting equipment should help to optimize coagulant performance and plant efficiency. This will lower the coagulant dosing and thus reduce aluminum residual and should reduce the reliance on Hyperion, which creates more solids for the waste lagoons.
- Samples of raw and filtered water for *Clostridium perfringens* were taken weekly; there were no detections in the filtered water.
- Samples of raw and treated water for nitrites, nitrates, and ammonia were taken weekly between January and May 2018, monthly in June and July, and then quarterly after that.
- Samples of Geosmin and MIB from raw and treated water were taken weekly from July to September, 2018, once in May and three times in June; detections were generally only in the raw water, but there were five detections of Geosmin and MIB in the treated water (July 9, 16, 23 (MIB only), 30, August 7 (Geosmin only), and September 10)
- Samples of raw and treated water were taken weekly for chloride, sulphate, TOC, DOC and alkalinity for operational purposes.
- As part of the Enhanced Corrosivity 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 2017, the chloride to sulphate mass ratio (CSMR) values in the treated water were above 0.6 and the Langelier's Index values were below 0 (except for a sample taken from the Cottam Booster Station in Kingsville on April 9, 2018), indicating that corrosion may occur. The lead concentrations in 2018 were all very low (0.02 to 0.71ug/L). The owner has stated that the enhanced corrosivity monitoring will continue indefinitely. No plumbing samples are currently being sampled for lead as the UWSS is exempt from this monitoring. Due to the water conditions, it is once again recommended that monthly plumbing samples be added to the corrosivity study to assess how the water conditions affect lead service lines and/or solder. This is especially important with the installation of the pH adjustment equipment. Although bench scale studies indicate that there will be sufficient off-gassing of the carbon dioxide during the treatment process, and thus the treated water pH will not be impacted (i.e. will remain around 8), the owner has stated that close monitoring will continue. Monitoring of lead in plumbing prior to the commissioning of the pH adjustment equipment would provide some baseline data to compare any impacts of this treatment change on corrosivity in the distribution system.
- As part of UWSS internal algal toxin monitoring program, samples were taken once or twice weekly from June 13 to November 21, 2018. Raw water samples were taken throughout the whole sampling period and treated samples were also taken during August and September. Total microcystins in both raw and treated (when taken) samples were all below detection (0.1ug/L), with the exception of one raw sample on August 8th (0.10ug/L) and another on October 17th (0.14ug/L).

### 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.**

For the adverse event that took place on May 19, 2018 (loss of coagulant for more than 30 minutes), failure of the PLC prevented the corrective actions (shutting off flow to Clarifier 4) from resolving the incident. Review of turbidity trends indicated a small spike in turbidity at filter 6; however, it was still very low, and the other filters did not show a similar trend. The data did not indicate breakthrough of the filters so improperly disinfected water was not directed to users. Regardless, the operating authority chose to update the reporting procedure to direct operators to place the coagulant pump in manual mode as soon as they receive a loss of coagulant flow alarm to ensure that coagulant is always flowing.

- **All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.**
- **All required written notices of adverse water quality incidents were provided as per O. Reg. 170/03 16-7.**
- **In instances where written notice of issue resolution was required by regulation, the notice was provided as per O. Reg. 170/03 16-9.**
- **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 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 appropriate actions were taken in a timely manner for regulatory equipment alarms.

- **The Annual Report containing the required information was prepared by February 28th of the following year.**
- The 2018 Annual Report, prepared under section 11 of O. Regulation 170/03, was received by member municipal representatives on February 22, 2019 and presented at the Joint Management Board meeting on February 27, 2019.
- **Summary Reports for municipal council were completed on time, included the required content, and were distributed in accordance with the regulatory requirements.**

The 2018 Summary Report, prepared under section 22 of O. Regulation 170/03, was received by member municipal representatives on February 22, 2019 and presented at the Joint Management Board meeting on February 27, 2019. All required content was included in the Summary Report.

- **All changes to the system registration information were provided within ten (10) days of the change.**
- On February 27, 2019, the population number was updated from 60,000 to 65,000.

### Other Inspection Findings

- **The following issues were also noted during the inspection:**  
See SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES.

## **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.

**Not Applicable**

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

**Recommendation:**

It is recommended that the valve turning program be restarted as planned.

**2. The following issues were also noted during the inspection:**

**Recommendation:**

a. SCADA trending is used to remove spikes in flow rate due to pump initiation. It is recommended that the raw flow data from SCADA is used to remove these outliers and determine the true maximum daily flow, instead of an estimate based on SCADA trending.

b. Reservoir vents were observed to be corroded. It is recommended that these screens are inspected and repaired or replaced as required.

c. SOP OCWA-C6-12 Cyanobacterial Toxins – Microcystin-LR includes some guidance on when to turn off the chlorination at the intake. It is recommended that the wording in the SOP be clarified so that chlorination at the intake is not turned back on prematurely.

d. No plumbing samples are currently being sampled for lead as the UWSS is exempt from this monitoring. It is once again recommended that monthly plumbing samples be added to the corrosivity study to assess how the water conditions affect lead service lines and/or solder, especially with the upcoming installation of the pH adjustment equipment. Monitoring of lead in plumbing prior to the commissioning of the pH adjustment equipment would provide some baseline data to compare any impacts of this treatment change on corrosivity in the distribution system.

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**SIGNATURES**

Inspected By:

Emily Awad

Signature: (Provincial Officer)

Reviewed &amp; Approved By:

Marc Bechard

Signature: (Supervisor)

Review &amp; 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.



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**Stakeholder Appendix**

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# 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 Ministry if you need assistance or have questions at 1-866-793-2588 or [waterforms@ontario.ca](mailto:waterforms@ontario.ca).

For more information on Ontario's drinking water visit [www.ontario.ca/drinkingwater](http://www.ontario.ca/drinkingwater)



PUBLICATION TITLE	PUBLICATION NUMBER
<b>FORMS:</b> Drinking Water System Profile Information Laboratory Services Notification Adverse Test Result Notification	012-2149E 012-2148E 012-4444E
Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils	Website
Procedure for Disinfection of Drinking Water in Ontario	Website
Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids	Website
Filtration Processes Technical Bulletin	Website
Ultraviolet Disinfection Technical Bulletin	Website
Guide for Applying for Drinking Water Works Permit Amendments, & License Amendments	Website
Certification Guide for Operators and Water Quality Analysts	Website
Guide to Drinking Water Operator Training Requirements	9802E
Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption	Website
Drinking Water System Contact List	7128E01
Ontario's Drinking Water Quality Management Standard - Pocket Guide	Website
Watermain Disinfection Procedure	Website
List of Licensed Laboratories	Website



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**Inspection Rating Record**

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

<b>DWS Name:</b>	UNION AREA WATER SUPPLY SYSTEM
<b>DWS Number:</b>	210000853
<b>DWS Owner:</b>	Union Water System Joint Board Of Management (Leamington, Kingsville, Essex, Lakeshore)
<b>Municipal Location:</b>	Kingsville

**Regulation:** O.REG 170/03  
**Category:** Large Municipal Residential System  
**Type Of Inspection:** Detailed  
**Inspection Date:** January 8, 2019  
**Ministry Office:** Windsor Area Office

**Maximum Question Rating:** 632

Inspection Module	Non-Compliance Rating
Permit To Take Water	0 / 12
Capacity Assessment	0 / 42
Treatment Processes	0 / 72
Process Wastewater	0 / 20
Distribution System	0 / 25
Operations Manuals	0 / 42
Logbooks	0 / 30
Certification and Training	0 / 49
Water Quality Monitoring	0 / 132
Reporting & Corrective Actions	0 / 88
Treatment Process Monitoring	0 / 120
<b>TOTAL</b>	<b>0 / 632</b>

<b>Inspection Risk Rating</b>	<b>0.00%</b>
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<b>FINAL INSPECTION RATING:</b>	<b>100.00%</b>
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Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2018-2019)

<b>DWS Name:</b> UNION AREA WATER SUPPLY SYSTEM
<b>DWS Number:</b> 210000853
<b>DWS Owner:</b> Union Water System Joint Board Of Management (Leamington, Kingsville, Essex, Lakeshore)
<b>Municipal Location:</b> Kingsville

**Regulation:** O.REG 170/03  
**Category:** Large Municipal Residential System  
**Type Of Inspection:** Detailed  
**Inspection Date:** January 8, 2019  
**Ministry Office:** Windsor Area Office

Maximum Question Rating: 632

Inspection Risk Rating	0.00%
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<b>FINAL INSPECTION RATING:</b>	<b>100.00%</b>
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