

**Ministry of the Environment,
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**Ministère de l'Environnement , de la
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February 28, 2020

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

File #: SI-ES-KI-540

Attention: Mr. Rodney Bouchard, Manager

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

Please find enclosed the Inspection Report for the inspection that was conducted at the Union Water Supply System (DWS#210000853) on January 15, 2020.

A summary of **Non-Compliance with Regulatory Requirements and Actions Required** are found on pages 14 and a **Summary of Recommendations and Best Practice Issues** are found on page 15 in the attached inspection report.

If you have any questions or concerns regarding this report, please call me at (226) 280-1406 or my supervisor, Marc Bechard, at (519) 383-3778.

Sincerely,

Emily Awad
Water Inspector, Provincial Officer #1823
Drinking Water and Environmental Compliance Division
Sarnia/Windsor District

Encl.

cc: Sam Wen, Process & Compliance Technician, Ken Penney, Senior Operations Manager (Distribution) 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, Victoria Peczulis, Manager, Environmental Health; WECHU;
Katie Stammer, Source Water Protection Manager, Essex Region Conservation Authority;
Marc Bechard, Supervisor, Ministry of Environment, Conservation and Parks



Ministry of the Environment, Conservation and Parks

**UNION AREA WATER SUPPLY SYSTEM
Inspection Report**

Site Number:	210000853
Inspection Number:	1-L5D2Z
Date of Inspection:	Jan 15, 2020
Inspected By:	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:	Operator	Name:	Sam Wen
Phone:	(519) 326-4447	Fax:	(519) 326-0450
Email:	swen@owca.com		
Title:	Senior Operator/Mechanic (ORO), OCWA		

Type:	Operating Authority	Name:	Ken Penney
Phone:	(519) 326-4447	Fax:	(519) 326-0450
Email:	kpenney@ocwa.com		
Title:	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		

INSPECTION DETAILS:

Site Name:	UNION AREA WATER SUPPLY SYSTEM
Site Address:	1615 UNION Avenue 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:	Unannounced
Inspection Number:	1-L5D2Z
Date of Inspection:	Jan 15, 2020
Date of Previous Inspection:	Jan 08, 2019

COMPONENTS DESCRIPTION

Site (Name):	Union AWSS	Sub Type:	Other
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.

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. Beginning on June 4, 2018, the UWSS initiated a routine shutdown of their chloramination system for maintenance purposes. On December 23, 2019, UWSS notified the MECP that based on their Consultant's monitoring report, the Union Water Supply System Joint Board of Management had decided to permanently switch to free chlorine for secondary disinfection. The high-lift pump station consists of two wells. High-lift pump well #1 houses six 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 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)
- Drinking Water System Licence 041-101, Issue Number 7, issued July 18, 2019
- Drinking Water Works Permit 041-201, Issue Number 5, issued July 18, 2019
- 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 unannounced basis on January 15, 2020. It included a physical inspection of the low and high lift pumping facilities and water treatment equipment. A follow-up visit was conducted on January 29, 2020 to inspect the Comber Booster Station and the residual waste management facilities. The inspection period is January 1, 2019 to December 31, 2019.

Source

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

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 the Licence 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.

Capacity Assessment

2.1.2 The flow rate and daily volume of water that flows into the treatment subsystem.

Three ultrasonic 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 flow meters for Clarifier 1, 2, and 3 were replaced with Transit-Time Ultrasonic Flow Meters on April 12, 2019. 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. Flow was also observed at meters 1A and 1B, the two primary flow meters at the high lift (from the treatment subsystem to the distribution system).

- **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 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 84,521 m³, approximately 68% 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.**

All equipment appeared to be installed in accordance with the Permit. The remaining microstrainer in the microstrainer room has been removed and the laboratory will be relocated to this area. The carbon dioxide system has been installed and is still in the testing phase. The owner estimates that it will be in service in the summer of 2020. This system will inject carbon dioxide prior to coagulant dosing to decrease raw water pH which will optimize the coagulant performance and reduce the aluminum residual. The chlorine building has been updated with new scales and gas scrubbers as well as a building addition. Commissioning of this new equipment is still underway.

- **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 during 2019 for:

1. Change in treatment coagulant chemical from DelPac 2020 to DelPac XG 15 on May 15, and then a switch back to DelPac 2020 on Oct. 15. Two Forms completed.
2. Replacement of Clarifier 2, 3, and 4 turbidimeters with Hach SWAM AMI TURBIWELL Model AMI-2 on Jan. 23. Three Forms completed.
3. Replacement of plant effluent turbidimeter (TM-PE) with a Hach SC200 on Sept. 12.
4. Replacement of filter channel 1 and 2 turbidity analyzer with Hach SC200 on Feb. 28 and Mar. 5.
5. Installation of new carbon pump for Clarifier 1 on Aug. 1 and replacement of carbon pump #2 on Nov. 7. Two Forms completed.
6. Replacement of sodium hypochlorite pumps at low lift with Qdos models on June 13.
7. Installation of Rosemount 56 pH Probe at low lift intake #1 and #2. Forms completed Jan. 4 and May 14, respectively. Two Forms completed.
8. Replacement of coagulant tank level controller with two new Siemens units (to differentiate tank 1 and tank 2 levels and alarms) on Mar. 28.
9. Installation of truckway coagulant spill level controller, strobe and alarm with Horner HE-X2R on Mar. 29.
10. Upgrade of high lift vacuum status and values interfaced with SCADA system on Apr. 29.
11. Replacement of Clarifier 1, 2, and 3 Flowmeters with Greyline TTFM 6.1 Ultrasonic Flow meters on Apr. 12. Three Forms completed.
12. Replacement of CRA-2 chlorine analyzer (Prominent) on Mar. 22, installation of new chlorine analyzer

Treatment Processes

(Prominent) at inlet on Jul. 10 and replacement of CRA1 with SWAM AMI-2 on Nov. 19 at Cottam Booster Station. Three forms completed.

13. Installation of raw water chlorine analyzer (Prominent DACB) on Apr. 16.

14. Replacement of chlorine analyzers: CRA-3 (Feb. 28), CRA-9 (plant effluent; Sept. 12), and CRA-10 (plant effluent total; Sept. 12) with Prominent DACB.

- **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, filters #6 and 8 were offline, and filter #1 was out of service.

Operating logs and continuous trends from January to December 2019 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. Loss of coagulant flow was recorded on the Summary of Critical Control Point Limit Exceedances Logsheet (beginning in September 2019) in addition to the Facility Logbook. There were 12 incidents of loss of coagulant flow recorded which lasted only a short duration (1 to 13 minutes).

Turbidity levels from filters #1-8 ranged from 0 to 0.73 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 June and July, which ranged from 99.96 to 100%.

- **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 free chlorine residuals in each of the respective municipalities fed by the Union Water Supply System (UWSS) are included within the scope of inspections for each of the stand-alone distribution systems for those drinking water systems. The UWSS 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.

Beginning on June 4, 2018, the UWSS initiated a routine shutdown of their chloramination system for maintenance purposes. As per Condition 2, Schedule D of their licence, increased sampling in the distribution system was required during the transition from chloramination to free chlorine secondary disinfection. By June 15, 2018, the chlorine residuals in the distribution systems had stabilized and the increased sampling was no longer required. On April 4 and October 29, 2019, UWSS requested extensions of the planned shutdown of the chloramination system, both of which were approved by the MECP. On December 23, 2019, UWSS notified the MECP that based on their Consultant's monitoring report, the Union Water Supply System Joint Board of Management had decided to permanently switch to free chlorine for secondary disinfection. An amendment to the licence is recommended to reflect this change.

A review of the free chlorine residuals at the outlet of the Cottam Booster Station showed the majority of measurements above 0.05mg/L, generally ranging from 0.12 to 3.30 mg/L, with an average concentration of

Treatment Processes

1.04mg/L. There were several measurements recorded as zero; however, logs indicated that these corresponded to meter maintenance or generator testing. There were two instances (May 2 and August 7) where free chlorine residuals spiked up to 5.12mg/L. OCWA reported the May incident and stated that it was due to a SCADA communication loss. As noted in the logbook, the August incident was due to maintenance on the potable water line going to the analyzer. During the inspection, the chlorine residual was measured at CRA-3 at the Cottam Booster Station, and the value was 1.06 mg/L (1.04 mg/L on continuous analyzer). The chlorine pump initiates when the concentration drops to 1.0 mg/L and stops at 1.2 mg/L.

- **Where an activity has occurred that could introduce contamination, all parts of the drinking water system were disinfected in accordance with Schedule B, Condition 2.3 of the Drinking Water Works Permit.**

Equipment (e.g. filters and pumps) that are taken out of service for maintenance or repair are disinfected as per applicable AWWA standards. SOP OCWA-C3-07 describes the procedure to disinfect filters, which follows AWWA standard C653-13. Disinfection of reservoirs is conducted as per AWWA C652 and disinfection of any other part of the water treatment plant is conducted as per AWWA C653. Disinfections are documented in the Disinfection Binder and include the volume of sodium hypochlorite, duration of disinfection and chlorine residuals.

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". Free chlorine residuals from this monitor generally ranged between 0.84 to 1.60 mg/L. Values below 0.84 mg/L corresponded to notations of maintenance in the Facility Logbook. There were approximately 11 instances where the minimum free chlorine reading dropped to 0 mg/L 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 1.25mg/L.

- **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. Filter #1 was out of service and filters #6 and 8 were offline for 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 from the previous day are completed daily.

- **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.

Chlorine alarm setpoints for CRA-7 are currently LoLo: 1.00, Lo: 1.15, Hi: 1.75 and HiHi: 1.85 mg/L and the post chlorinator setpoint is 1.5mg/L. The post chlorinator control setpoint was decreased to 1.3mg/L to address chlorine

Treatment Process Monitoring

odour complaints that were received in 2019. Due to this decrease, CRA-7 alarm setpoints were decreased to LoLo: 0.9, Lo: 0.95, Hi: 1.55, HiHi: 1.65 mg/L. The setpoints were switched back to the current settings after it was determined that odour was no longer an issue. Filter turbidity alarm setpoints are Hi: 0.16 and HiHi: 0.20 NTU. At 0.20 NTU, the filter is automatically directed to waste; however, this setting is operator modifiable between 0-0.9 NTU (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 (Hi) and 5 NTU (HiHi).

New Hach turbidimeters have been installed on all filters and 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. SCADA upgrades have been completed to include these flow interruption and power loss alarms.

Due to the complexity of the UWSS, 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 licence renewal in 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, ss. 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. The current SCADA server is set up for "cyclic" data acquisition, which means that when the value is exactly the same, it only keeps the initial entry and checks again at the next minute interval. This setup saves on data storage and should be resolved once UWSS migrates to the new server with a redundant backup and data gap recovery.

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

The HACH TU5300sc turbidimeter 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. 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. 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 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. Third party inspections are not conducted on continuous analyzers. Manufacturer manuals are stored on the shared drive and hard copies are filed in the office, readily available to all staff.

Treatment Process Monitoring

Annual certification of the portable and benchtop chlorine and turbidity meters (21) was completed by Hach on June 11, 2019. Annual verification of the flow meters was completed by SCG Flowmetrix on May 7-8, 2019.

Operations Manuals

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

The UWSS Operations Manual contains descriptions of each of the process steps. Standard Operating Procedure manuals for the plant and the Cottam Booster Station contain procedures and policies. The Operations Manual was last revised in 2017 and has not been updated since. Once the pH adjustment system has been commissioned, the manual will require an update.

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.

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 UWSS Operations Manual contains procedures for monitoring, operating and maintaining equipment, contingency plans for emergencies, and procedures for dealing with complaints.

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 UWSS 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, 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.

Certification and Training

- **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 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 8, 2019. The previous sample for analysis of these parameters was taken January 9, 2018.

- **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 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 8, 2019. The previous sample for analysis of these parameters was taken January 9, 2018.

- **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.

Samples for HAA analysis were also taken at the water treatment plant quarterly and ranged from 5.3 (below detection limit) to 5.5 ug/L, with a running annual average (RAA) of 5.35 ug/L. The HAAs in the four distribution systems that are fed by the UWSS were lowest at Kingsville (5.3-16.1 ug/L; RAA=10.6ug/L) and Leamington (5.3-17.2 ug/L; RAA=11.0ug/L) and highest at Essex (5.3-24.6 ug/L; RAA=12.8 ug/L) and Lakeshore (8.0-27.4 ug/L; RAA=14.7 ug/L). HAA concentrations in the distribution system were similar or lower in 2019 compared to 2018, with the exception of a small increase in Leamington (2018: Essex=5.3-25.1 ug/L, RAA=14 ug/L; Kingsville=5.3-19 ug/L, RAA=10.7 ug/L; Lakeshore=5.3-32.6 ug/L, RAA=15.1 ug/L; and Leamington=5.3-15.1 ug/L, RAA=9.7 ug/L). All RAAs are well under the standard of 80 ug/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.

Samples for THM analysis were also taken at the water treatment plant monthly and the RAA for 2019 (19.9 ug/L)

Water Quality Monitoring

was higher than in 2018 (18.7 ug/L) and in 2017 (13.4 ug/L) but lower than the RAAs at the four distribution systems that are fed by the UWSS (Essex=37.7 ug/L, Kingsville=29.6 ug/L, Lakeshore=50.4 ug/L, and Leamington=34.7 ug/L). THM concentrations in the distribution system have increased since 2018 (Essex=23.5ug/L, Kingsville=19.6ug/L, Lakeshore=25.2 ug/L, and Leamington=21.5 ug/L). The increase in THMs in the distribution system occurred just after the switch to free chlorine (June 2018) and continued into 2019. Although THM levels were still well below the standard of 100 ug/L, the owner should continue to monitor these closely.

As per Schedule D, Condition 1.2.6 of the Licence, THMs were sampled monthly within the distribution system during the annual temporary shutdown of chloramination system and this sampling regime continued afterward throughout 2019. The operating authority can resume quarterly THM sampling.

- **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, treated samples were taken and analysed for nitrate and nitrite every 3 months. Concentrations of nitrate (below method detection to 0.7 mg/L) and nitrite (all below method detection (0.1 mg/L)) in treated samples were well below the drinking water standards (nitrate=10 mg/L and nitrite=1 mg/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 8, 2019 (6.72 mg/L), well below the 20mg/L benchmark at which the local Medical Officer of Health must be notified. The previous sample was taken January 9, 2018.

- **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 8, 2019 (0.09 mg/L), well below the 1.5mg/L standard. The previous sample was taken January 9, 2018.

- **All water quality monitoring requirements imposed by the MDWL or DWWP issued under Part V of the SDWA were being met.**

As required by Schedule C, Condition 5.3 of the Licence, TSS was measured monthly in a composite sample from the point of discharge from the waste management settling pond(s). The annual average TSS for the South pond was 8.8 mg/L and for the North Pond was 3 mg/L, well below the limit of 25 mg/L. In addition, total chlorine residual was measured more frequently than required by the new Licence (July 2019), in the lagoon effluent (north and south lagoons). The six month average for both lagoons is 0.08 mg/L, exceeding the limit of 0.02 mg/L. Monitoring of the total chlorine residual in the lagoon discharge will continue and the MECP will work with the UWSS to investigate the cause of the elevated chlorine levels. If the elevated concentrations continue for the full year sampling period, a treatment system may be required.

Lagoon sludge pile runoff sampling was conducted, as required by Condition 5.3, Schedule C of the Licence, at the four monitoring stations in the municipal drain, when possible. In many cases, there was no runoff at the monitoring stations for sampling; therefore, operators collected grab samples more often than the required monthly frequency in April and May. Samples could not be collected in January, February, August, September, November, and December as well as at some of the stations during the other months. The samples were analyzed for total and dissolved aluminum. Monthly composite samples from the four monitoring stations were also analyzed for TSS, when possible. Annual average total and dissolved aluminum levels were significantly higher in 2019 compared to 2018 at SP1, SP3, and SP4 (total only). This increase may have been due to the increased removal of the residual solids pile in 2019. The MECP is satisfied with the continued commitment of UWSS to remove all of the residual (source) material and will review subsequent monitoring during the next inspection.

Water Quality Monitoring

The UWSS internal algal toxin monitoring program meets the required Harmful Algal Bloom monitoring, reporting and sampling plan (Schedule C, Condition 6). Samples were taken twice weekly from June 8 to October 30. Total microcystins in both raw and treated samples were all below detection (0.1 ug/L), with the exception of six raw samples in September and two in October, with concentrations ranging from 0.1 to 0.13 ug/L.

- **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 treated microbiological samples each week. Free chlorine residual ranged from 0.90 to 1.47 mg/L during the inspection 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 2019:

(i) Aluminum residual samples of treated water from the plant were taken weekly. Concentrations were elevated above the operational guideline (100 ug/L) in April and May prior to and just after the switch to DelPac XG 15 (May 15). The highest concentration was measured on May 21 at 158 ug/L. There was a slight spike above the guideline in late October, just after the switch back to DelPac 2020 (October 15), perhaps due to unseasonably warm temperatures. Aluminum concentrations were maintained much lower in 2019 compared to 2018 (269 ug/L) likely due to the coagulant switch. 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.

(ii) Samples of raw and filtered water for *Clostridium perfringens* were taken weekly; there were no detections in the filtered water with the exception of an NDOGT (overgrown with target bacteria) result on February 5.

(iii) Samples of Geosmin and MIB from raw and treated water were taken weekly from July to October, and monthly the remainder of the year. Detections were generally only in the raw water, with the exception of low detections of both Geosmin and MIB (4 ng/L) in the treated water in samples taken July 15 and 22.

(iv) Samples of raw and treated water were taken weekly for chloride, sulphate, TOC, DOC and alkalinity for operational purposes.

(v) 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 and 2018, the chloride to sulphate mass ratio (CSMR) values in the treated water were above 0.59 and the Langelier's Index values were below 0 in most cases, indicating that corrosion may occur. The lead concentrations in 2019 were all very low (0.05 to 1.24 ug/L). The owner has stated that the enhanced corrosivity monitoring will continue for at least another year. 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.

Reporting & Corrective Actions

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

The water plant is staffed 24 hours per day, 365 days per year, therefore an operator is always on site and the

Reporting & Corrective Actions

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.

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. The following issues were also noted during the inspection:

Recommendation:

1. As per the previous inspection, it is recommended that the raw flow data from SCADA be used to remove outliers due to pump initiation and determine the true maximum daily flow, instead of an estimate based on SCADA trending.
2. During the previous inspection, reservoir vent screens were observed to be corroded. These screens were replaced; however, during the site inspection on January 15, 2020, the screening on three of the vents were in need of repair. It is recommended that these screens are inspected and repaired or replaced as required.
3. No plumbing samples were tested for lead in 2019, as the UWSS is exempt from this monitoring. As previously recommended, monthly plumbing samples should 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.
4. The existing waste residual pile has been reduced to approximately a quarter of the original size in only a few years. In 2020, UWSS plans to dispose the remainder of the materials in the existing pile at the landfill; limited only by weather and the ability of the landfill to accept the material. At the inspection, new piles of filter bed material (anthracite) were observed on site. The UWSS indicated that they plan to start a new pile for current filter waste and sludge that will need to be dredged from the pond over the next few years. They are considering installing a containment system for future waste residuals which would direct any runoff back to the waste lagoons. Prior to installing this system, an amendment to the licence would be required.

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 Ministry if you need assistance or have questions at 1-866-793-2588 or waterforms@ontario.ca.

For more information on Ontario's drinking water visit www.ontario.ca/drinkingwater



PUBLICATION TITLE	PUBLICATION NUMBER
FORMS: 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



Inspection Rating Record

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2019-2020)

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 15, 2020
Ministry Office: Windsor Area Office

Maximum Question Rating: 419

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 81
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 42
Water Quality Monitoring	0 / 91
Reporting & Corrective Actions	0 / 21
Treatment Process Monitoring	0 / 112
TOTAL	0 / 419

Inspection Risk Rating	0.00%
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FINAL INSPECTION RATING:	100.00%
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Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2019-2020)

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 15, 2020
Ministry Office:	Windsor Area Office

Maximum Question Rating: 419

Inspection Risk Rating	0.00%
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FINAL INSPECTION RATING:	100.00%
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