

Ministry of
the Environment

Safe Drinking Water
Branch

Sarnia/Windsor District
1094 London Rd
Sarnia ON N7S 1P1

Ministère de
l'Environnement

Direction du contrôle de la qualité de
l'eau potable

District de Sarnia et de Windsor
1094, chemin London
Sarnia (Ontario) N7S 1P1



File: SI-ES-KI-540
Union AWSS

March 17, 2015

Union Area Water Supply System
1615 Union Ave.
Ruthven, ON N0P 2G0

Attention: Mr. Rodney Bouchard
Manager
rbouchard@unionwater.ca

Dear Mr. Bouchard:

Re: December 17, 2014 Inspection – Union Area Water Supply System

Enclosed is a copy of the inspection report prepared for the Union Area Water Supply System, under the Ministry's focused inspection protocol to assess compliance with *Safe Drinking Water Act* legislation. The report is based on conditions encountered at the time of inspection, and subsequent follow-up.

The Union Water System Joint Board of Management must directly address the items under the heading "**Non-Compliance with Regulatory Requirements and Actions Required**" since they relate to compliance with regulatory requirements under *Safe Drinking Water* legislation. Written responses must be submitted by the dates identified in the required actions.

For the items under the heading "**Summary of Best Practice Issues and Recommendations**", you are also encouraged to provide a written response stating how these items have been or will be addressed.

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 <http://www.ontario.ca/document/taking-care-your-drinking-water-guide-members-municipal-councils>.

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 D of the inspection report, provides the Ministry, the system

owner and the local Public Health Unit 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.

Should you note any errors or omissions or have any concerns, please contact me at (519) 383-3785, or Gary Johnson at (519) 383-3769.

Yours truly,

Al Petersen
Provincial Officer
Safe Drinking Water Branch, Sarnia District Office
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File: SI-ES-KI 540 Union Area Water Supply (2014/15)



Ministry of the Environment

**UNION AREA WATER SUPPLY SYSTEM
Inspection Report**

Site Number:	210000853
Inspection Number:	1-BD1GG
Date of Inspection:	Dec 17, 2014
Inspected By:	Al Petersen

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OWNER INFORMATION:

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

CONTACT INFORMATION

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Email: rbouchard@unionwater.ca
Title: Manager, UWSS Joint Board Management

INSPECTION DETAILS:

Site Name: UNION AREA WATER SUPPLY SYSTEM
Site Address: 1615 UNION AVE RUTHVEN ON N0P 2G0
County/District: Kingsville
MOE 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-BD1GG
Date of Inspection: Dec 17, 2014
Date of Previous Inspection:

COMPONENTS DESCRIPTION

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

Comments:

The Union Area Water Supply System (Union AWSS) 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 board, but each also owns and operates a separate standalone distribution system receiving water from the Union AWSS. According to the drinking water system registration profile, this results in a total serviced population of approximately 55,000 persons. The Union AWSS system is considered a "large municipal residential system" under O. Regulation 170/03.

The communities of Kingsville, Leamington, Essex are equipped with elevated tanks. A new tank along Albuna Townline was recently commissioned; serving Leamington. 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 a pre-chlorination line retrofitted through the number 2 intake line, extending to a diffuser within its intake crib. The original pre-chlorination line extending to the number 1 intake crib has not normally been used and is disconnected. 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 AWSS 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 (alum), coagulant aid (polymer) and activated carbon addition. Clarified water flows into eight dual media-type filters (sand and anthracite) after addition of filter aid as needed. 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 water (pre) or filtered water (post) locations. Injection into the filtered water is currently used. 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. One of the high-lift pumps in pump well 1 is disconnected and not equipped with a motor or diesel drive. 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 legislation and authorizing documents such as Orders and Certificates of Approval, as well as evaluating conformance with Ministry drinking water related policies and guidelines during the inspection period.

The Ministry is implementing a rigorous and comprehensive approach in the inspection of drinking water systems that keys on the source, treatment and distribution components of the system 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 your system. Although the inspection involved fewer activities than those normally undertaken by a detailed inspection, it contained most of the elements required to assess key compliance issues.

Your system was chosen for a focused inspection during this inspection cycle because inspection findings over the past three years were such that the number of violations were minimal or non-existent, there were few or no orders issued to you that were of significance in the maintenance of water potability and there were no deficiencies as defined in O. Reg. 172/03. The undertaking of a focused inspection at your drinking water system during this year's inspection cycle does not ensure that a similar type of inspection will be conducted at any point in the future.

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 operator licensing;
- Drinking Water System Licence 041-101, Issue Number 4, issued July 21, 2014, related to selected Performance, Monitoring and Recording, Operations and Maintenance requirements;
- Drinking Water Works Permit 041-201, Issue Number 3, issued July 21, 2014, and
- Ontario Drinking Water Quality Standards based on water quality data generated since the previous inspection.

The inspection was conducted on an announced basis on December 17, 2014, consisting of:

1. a physical inspection of the low and high lift pumping facilities, water treatment equipment and associated works;
2. a review and testing of critical alarms,
3. staff interviews, and
4. a brief review of the most current operating logs.

Additional components of the inspection were completed on January 15, 2015 at the water treatment plant and Cottam Booster Station, consisting of:

1. a physical inspection at the Cottam Booster Pumping Station;

INTRODUCTION

2. testing free residual disinfectant from the point of primary chlorine contact and combined chlorine residuals from the treated water and the Cottam Booster Station;
3. collection of relevant operational documents and owner's sampling results, and
4. a review of operator certification records;

Follow-up components of the inspection consisted of review of collected documentation and operating and contingency procedures for assessment of compliance with regulated requirements. The inspection covers the period from September 2013 to December 2014.

The on-site inspections did not include a visual check of the waste residuals management facilities nor sludge storage facilities.

CAPACITY ASSESSMENT

- * **There was sufficient monitoring of flow as required by the Permit and Licence or Approval issued under Part V of the SDWA**

Condition 2.0 of Schedule C of the Drinking Water 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.

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

One magnetic type and three differential pressure type meters are installed on the raw inlet supply to each upflow clarifier, four in total. The metered flow piping to clarifiers 1 and 2 are interconnected 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 and jet wash flows.

Flows from these meters are recorded on the SCADA system.

A flow meter is also provided at the Cottam booster pumping station on the station effluent/bypass header.

- * **The owner was in compliance with the conditions associated with maximum flow rate or the rated capacity conditions in the Permit and Licence or Approval issued under Part V of the SDWA.**

Condition 1.0 of Schedule C of the Drinking Water System Licence states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 124,588 m³/day.

During the period of review, the maximum day flow of treated water was 71,368 m³, or approximately 57.3 % of the approved rated capacity.

TREATMENT PROCESSES

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

A physical inspection was done to review the plant works for consistency with those identified in the Drinking Water System Description outlined in Schedule A of the Drinking Water Works Permit issued in July 2014, which incorporated the approval of new works and modifications identified during the last inspection. The works inspected were generally consistent with those identified in the Drinking Water System Description.

The following observations were made:

TREATMENT PROCESSES

1. Filter 3 was retrofitted with filter media air scour to replace water jet wash and new underdrains, as proposed. Similar changes to filters 2 and 4 were observed to be underway during the inspection.
2. A new primary coagulant dosing pump setup was installed, complete with variable speed controllers and flow monitoring, as proposed.
3. A new permanent secondary coagulant dosing pump setup was installed to replace the temporary setup for piloting new coagulants, as proposed. Delpac 2020 polyaluminum chloride is currently in use and available as a alternative to coagulant alum dosing. The operating authority has noticed that chemical use and sludge production is significantly lowered with this product.
4. The sodium hypochlorite dosing pump for Zebra Mussel control was changed since the last inspection.
5. Repairs to the discharge header for main filter wash pump MW-1, underway since the last inspection, were completed, once again providing redundancy for filter backwashing. A check valve was added to the MW-1 header, which is cross-connected with the high-lift pump #1 discharge line, to address a concern identified with backflow of water from the filters directly into the clearwell.
6. A new ventilation system was added for dissipating heat from the diesel drive serving high-lift pump #1.
7. A new switch gear and PLC control system has been added for the plant's main standby power system, permitting remote operation from the SCADA control terminal during hydro outages.

Requirements for compliance with the provisions of Condition 4.0 of the Drinking Water Works Permit for minor modifications are discussed below.

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

A Form 1 "Record of Watermains Authorized as a Future Alteration" document was prepared for a December 2014 diversion of an existing 150 mm and 400 mm watermains along Division Road (County Road 29) under a proposed stormwater culvert. The document was prepared February 10, 2015, shortly after the inspection.

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

Form 2 documents must be prepared for any works falling within the scope of sections 4.1, 4.2 and 4.3 of the Drinking Water Works Permit. The required documents were prepared shortly after the inspection:

- Replacement of High Lift pump #6 - September 9, 2013
- A new check valve on the Filter Main Wash pump #1 line - January 21, 2014
- Replacement of chemical feed pumps at the Cottam Booster Station - March 28, 2014
- Zebra mussel sodium hypochlorite dosing pump replacement - May 20, 2014
- New switch gear and PLC control for the plant's main standby power system - November 10 and 11, 2014

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

Operating logs and continuous trends from September 2013 to December 2014 were reviewed.

In order to claim applicable *Cryptosporidium* oocyst and *Giardia* cyst removal credits, the Procedure for Disinfection of Drinking Water Supplies in Ontario states that performance must meet filtered water turbidity of less than or equal to 0.3 NTU in 95% of the turbidity measurements

TREATMENT PROCESSES

each month. Summaries assessed for the review period show that 99.995 % of the time, out of approximately 2,962,500 filter operating minutes, turbidity values were less than 0.3 NTU. The standard was met at each filter in each month.

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.

There were a few instances identified in logs and trends where the operator noted that there had been coagulant dosing interruptions:

1. On February 6, 2014 the operator noted that alum pump #4 had tripped off for an estimated half hour.
2. On March 14, 2014 the operator found that alum pump #4 was in pump fault mode at the controller. Upon discovery, the pump was reset and returned to operation. It is possible that the outage may have lasted up to 8 hours after switching back to hydro power upon completion of a plant standby generator test. This sometimes causes operating equipment to trip.
3. On March 16, 2014 the operator found that alum pump #3 was not pumping fully but proper functioning was restored after some maintenance water flushing.

Trended turbidity values from the in-service clarifier effluent streams and filters were within normal ranges for the duration of these incidents. With regards to the March 14, 2014 event, metering pumps equipped with low flow sensors and alarms were installed in November 2014 in accordance with actions required in the last inspection report.

Concerns about maintaining adequate filter bed levels for Filter units #2 and #4 are discussed below.

Available logs and trends suggest that the adequate chlorine contact CT was consistently provided. An incident occurred on January 20, 2014 where a crash of the main SCADA PLC resulted in a deemed zero flow at the chlorinator control units, effectively halting dosage of chlorine disinfection. Because the filter effluent valves do not auto-close on a control system failure, and the low-lift pumps continued to operate without the operator being able to intervene from the water plant, the filters remained "on-line", allowing water to pass into the reservoir without chlorination. Lack of adequate operational alarming prevented the operator from being aware of the PLC failure. The operator calculated that approximately 302,634 gallons of undisinfecting water entered the clearwell and reservoir which contained 4,637,618 gallons (or 6.5% of the volume entered undisinfecting). High-lift pumps also shutdown but were resumed when operations restarted. Because the reservoirs receive some mixing, the lowest chlorine residual measured at the CT outlet of the reservoir was 1.75 mg/L; still within the plant's target CT disinfection range. The operator reported that:

(i) An audible alarm has been integrated into the SCADA system in the event that the PLC fails in the future.

(ii) Other possible measures to prevent future occurrences include twinning the plant's PLC panel and installation of a fiber optic line to the low-lift station PLC in order to permit the operator to control the low-lift PLC operations independently.

- * **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 AWSS are included within the scope of inspections for each of the

TREATMENT PROCESSES

stand-alone distribution systems for those drinking water systems. A couple of exceptions are noted since the Union AWSS is responsible for operation of the remote sites including Cottam Booster Station and the elevated tank and tower sites, and must maintain adequate combined chlorine residuals at those locations to ensure acceptable residuals are maintained throughout the entire system.

The Union AWSS monitors combined chlorine residuals at the inlet and outlet of the Cottam Booster Station. The Cottam Booster station feeds the Town of Essex. According to the operating authority, based on available reservoir storage and the town's demand, the reservoir is normally under-utilized. Water age, and deteriorating combined chlorine residuals especially in the summer, plays a factor in the need to operate the reservoir at lower levels to achieve a quicker turnover rate to keep the water fresh and residuals up. Levels in the Essex tower need to be similarly managed in order to maintain adequate residuals for the town.

However during the summer of 2014, after the Union AWSS had transitioned to free chlorine secondary disinfection, the Town of Essex's Harrow-Colchester South drinking water system was supplied by the Union AWSS via the Essex (Union) Distribution System in order to conduct structural maintenance at their plant. This required higher water levels to be maintained in the Cottam Booster station and Essex tower in order to meet demands and maintain tower levels in Harrow.

A review of available logs and trends reveals that no inadequate residual measurements were determined, although it was found that areas in the periphery of the Essex service area transitioned more slowly to free chlorine and required additional flushing in order to supply Harrow-Colchester South with adequate free chlorine residuals.

- * **The Operator-in-Charge ensures that the equipment and processes are monitored, inspected and evaluated.**

To ensure that all critical equipment and processes are performing appropriately, Section 26 of O. Reg. 128/04 requires operators-in-charge to ensure that the process and all process equipment are monitored, inspected and evaluated and records are prepared noting the status of the process and equipment. The Operating Authority has a set of rounds sheets and checks that are used for identifying parameters to be inspected and for logging observations from these checks. This includes the water treatment plant and remote site facilities. The logs reviewed indicate that required checks and assessments are occurring.

In the March 14, 2014 alum interruption incident, discussed above, the operator found that alum pump #4 was in pump fault mode that may have lasted up to 8 hours after the generator test and hydro transfer. A review of its potential impact on filtration didn't take place until three days later. Under paragraph (a) of sub-section 26 (2) of O. Regulation 128/04, an operator-in-charge is required to take all steps reasonably necessary to operate the processes within his or her responsibility in a safe and efficient manner in accordance with the relevant operations manuals. A review of the Standard Operating Procedure OCWA-C6-04 "Diesel Test Run (hydro ON) Generator A and B together" shows that the operator must check process equipment immediately after power transfers since they may cause faults and equipment may not return to service automatically. Also, Standard Operating Procedure OCWA-C8-03 requires operators to advise the manager and compliance technician upon discovery of the alum feed interruption immediately.

TREATMENT PROCESS MONITORING

- * **Primary disinfection chlorine monitoring was being conducted at a location approved by Permit, Licence or Approval issued under Part V of the SDWA, or at/near a location where the intended CT had just been achieved.**

A ProMinent D1C continuous chlorine monitor / controller (designated as CRA-7) with CLE probe 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.

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

Filter effluent turbidity values, measured by ABB 4600 continuous turbidity analysers with ABB 7997 turbidity sensors, are results recorded by SCADA. [Note: The turbidimeter on Filter 2 was replaced with a Hach 1720E unit since the last inspection.] Alarm and filter-to-waste set-points are established in SCADA to respond to measured tests from these analysers.

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

As discussed above, distribution monitoring programs for combined chlorine residuals in each of the respective municipalities fed by the Union AWSS are included within the scope of those inspections.

Additionally, continuous analysers are provided for monitoring chlorine residuals at the:

1. Cottam booster station. Inlet and outlet total chlorine (essentially combined chlorine) readings measured by these analysers are recorded by the SCADA system.
2. Albuna tower in Kingsville. Tower inlet and outlet total chlorine and tower outlet free chlorine readings measured by these analysers are recorded by the SCADA system.
3. Essex tower. Tower bowl outlet total chlorine readings measured by this analyser have recently been captured for recording by SCADA and review at the Union AWSS.

During the 6 month temporary transition to free chlorine, chlorine probes for the analysers at the Cottam Booster Station and Essex elevated water tower were switched for free chlorine measurement.

- * **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, reviews of continuous monitoring results via daily summary reports are completed once per day and recorded on the summary reports.

- * **All continuous monitoring equipment utilized for sampling and testing required by O. Reg. 170/03, or approval or order, were equipped with alarms or shut-off mechanisms that satisfied the standards described in Schedule 6.**

As discussed above:

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

Low and high chlorine alarm settings reviewed for CRA-7 through SCADA during the Ministry's inspection were 1.40 mg/L and 2.35 mg/L respectively. These settings were seasonally adjusted from 1.30 mg/L low and 2.50 mg/L high settings documented in the operating manual in order to adjust for required increased secondary disinfection combined residuals in Essex and Lakeshore. Alarms for secondary disinfection free and total chlorine levels leaving the plant are similarly set.

TREATMENT PROCESS MONITORING

High filter turbidity alarms reviewed through SCADA during the inspection were 0.24 NTU and 0.24 NTU (auto filter-to-waste). Operational alarms for clarifier effluent turbidity prior to filtration are set at 3 NTU (high) and 5 NTU (high-high).

Alarms are enunciated via SCADA to an audible bell in the plant and visual display at the SCADA terminal. The plant is staffed 24 hours per day. The operator indicated that the audible can be heard through and outside the plant.

During the inspection, a low chlorine alarm was simulated by temporarily setting the alarm set point higher than the actual concentration. Similarly, a high turbidity alarm was simulated for filter #2 by temporarily setting the alarm set point lower than the current turbidity value. The alarms enunciated out through the audible bell, displayed at the SCADA terminal and were recorded on the event/alarm logger. The turbidity alarm for out of service filter unit #2 was used in order to prevent filter to waste causing anomalous turbidity readings at the analyser caused by the change of filter flows on an operating filter.

An assessment of worst case conditions for CT (treated water pH of 7.5 and minimum temperature of 0.5 deg. Celsius) under current reservoir operating levels indicated that the current low-low alarm more than satisfies the requirement under O. Regulation 170/03 Schedule 6-5(1.1) to maintain a minimum alarm standard 0.1 milligrams per litre less than the concentration of free chlorine residual that is required to achieve primary disinfection.

- * **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.**

Specifications for the Prominent post-reservoir analyser probe show that it has a reaction time of 60 seconds as the chlorine concentration rises or falls.

Specifications for the ABB filter effluent turbidity sensors show that the instrument response time varies with flow rate, typically less than 45 seconds for a 90% step change in reading at a sample flow rate of 1 L/min. Specifications for the Hach 1720E filter effluent turbidity sensor shows that the instrument has a response time of 1 minute, 15 seconds for a full scale step change.

O. Regulation 170 sub-section 6-5(1), paragraph 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.

The last inspection report required the owner and operating authority to confirm, by January 15, 2014, that changes to the data recording capabilities for these parameters were being recorded at least with the minimum frequencies and format.

Recording with a frequency of one minute was implemented on approximately October 15, 2013 for turbidity on all filter units and CT free chlorine residual (CRA-07), although the Filter unit # 2 TM-F2 and CRA-07 data queried and supplied for this inspection yielded some variable results which may possibly be attributed to query or program logic issues. The operator is looking into these issues.

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

Manufacturer's instructions for the Prominent free chlorine analyser located at CRA-7 indicates calibration should be repeated at regular intervals and, in potable water applications, they are normally every 3 to 4 weeks. Operating logs show that the continuous chlorine analyser was verified / calibrated on a regular basis. Since the SCADA control system uses CRA-7 free chlorine analyser signal in a compound loop with the final plant flow signal to accurately dose aqua-ammonia to achieve a full conversion to monochloramine, CRA-7 accuracy must be frequently checked.

TREATMENT PROCESS MONITORING

Manufacturer's instructions for the ABB turbidity sensor recommend maintenance limited mainly to manual monthly cleaning of the flow chamber under normal conditions, unless there is a high turbidity breakthrough, upon which the chamber should be cleaned immediately to ensure accurate readings. Instructions also state that routine calibration is normally unnecessary but routine calibration checks of the system accuracy may be needed, particularly after cleaning. If readings are still out of specification, instructions are given to calibrate the sensor using a manufacturer's dry calibration standard or wet calibration formazine standard.

Routine calibration checks of on-line instrument versus hand-held and lab bench units are done for this purpose. Maintenance, checks and calibrations are documented in the operating authority's Hansen equipment maintenance recording system.

The operating authority maintains three instrument calibration SOPs for operator reference:

- OCWA-C1-01 ABB Turbidimeter Calibration
- OCWA-C1-03 Portable pH Probe Calibration
- OCWA-C1-04 Prominent Chlorine Analyzer Calibration

These procedures contain excerpts from manufacturers' manuals.

OPERATIONS MANUALS

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

The Union Area WSS Operations Manual contains descriptions of each of the process steps. As-built drawings for the water plant are available for reference by its operators. It was indicated during the inspection that a review of the Operations Manual would be undertaken in 2015 with a view to revising and updating its content.

Standard Operating Procedure manuals for the plant and the Cottam Booster Station contain standard procedures and policies.

Operators also have access to a map showing transmission mains in the Union distribution system along with as-built drawings. These are available as hard copies at the water plant.

- * **The operations and maintenance manuals did not meet the requirements of the Permit and Licence or Approval issued under Part V of the SDWA.**

Condition 16.2 under Schedule B of the Drinking Water System licence includes the following conditions regarding procedures to be maintained in the operations manual:

16.2.1 The requirements of this licence and associated procedures;

16.2.2 The requirements of the drinking water works permit for the drinking water system;

16.2.3 Procedures for monitoring and recording the in-process parameters necessary for the control of any treatment subsystem and for assessing the performance of the drinking water system;

16.2.4 Procedures for the operation and maintenance of monitoring equipment;

16.2.5 Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown;

16.2.6 Procedures for dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in respect of the complaint;

The available operating manual and standard operating procedures satisfy these conditions, yet a few significant exceptions were noted.

OPERATIONS MANUALS

When annual maintenance was done on Filters #2 and #4, the anthracite depths measured were:

- Filter #2 - January 22, 2014 – side A 9", side B 12"
- Filter #4 - January 30, 2014 – side A 9", side B 11"

The First Engineer's Report, the current operations manual and previous Certificates of Approval prescribe design anthracite depths of 450 mm (approx. 18") for Filters #1-4.

Trending from November and December 2013 showed numerous instances of short Filter #2 runs and turbidity approaching breakthrough, activating automatic filter to waste. A lesser number of events were found for Filter #4 in November and December 2013, and for both filters in other months, including November and December 2014 when elevated raw water turbidities appeared to place additional stress on filtration. Compared with the other filters, poorer performance of Filters #2 and #4 in monthly assessments of filter effluent turbidity greater than 0.3 NTU reflects the inadequate media depths in these filters. Moreover, a routine weekly filtered water sample from Filters #1-4 combined flow yielded a positive Clostridium result on November 4, 2013. At the time of inspection Filters #2 and #4 were out of service and undergoing upgrades.

Standard Operating Procedure OCWA-C3-07 "Filter Maintenance (Annual)" provides instructions for conducting filter maintenance, including measuring and recording media depths. However, it does not indicate minimum media depths to be maintained nor direct operations staff on adding anthracite to replenish lost media. Also, the Facility Emergency Plan's essential suppliers list does not include a contact for supply and ordering of anthracite to readily replenish any lost filter media.

Modulating flow control valves installed on upgraded Filters #2 and #4 (and currently on filters #1 and #3) will ensure consistent backwash flows to prevent media washout. For Filters #5 to #8, the operator is responsible for ensure consistent backwash flows to prevent media washout by observation and manual control, yet the Operations Manual backwash procedures give no cautions to minimize or prevent such incidents.

LOGBOOKS

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

SECURITY

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

The Union AWSS water treatment plant and reservoirs are located in a fenced compound with locked / camera monitored security entrances which must be remotely opened by the operator. With the exception of the front door of the plant, which is monitored from the control room, all doors of the plant 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 a brick structure, equipped with secure doors, intruder door contact alarms, and is located within a fenced compound with lockable gate.

All finished water elevated water structures, are located within fenced compounds. The elevated tanks in Leamington, Kingsville and Essex were not visually inspected within the scope of this inspection but are required to be fitted with locks on their external ladders, electrical control panel boxes and valve chamber hatches. The Albuna tower is equipped with locked steel security doors

SECURITY

on its concrete base, an intruder door contact intrusion alarm and a keycode pad door access alarm.

There are no windows on any of the remote site structures. Most are equipped with outdoor security lights.

CERTIFICATION AND TRAINING

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

The operating authority has a posting indicating the overall responsible operator for the treatment system and distribution system. He holds class IV certification for both; matching the classification of the Union water treatment plant and the Union trunk water distribution system. This designation was confirmed in September 2013. The backup overall responsible operator holds class III certifications for both treatment and distribution sub-systems. Sub-section 23 (4) of O. Regulation 128/04 states that an operator who has certification not more than one class lower than the class of the subsystem may act in the place of the overall responsible operator. However, sub-section 23 (4) states that this shall not be relied on by the owner or operating authority of a municipal residential subsystem for more than 150 days in any 12-month period.

- * **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. When an operator in training was on shift during the review period, log book entries were consistently made identifying her shift's OIC.

- * **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. Regulation 170/03 Schedule 10-3 requires the owner and operating authority to sample treated water once per week and analyse them for E. coli, total coliforms and heterotrophic plate count (HPC).

For the period reviewed, treated water microbiological samples were taken each week.

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

Provided that previous sample results haven't exceeded one-half maximum acceptable concentration (MAC) for any parameter under Schedule 23, O. Regulation 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 13, 2014. Previous samples for analysis of these parameters were taken January 15, 2013.

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.

WATER QUALITY MONITORING

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

Provided that previous sample results haven't exceeded one-half maximum acceptable concentration (MAC) for any parameter under Schedule 24, O. Regulation 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 13, 2014. Previous samples for analysis of these parameters were taken January 15, 2013.

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 trihalomethanes water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

The drinking water system does not include any distribution systems except transmission mains. An assessment of distribution sampling compliance for Trihalomethanes is referred to within the scope of those separate stand-alone distribution system inspections. However, samples for Trihalomethane analysis were also taken at the water treatment plant at least every three months and can be compared to results of samples taken in each of the distribution systems. During the transition period during which free chlorine was used for secondary disinfection, treated water was tested for Trihalomethane analysis each month.

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

As required under O. Regulation 170/03 Schedule 13-7, samples must be taken and analysed for nitrate and nitrite every 3 months. Samples taken at the plant in conjunction with distribution total ammonia, nitrate/nitrite samples in order to track nitrification trends within the distribution system, were taken essentially each week. During the transition period during which free chlorine was used for secondary disinfection, treated water was testing for nitrate/nitrite analysis was reduced to each month, but then accelerated to weekly again when chloramination was restarted.

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

O. Regulation 170/03 Schedule 13-8 requires sampling and analysis of sodium every 60 months. A sample for analysis of sodium was last taken on January 15, 2014. A previous sample for analysis of this parameter was taken January 15, 2013.

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

O. Regulation 170/03 Schedule 13-9 requires sampling and analysis of fluoride every 60 months. A sample for analysis of fluoride was last taken on January 15, 2014. A previous sample for analysis of this parameter was taken January 15, 2013.

- * **All water quality monitoring requirements imposed by the Permit and Licence or Approval issued under Part V of the SDWA were being met.**

Under amendment to the drinking water system licence for Regulatory Relief from approved secondary disinfection, the owner was required to take additional microbiological samples during the transition to, and transition from, free chlorine secondary disinfectant for the 6 month pilot test. This sampling was required in the distribution system at the following frequencies:

- (i) On the day prior to when free chlorine disinfection of the water-supply system is to commence: 25 samples at locations throughout the entire distribution system.

WATER QUALITY MONITORING

(ii) On the first and third days following commencement of free chlorine disinfection: 25 samples at locations throughout the entire distribution system.

(iii) After the study period is completed and during the transition back to chloramine use, undertake the above sampling protocol.

This sampling was accomplished by taking respective proportions of samples in each of the member municipal distribution systems and an assessment of this sampling is not included within the scope of this inspection.

During the 6 month free chlorine pilot, the owner was also required to accelerate distribution Trihalomethane sampling to monthly. An assessment of monthly distribution sampling is also not included within the scope of this inspection, but treated water Trihalomethane sampling coincident with this program is discussed above.

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

WATER QUALITY ASSESSMENT

- * **The audit samples collected by the inspector met the applicable Ontario Drinking Water Quality Standards and/or the aesthetic objectives or operation guidelines. The results of the audit sampling are summarized as follows:**

Treated water samples were taken as part of the inspection and tested for disinfectant residual levels. Filter effluent turbidity readings from operating filters were also recorded. Combined chlorine residuals were also measured and/or recorded from continuous analysers at the Cottam Booster Station.

Audit sample results, including operational sample readings, are found in Appendix B.

- * **Records show that all water sample results taken during the review period met the Ontario Drinking Water Quality Standards (O. Reg. 169/03).**

The following water quality is also noted from the owner's results for treated water samples collected from September 2013 to December 2014:

(i) Microbiological quality consistently met Ontario Drinking Water Quality Standards. None of the 70 routine treated samples yielded an adverse E- coli or total coliform count.

(ii) Trihalomethane samples from treated water from the plant yielded an average concentration of 0.0177 mg/L for the last four quarters of sampling, below the drinking water standard of 0.100 mg/L (moving annual average). The Technical Support Document for Ontario Drinking Water Quality Standards, Objectives and Guidelines indicates that trihalomethanes in drinking water are primarily produced by the reaction of chlorine and the naturally occurring organics (precursors) in the water.

(iii) Sampling for nitrification products associated with chloramination yielded results that were within Ontario Drinking Water Quality Standards for nitrites (as N) and nitrates (as N). The sampling program during the review period consisted of 46 samples from the treated water sampling point. The maximum nitrite and nitrate concentrations found were 0.1 mg/L and 0.7 mg/L respectively. Ontario Drinking Water Standards for these parameters are 1 mg/L and 10 mg/L respectively.

(iv) Samples submitted weekly for monitoring of algal toxins seasonally under a special DWSP monitoring program showed detections of Microcystins in the raw water but no detections in treated water.

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.**

Because the water plant is staffed 24 hours per day, 365 days per year, an operator is always on site and the operating authority has an expectation of an immediate response to alarms.

Water plant operating logs reviewed do not indicate that response to analyser alarm conditions was inadequate in the instances where the operator was alerted to the problem.

OTHER INSPECTION FINDINGS

- * **Two additional issues of non-compliance were also noted during the inspection:**

Although it can't be conclusively shown these events translated into a discernable loss of disinfection credits, the January 20, 2014 (chlorine disinfection system) and March 14, 2014 (coagulant interruption) failures described in the "TREATMENT PROCESSES" section of the report technically contravene paragraph 1 of subsection 1-2 (2) under O. Regulation 170/03.

A. A check of CT values for the January 14, 2014 event, using available data for chlorine concentration, flow and normal reservoir operating set point water levels, confirms that adequate CT was achieved. Prompt operator and maintenance personnel action was taken to restore control and disinfection processes before further deterioration of disinfectant levels to potentially adverse levels, although weaknesses in design and control/operation measures were exposed during the loss of the PLC system including inadequate alarming to PLC failure, lack of low-lift control, lack of chlorination control and/or potential inadequate fail-safe shutoffs for flow control valves.

B. In the March 14, 2014 alum interruption incident, the operator found that alum pump #4 was in pump fault mode that may have lasted up to 8 hours after the generator test and hydro transfer. A review of its potential impact on filtration didn't take place until three days later, but clarifier and filter effluent turbidity trending shows that no indications of turbidity above baseline readings resulted in filter breakthrough. This suggests that treatment buffering in the upflow clarifier was sufficient to maintain adequate coagulation and flocculation of incoming raw flows.

Under paragraph (a) of sub-section 26 (2) of O. Regulation 128/04, an operator-in-charge is required to take all steps reasonably necessary to operate the processes within his or her responsibility in a safe and efficient manner in accordance with the relevant operations manuals. A review of the Standard Operating Procedure OCWA-C6-04 "Diesel Test Run (hydro ON) Generator A and B together" shows that the operator must check process equipment immediately after power transfers since they may cause faults and equipment may not return to service automatically. Also, Standard Operating Procedure OCWA-C8-03 requires operators to advise the manager and compliance technician upon discovery of the alum feed interruption immediately. It appears that these procedures were not precisely followed.

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

A. Form 2 documents must be prepared for any works falling within the scope of sections 4.1, 4.2 and 4.3 of the Drinking Water Works Permit. The required documents were prepared shortly after the inspection:

- Replacement of High Lift pump #6 - September 9, 2013
- A new check valve on the Filter Main Wash pump #1 line - January 21, 2014
- Replacement of chemical feed pumps at the Cottam Booster Station - March 28, 2014

OTHER INSPECTION FINDINGS

- Zebra mussel sodium hypochlorite dosing pump replacement - May 20, 2014
- New switch gear and PLC control for the plant's main standby power system - November 10 and 11, 2014.

B. Recently adopted provisions under Section 4.3.3 of the Drinking Water Works Permit require the owner to undertake certain investigations and notify the Director in the event there are changes in coagulants and pH adjustment chemicals, where replacement chemicals perform the same function.

C. Changes to the continuous data recording capabilities for filter effluent turbidity and CT free chlorine (CRA-07) values were implemented on approximately October 15, 2013, although the TM-F2 and CRA-07 data queried and supplied for this inspection yielded some variable results which may possibly be attributed to query or program logic issues.

D. An August 5, 2014 log entry indicates a taste and odour complaint was received from a seniors facility with residents complaining of nausea. The operating authority maintains a brief complaint response procedure but it does not indicate that all complaints with health or illness related concerns should be promptly forwarded to the health unit.

E. A November 15, 2013 log entry indicates that filling the high-lift pump well needed to be restricted to prevent a leak onto the high-lift floor. The operator identified that the problem was from a crack in the clearwell which develops a minor leak making the high-lift floor wet if water levels in the reservoirs get too high. The crack in the clearwell correspondingly represents a route of contamination into this finished water structure. The truckway for unloading chemicals and materials into the building is also located overtop of this clearwell and presents a potential source of contamination.

NON-COMPLIANCE WITH REGULATORY REQUIREMENTS AND ACTIONS REQUIRED

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

1. The operations and maintenance manuals did not meet the requirements of the Permit and Licence or Approval issued under Part V of the SDWA.

One significant exception to these requirements was noted and is described in greater detail in the "OPERATIONS MANUAL" section of this report. There are three items related to this concern:

(i) Standard Operating Procedure OCWA-C3-07 "Filter Maintenance (Annual)" provides instructions for conducting filter maintenance, including measuring and recording media depths. However, it does not indicate minimum media depths to be maintained nor direct operations staff on adding anthracite to replenish lost media. The First Engineer's Report, the current operations manual and previous Certificates of Approval prescribe design anthracite depths of 450 mm (approx. 18") for Filters #1-4. A lack of adequate media depth maintenance on Filters #2 and #4 contributed to poor performance during the review period including short filter runs, trending towards filter breakthrough and activation of automatic filter to waste.

(ii) For filters #5 to #8, the operator is responsible for ensure consistent backwash flows to prevent media washout by observation and manual control, yet the Operations Manual backwash procedures give no cautions to minimize or prevent such incidents.

(iii) The Facility Emergency Plan's essential suppliers list does not include a contact for supply and ordering of anthracite to readily replenish any lost filter media.

Action(s) Required:

By April 15, 2015, undertake the following actions:

(i) Revise SOP OCWA-C3-07 "Filter Maintenance (Annual)" to ensure that measures are taken to replenish media when anthracite depths are found to be inadequate or the operator notices that significant media has washed out of the bed during backwash activities. Ensure that the procedure for replenishment of filter media is in accordance with AWWA standard B100-09, specifically Section 4.6 Replenishing Filter Media in an Existing Bed.

(ii) Revise sections 6.4.1 and 6.4.2 of the Operations Manual to ensure they include reference to controlling backwash flows to prevent media washout during backwashing operations.

(iii) Update the Facility Emergency Plan's essential suppliers list to ensure it includes a contact for supply and ordering of anthracite to readily replenish any lost filter media.

(iv) Review the changes in the SOPs, Operations Manual instructions and Facility Emergency Plan essential suppliers list with all operators responsible for operation at the water treatment plant.

(v) Report to the issuing officer on the status of items (i) to (iv) above and submit copies of any revised procedures or directions.

2. Two additional issues of non-compliance were also noted during the inspection:

These were identified, and are described in detail under the "OTHER INSPECTION FINDINGS" section.

Action(s) Required:

With respect to the two additional observations noted:

A. Existing procedures, preventative and planned actions taken in response to these events appear to have been taken or are under consideration, and no further action is required at this time. However, since the filter effluent valves and raw influent control valves may not be equipped to automatically fail-closed, the owner and operating authority may also consider consulting with an engineer to review their theory of operation and determine the feasibility of this status in conjunction with any other measures to be taken to address PLC control system or other potential failures. Any consideration of fail-safe shutoffs for flow control valves should also take into consideration the capabilities of their respective overflow structures.

B. By April 15, 2015, in order to stress the significance of preventing prolonged coagulant interruptions:

(i) Review the relevant sections of Standard Operating Procedures OCWA-C6-04 and OCWA-C8-03 with all operators responsible for operation at the water treatment plant.

(ii) Report to the issuing officer on the status of items (i) above.

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:

Five additional issues were identified, and are described in detail under the "OTHER INSPECTION FINDINGS" section.

Recommendation:

With respect to the additional observations noted:

A. The following is recommended:

(i) The owner/operating authority must ensure that Form 2 documents are prepared in a timely manner rather than waiting for projects subject to these requirements to be identified during the inspection.

(ii) The operating authority has a Standard Operating Procedure entitled: "Minor Modifications to the Drinking Water System" detailing these requirements. Recent revisions have been made to Section 4.0 of Schedule B of the Drinking Water Works Permit. Notably additions have been made to sections 4.2 and 4.3. The standard operating procedure should be revised to reflect those revisions.

B. There was no indication that the Delpac coagulant piloted in 2014 has been permanently selected as the coagulant to be used as an alternative to alum dosing. However, the owner and operating authority should be aware of their obligations under the new compliance requirements prescribed in Section 4.3.3 of the Drinking Water Works Permit for a change in coagulants.

C. It is recommended that the operational compliance data gaps found in trending supplied for the inspection be resolved such that reliable data is available for future requests and inspection reviews.

D. Standard Operating Procedure OCWA-C3-17 "Community Complaints" should be amended to address the concerns noted above with respect to notifying with the health unit.

E. Clause (i) of paragraph 2 under sub-section 11 (1) of the Safe Drinking Water Act requires that the owner and operating authority are required to ensure the drinking water system is maintained in a fit state of repair. It is strongly recommended that this known breach in the clearwell is properly repaired and sealed. The truckway and high-lift floor should also be inspected to ensure the integrity of protection overtop of the clearwell.

SIGNATURES

Inspected By:

Al Petersen

Signature: (Provincial Officer):

Reviewed & Approved By:

Gary Johnson

Signature: (Supervisor):

Review & Approval Date: 17/03/2015 (dd/mm/yyyy)

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.



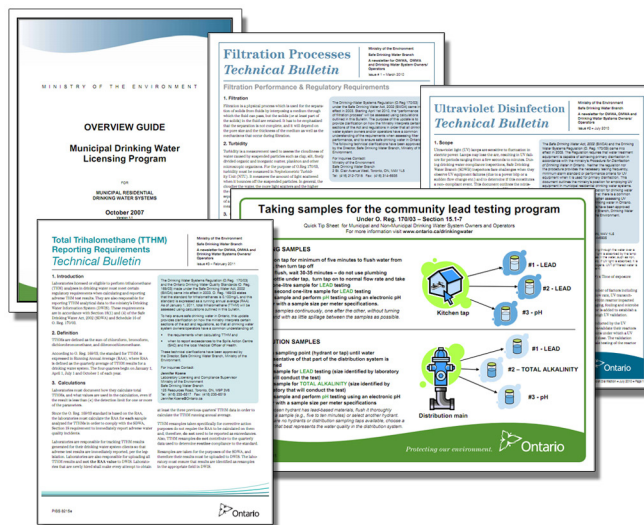
Stakeholder Appendix

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are posted on the Ministry of the Environment's **Drinking Water Ontario** website at www.ontario.ca/drinkingwater to help in the operation of your drinking water system.

Below is a list of key materials frequently used by owners and operators of municipal drinking water systems. To read or download these materials, go to **Drinking Water Ontario** and search in the **Resources** section by **Publication Number**.

Visit **Drinking Water Ontario** for more useful materials. Contact the Public Information Centre if you need assistance or have questions at 1-800-565-4923/416-325-4000 or picemail.moe@ontario.ca.



PUBLICATION NUMBER	PUBLICATION TITLE
4448e01	Procedure for Disinfection of Drinking Water in Ontario
7152e	Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids
7467	Filtration Processes Technical Bulletin
7685	Ultraviolet Disinfection Technical Bulletin
8215	Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (February 2011)
2601e	Overview Guide: Municipal Drinking Water Licensing Program
0000	Municipal Drinking Water Licensing Program Bulletin, Issue 1, January 2011
0000	Certification Guide for Operators and Water Quality Analysts
6560e	Taking Samples for the Community Lead Testing Program
7423e	Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption
7128e	Drinking Water System Contact List
4449e01	Technical Support Document for Ontario Drinking Water Quality Standards

ontario.ca/drinkingwater



MOE Audit Sample Results

Ministry Audit Samples - Operational Results

Sample Type	Location Union AWSS Water Supply	Date/Time	Bacti Sample	Field Reading		Owner's Sample / Analyser Reading	
				F / T Cl ₂	turb.	F / T Cl ₂	turb.
Raw	Union AWSS raw water	Dec 17 10:12 AM	N	-	-	-	44.1 *
Treated CT	Union AWSS WTP reservoir effl. (CT)	Jan 15 2:55 PM	N	1.66 free 1.90 total	-	1.64 free ¹ 2.05 total ²	-
Treated POE	Union AWSS WTP high lift discharge	Jan 15 2:37 PM	N	0.10 free 1.84 total	-	0.07 free ³ 1.99 total ⁴	-
Clarifier #1 effl	Union AWSS Clarifier #1 Effluent	Dec 17 11:53 AM	N	-	-	-	0.65 *
Clarifier #2 effl	Union AWSS Clarifier #2 Effluent	Dec 17 11:53 AM	N	-	-	-	**
Clarifier #3 effl	Union AWSS Clarifier #3 Effluent	Dec 17 11:53 AM	N	-	-	-	1.47 *
Clarifier #4 effl	Union AWSS Clarifier #4 Effluent	Dec 17 11:53 AM	N	-	-	-	**
Filter #1	Union AWSS WTP filter Filter1 effl.	Dec 17 1:45 PM	N	-	-	-	**
Filter #2	Union AWSS WTP filter Filter2 effl.	Dec 17 1:50 PM	N	-	-	-	0.04 *
Filter #3	Union AWSS WTP filter Filter3 effl.	Dec 17 1:47 PM	N	-	-	-	**
Filter #4	Union AWSS WTP filter Filter4 effl.	Dec 17 1:50 PM	N	-	-	-	**
Filter #5	Union AWSS WTP filter Filter5 effl.	Dec 17 1:55 PM	N	-	-	-	**
Filter #6	Union AWSS WTP filter Filter6 effl.	Dec 17 1:52 PM	N	-	-	-	0.04 *
Filter #7	Union AWSS WTP filter Filter7 effl.	Dec 17 1:55 PM	N	-	-	-	0.12 *
Filter #8	Union AWSS WTP filter Filter8 effl.	Dec 17 1:55 PM	N	-	-	-	0.05 *
Distribution	Cottam Booster PS inlet CRA-1	Jan 15 11:20 AM	N	0.09 free 1.65 total	-	1.78 total	-
Distribution	Cottam Booster PS discharge CRA-2	Jan 15 11:20 AM	N	0.08 free 1.67 total	-	1.86 total	-

NOTES:

¹ Continuous analyser reading – CRA-7

² Continuous analyser reading – CRA-8

³ Continuous analyser reading – CRA-9

⁴ Continuous analyser reading – CRA-10

* Continuous analyser reading(s) or via SCADA review

** Treatment unit out of service

Provincial Officer Report(s) and Order(s)

Not applicable



Inspection Rating Record

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2014-2015)

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:	December 17, 2014
Ministry Office:	Windsor Area Office

Maximum Question Rating: 434

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 85
Operations Manuals	14 / 28
Logbooks	0 / 14
Certification and Training	0 / 28
Water Quality Monitoring	0 / 95
Reporting & Corrective Actions	0 / 21
Other Inspection Findings	0 / 0
Treatment Process Monitoring	0 / 133
TOTAL	14 / 434

Inspection Risk Rating	3.23%
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FINAL INSPECTION RATING:	96.77%
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Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2014-2015)

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:	December 17, 2014
Ministry Office:	Windsor Area Office

Non-compliant Question(s)	Question Rating
Operations Manuals	
Do the operations and maintenance manuals meet the requirements of the Permit and Licence or Approval issued under Part V of the SDWA?	14
Other Inspection Findings	
In the event that an issue of non-compliance outside the scope of this inspection protocol is identified, a "No" response may be used if further actions are deemed necessary (and approved by the DW Supervisor) to facilitate compliance.	0
TOTAL QUESTION RATING	14

Maximum Question Rating: 434

Inspection Risk Rating	3.23%
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FINAL INSPECTION RATING:	96.77%
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