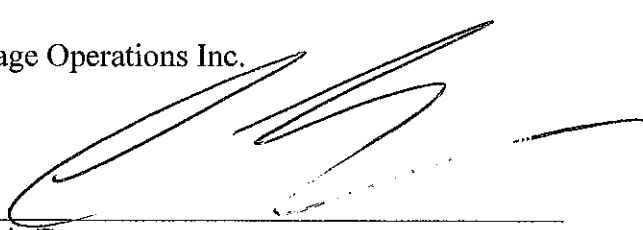


# South Dundas Regional Water Treatment Plant

Drinking Water Works Permit No. 165-201  
Municipal Drinking Water Licence No. 165-101  
Works No. 220001012

- 2012 Summary Report -

Prepared by:  
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Operations Manager:



Chris Eamon

# **SOUTH DUNDAS REGIONAL WATER TREATMENT PLANT**

## **2012 SUMMARY REPORT**

<b>Facility description:</b>	<b>Ultrafiltration (Zenon membrane filtration), booster station, 2 elevated tanks</b>
<b>Capacity:</b>	<b>9,495 m<sup>3</sup>/day</b>
<b>Service area:</b>	<b>Villages of Morrisburg and Iroquois</b>
<b>Service population:</b>	<b>3,700</b>
<b>In-service date:</b>	<b>2006</b>
<b>Raw water source:</b>	<b>St. Lawrence River</b>
<b>Disinfection method:</b>	<b>Sodium Hypochlorite</b>
<b>Operator in Charge:</b>	<b>Troy Brownell (613) 551-4542</b>

This report is a summary of water quality information for the South Dundas Regional Water Treatment Plant, published in accordance with Schedule 22 of Ontario's Drinking Water Systems Regulation for the reporting period of January 1, 2011 to December 31, 2012. The South Dundas Regional Water Treatment Plant is categorized as a Large Municipal Residential Drinking Water System.

This report is prepared by Caneau Water and Sewage Operations Inc. on behalf of the Corporation of the Township of South Dundas. A copy of the Summary report is to be provided to the members of the municipal council not later than March 31, 2013.


"The report must list the requirements of the Act, the regulations, the system's approval and any order that the system failed to meet at any time during the period covered by the report and specify the duration of the failure; and for each failure referred to, describe the measures that were taken to correct the failure." – O. Reg. 170/03 s. 22(2)

"The report must also include the following information for the purpose of enabling the owner of the system to assess the rated capability of their system to meet existing and planned uses of the system:

1. A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows and daily instantaneous peak flow rates.
2. A comparison of the summary referred to in paragraph 1 to the rated capacity and flow rates approved in the system's approval."

O. Reg. 170/03 s. 22 (3)

### **System Description**

The South Dundas Regional Water Treatment Plant is located at 99 Augusta Street in the village of Morrisburg. The water treatment plant is a membrane filtration plant that began producing water in June 2006. The treatment process includes ultrafiltration (ZeeWeed membrane system manufactured by Zenon Environmental Inc) through one of three membrane cassettes which are housed in large concrete tanks, taste and odour removal through granular activated carbon (GAC) contactors, and primary disinfection provided by sodium hypochlorite, which is injected downstream of the GAC tanks. The water then passes through the chlorine contact chamber and a baffled clearwell into a high lift pumping well, all of which are located beneath the water treatment plant. An 11.5 km transmission main joins the distribution systems in Morrisburg and Iroquois. The original Iroquois Water Treatment Plant was converted into a booster station. 

rated capacity is 9,495m<sup>3</sup>/day. The distribution system now services a combined population in Morrisburg and Iroquois of approximately 3,700.

### **Compliance with Terms and Conditions of the Municipal Drinking Water Licence**

The Morrisburg Water Treatment Plant and distribution system is operated and maintained in accordance with O. Reg. 170/03 dated June 2003 (last amendment – O. Reg. 420/12) and the Municipal Drinking Water Licence.

In accordance with the MDWL, Performance Limits 1.1 – “The maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 9,495 m<sup>3</sup>”. (See Appendix I for total flow and average and maximum daily flow.) The maximum daily volume was not exceeded at any time during 2012.

The Morrisburg Water Treatment Plant has a valid Permit to Take Water, Number 7756-6E7GET (issued July 12, 2005 and expiring July 11, 2015), authorizing the taking of no more than 10,445 m<sup>3</sup>/day. The average water taking for the year was 3,499 m<sup>3</sup>/day, 33% of the authorized water taking. The maximum daily flow into the treatment system for the year was 6,561 m<sup>3</sup>.

The Morrisburg Water Treatment Plant chlorinates at the raw water intake when the water temperature is above 10 degrees Celsius, providing enhanced chlorine contact retention time and also to control zebra mussel populations in the raw water intake pipes.

The works and related equipment and appurtenances used to achieve compliance with the MDWL are properly operated and maintained, including effective performance, adequate funding, adequate operator staffing and training, including training in all procedures and other requirements of this certificate and the Act and regulations, adequate laboratory facilities, process controls and alarms, and the use of the process chemicals that come in contact with the water being treated is suitable for the process and appropriate for drinking water.

An Endress and Hauser flow meter measures the flow rate and daily quantity of water being taken from the source (intake) and conveyed to, and through, the water treatment plant. (See Appendix I). Annual calibration of the flow meter was completed June 12 & 13, 2012.

Free chlorine residual and turbidity in treated water are continuously monitored at the point of entrance to the distribution system. The Prominent chlorine analyzer is accurate to ±2% of the measured value. A low chlorine alarm calls out at a value that is above the required CT, and the high lift pumps will shut down if the chlorine reaches a level lower than the required CT, or the lowest Cl<sub>2</sub> level of 0.20 mg/L, to prevent non-chlorinated water from being produced. A high chlorine alarm calls out at 2.50 mg/L and the high lift pumps will shut down at 3.50 mg/L to prevent super-chlorinated water from being produced. Operators try to keep the chlorine residual at an average of 1.00mg/L. The on-line chlorine analyzer is checked with the hand-held chlorine analyzer and adjusted as required. Annual calibration of the on-line chlorine analyzer was completed on June 12 & 13, 2012. The Hach 1720C turbidimeter is accurate to ±0.1 NTU (Nephelometric Turbidity Unit). The turbidimeter is checked monthly using a hand-held turbidity analyzer and adjusted accordingly. Annual calibration of the on-line turbidity analyzer was completed on June 12 & 13, 2012 by Ken Harris Instrumentation. If the turbidity reaches 1.00 NTU (Nephelometric Turbidity Units) for a period of 14 minutes, 50 seconds, the affected Zenon train will shut down and alarm out to prevent turbid water from entering the contact chamber. (See Appendix I for minimum and maximum monthly turbidity, and minimum, maximum and average chlorine residual.)

Operators in charge of the South Dundas Regional Water Treatment Plant keep a daily log book recording flow meter readings, free and total chlorine residual (both continuous and grab samples), and turbidity. (See Appendix I)

Samples are collected throughout the year from the treated water to determine whether or not the water is safe for human consumption (in accordance with O. Reg. 170/03, Schedule 10 and 13, Microbiological and Chemical Sampling and Testing). Bacteriological analysis is performed weekly (1 sample per week from the raw water and 1 sample per week from the water treatment plant and 13 distribution system samples per month, chemical analysis is performed once a year (treated – Schedule 23 and 24) and 4 times a year in the distribution system (nitrates and THMs). Sodium and fluoride (treated water) are tested once every 60 months. (See Appendix II – 2012 Annual Report for the Ministry of the Environment.) All samples are analyzed at Caduceon Environmental Labs in Nepean, Ontario. Caduceon and their subcontracted labs are accredited by the Standards Council of Canada. Written procedures have been established for the notification of the Medical Officer of Health and the Ministry of the Environment Spills Action Centre should a sample result indicate an exceedance has occurred.

Lead sampling takes place twice a year, in the spring and fall in plumbing that serves private residences, plumbing that does not serve private residences and in the distribution system. Results are summarized in Appendix II – 2012 Annual Reports for the Ministry of the Environment. Under Ontario Regulation 170/03, Schedule 15, Section 15.1-5, the South Dundas Regional WTP is eligible for reduced sampling and reduced frequency (every 3 years).

Effluent discharged from the backwash wastewater facility is analyzed quarterly for Total Suspended Solids (annualized average). The results are summarized in Appendix II – 2012 Annual Report for the Ministry of the Environment.

Two alarmed, online chlorine analyzers with datalogging are installed in the distribution system. The analyzer is checked, at minimum, every 72 hours. The analyzer will alarm out when the chlorine goes below 0.15 mg/L for a period greater than 5 minutes. The online chlorine analyzers were calibrated on June 12 & 13, 2012 by Ken Harris Instrumentation. The distribution analyzer at the Iroquois tower has been off line since November 19, awaiting replacement.

All records and information relating to or resulting from the monitoring, sampling and analyzing activities required by the MDWL are retained for a minimum of 5 years.

The South Dundas Regional Water Treatment Plant is classified Water Treatment 2 and Water Distribution 2 (Certificate Number 1582, 1583). Operators responsible for the operation of the South Dundas Regional Water Treatment Plant hold valid licences applicable to this type of water treatment plant.

Following all maintenance or repairs to the water treatment facility, all affected areas are disinfected in accordance with the MOE's "Procedure for Disinfection of Drinking Water in Ontario" dated June 2006. All chemicals used in the treatment process and all materials contacting the water meet both the American Water Works Association (AWWA) quality criteria and the American National Standards Institute (ANSI) safety criteria. All chemicals have been registered by a testing institution accredited under the Standards Council of Canada Act or by ANSI.

A contingency plan has been implemented to ensure adequate equipment and material are available for dealing with emergencies, upset conditions and equipment breakdowns in the works.

An operating manual incorporates the requirements of the MDWL. The manual includes monitoring and reporting of the necessary and in-process parameters essential for control of the treatment process and for the assessment of the performance of the works. It also contains procedures that are required for adequate operation and maintenance of the monitoring equipment.

Drawings are prepared and kept up-to-date showing the new works as constructed (record drawings), including timely incorporation of all modifications made to the works throughout its operational life.

A Process and Instrumentation Diagram (PID) for the entire water treatment plant has been prepared and is kept up-to-date, including timely incorporation of all modifications made to the works throughout its operational life.

All record drawings and diagrams and all existing record drawings which are currently in retention throughout the operational life of the water works are readily available for inspection by Ministry staff.

Procedures have been established and are followed for receiving, responding to, and recording complaints about any aspect of the works, including recording the steps that were taken to determine the cause of complaint and the corrective measures taken to alleviate the cause and prevent its reoccurrence.

### **Non-Compliance with Regulatory Requirements and Actions Required**

The 2011-2012 Compliance Inspection was completed in December 2011, but the report was received April 05, 2011 after the 2011 Summary Report had been submitted. There were 7 issues of non-compliance.

#### **1. Logs for the treatment subsystem(s) of the drinking water system did not contain the required information.**

O. Reg. 128/04 27 (5) An operator-in-charge or a person authorized by an operator-in-charge shall record the following information in the logs or other record-keeping mechanisms in respect of each operating shift:

1. The date, the time of day the shift began and ended and the number or designation of the shift.
2. The names of all operators on duty during the shift.
3. Any departures from normal operating procedures that occurred during the shift and the time they occurred.
4. Any special instructions that were given during the shift to depart from normal operating procedures and the person who gave the instructions.
5. Any unusual or abnormal conditions that were observed in the subsystem during the shift, any action that was taken and any conclusions drawn from the observations.
6. Any equipment that was taken out of service or ceased to operate during the shift and any action taken to maintain or repair equipment during the shift. O. Reg. 128/04, s. 27 (5).

Review of the treatment subsystem(s) logbook found that on November 25, 2010 there was no operator signed in nor an OIC indicated for the shift.

The drinking water inspector recommends an update to the section in the operating authority's operations manual - Record Keeping and Reporting Requirements - to include (verbatim) legislative requirements of O. Reg. 128/04, along with any company recommendation(s) to ensure compliance. It is recommended that the operating staff receive training in the requirements

of O. Reg. 128/04, section 25 (in its entirety) and maintenance manual - Record Keeping and Reporting Requirements; as updated.

**Action(s) Required:**

Please provide to the undersigned drinking water inspector, not later than May 31, 2012, written confirmation that training has taken place and, the revision to the Records Keeping and Reporting Requirements of the operations and maintenance manual. Include in the correspondence the date, the materials covered and the attendance of the operating staff (sign-in confirmation sheet) responsible for South Dundas Regional DWS.

**Response:**

**The operating authority held a three training sessions March 8, 29 and April 19 where O. Reg. 128/04 was discussed and section 25 of the Reg.128/04 was reviewed in its entirety. Operators were given special instruction on how to complete the log books as required. The last meeting of the three was a follow-up meeting with operators to verify compliance.**

**2. Logs for the distribution subsystem(s) of the drinking water system did not contain the required information.**

O. Reg. 128/04 27 (5) An operator-in-charge or a person authorized by an operator-in-charge shall record the following information in the logs or other record-keeping mechanisms in respect of each operating shift:

1. The date, the time of day the shift began and ended and the number or designation of the shift.
2. The names of all operators on duty during the shift.
3. Any departures from normal operating procedures that occurred during the shift and the time they occurred.
4. Any special instructions that were given during the shift to depart from normal operating procedures and the person who gave the instructions.
5. Any unusual or abnormal conditions that were observed in the subsystem during the shift, any action that was taken and any conclusions drawn from the observations.
6. Any equipment that was taken out of service or ceased to operate during the shift and any action taken to maintain or repair equipment during the shift. O. Reg. 128/04, s. 27 (5).

Review of the South Dundas Regional Distribution subsystem logbook found:

- i) On or about June 13, 2011 the entry made did not indicate the date nor the time of the activity*
- ii) The OIC does not always sign in*

**Action(s) Required:**

Refer to question above for actions required by May 31, 2012.

**Response:**

**Please see response for #1.**

**3. The record system did not allow the reader to unambiguously identify the person who made the logbook entry.**

O. Reg. 128/04 27(4) A person who makes an entry in a log or other record-keeping mechanism shall do so in a manner that permits the person to be unambiguously identified as the maker of the entry. O. Reg. 128/04, s. 27 (4).

The drinking water inspector reviewed the logbooks and found the following:

Iroquois Water Tower Logbook - the entry following the June 21, 2011 date does not allow the reader to unambiguously identify the person making the logbook entry nor the activities undertaken.

**Action(s) Required:**

No further action required.

The DWI entered into discussion with the operating authority the importance of clear entries that will not give way to any ambiguity.

**Response:**

**As explained during the inspection, the person who signed the logbook was not an employee of Caneau. The Township of South Dundas fire chief had checked equipment at the Iroquois tower and thought he had to sign the log book. This matter was brought up with the individual and shouldn't happen again.**

**4. Operators in charge had not been designated for all subsystems which comprised the drinking water-system.**

O. Reg. 128/04 25. (1) The owner or operating authority of a subsystem or a person authorized by the owner or operating authority shall designate one or more operators as operators-in-charge of the subsystem. O. Reg. 128/04, s. 25 (1). The operating authority for the South Dundas Regional DWS has no written designation in place and operators generally do not sign in as OIC in the logbooks of the DWS. The operating authority provided verbally that designation of OIC is assigned to the operator conducting rounds, and as such, is responsible for the day to day operations of the system/subsystem. Duties (paraphrased), list includes:

- i) set operational parameters or direct or instruct/direct other operators on same
- ii) operate processes safely, in accordance with manuals
- iii) make adjustments as needed
- iv) ensure specific records are maintained
- v) ensure equipment properly monitored and maintained, and records prepared

Review of logs for the drinking water system and sub-systems did not always indicate who the OIC was for that date or operating shift.

**Action(s) Required:**

Please provide written documentation and a copy of the designation of the OIC no later than May 31, 2012 to the undersigned drinking water inspector ensuring that compliance has been met with the requirements of O. Reg. 128/04 25 (1); the designation of one or more operators as operators-in-charge of the South Dundas Regional DWS.

**Response:**

**As requested by the inspector, a spreadsheet retained by the operating authority which describes the licensing of operators has been revised to indicate which operators can be designated as the Operator in Charge. The operations manual has also been revised to include this designation as well. During the inspection it was explained that the operators are trained, that only an operator holding a Level 1 license or higher can be OIC and that whichever operator is operating a facility on any given day shall be the OIC for that facility. This statement will be incorporated into the operations manual.**

**5. Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was not performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03.**

O. Reg. 170/03 s. 6-5(1) If a drinking-water system uses continuous monitoring equipment for sampling and testing that is required under this Regulation, or under an approval or order, for a parameter set out in the Table to this section, the owner of the system and the operating authority for the system shall ensure that the following standards are met:

- 1. The continuous monitoring equipment must, except when no water is being directed to users of water sampled by the equipment,
  - i. test for the parameter with at least the minimum frequency specified in the Table for the parameter;

Review of data for the Iroquois Tower chlorine residuals from the datalogger reveals missing information for the following periods:

- i) September 07 - 17, 2010
- ii) October 18 - 27, 2010
- iii) February 2011 data lost

There is no record for the timeframes noted above, therefore, it is impossible to determine if the requirement has been met.

**Action(s) Required:**

No further action required.

A new datalogger was installed on or about April 14, 2011.

**Response:**

The information that was corrupt for these periods was erased due to a trained operator error, during the onsite download of the required data from the internal hard drive to the portable hard disk. To say that compliance cannot be assessed because the data was lost/corrupt is false, given that if a low chlorine event had occurred, it would have been responded to and written in the log book (the operating authority was not anticipating losing the data). As well, operators visit the site at a minimum every 72 hours and reviewed the onsite data. The operating authority also has chosen to have redundancy within the distribution system; a second online continuous Cl<sub>2</sub> analyzer is located in Morrisburg. The operating authority also collects chlorine grab samples at the frequency required by Reg. 170. The South Dundas distribution system is required to have only one continuous chlorine analyzer data logging at the frequency specified by Reg.170, if the Township chooses to use continuous monitoring option. At no time was the operating authority unable to supply the required continuous monitoring data from the distribution system. The data was available from one of the two online continuous chlorine distribution analyzers and the operating authority also had the minimum Reg. 170 requirement of chlorine grab samples as complete fail safe for Reg. 170 compliance. The Iroquois Cl<sub>2</sub> analyzer data is stored in two places, on the internal hard drive and also on the SCADA system at the South Dundas Regional water treatment facility via the internet. The SCADA at the South Dundas Regional water treatment facility graphs the data from the Iroquois Cl<sub>2</sub> distribution analyzer continuously and clearly shows that all regulatory requirements were met during the inspector's questioned time frame. It was not known until the logged data was lost in February that the analyzer was corrupting the logged data and a new analyzer was ordered and replaced on April 14, 2011. The new recorders use flash drive technology so the data will always be available on site and won't be deleted upon downloading from the hard disk.

6. All continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was not recording data with the prescribed format.

O. Reg. 170/03 s. 6-5(1) If a drinking-water system uses continuous monitoring equipment for sampling and testing that is required under this Regulation, or under an approval or order, for a parameter set out in the Table to this section, the owner of the system and the operating authority for the system shall ensure that the following standards are met:

2. If the continuous monitoring equipment tests for a parameter more often than is required by subparagraph 1 i, the equipment may, instead of complying with subparagraph 1 ii, i. record the minimum, maximum and mean results of tests for the parameter for every period that is equal to the length of time referred to in subparagraph 1 i, along with the sampling location, the date of the tests conducted during the period and the time at the end of the period;

A new datalogger was installed for the chlorine analyzer located at the Iroquois Tower on or about April 14, 2011.

The datalogger was set to record every minute, thus requiring that the above requirement be met. On Wednesday May 04th, it was determined that the analyzer was only recording the instantaneous value at one minute intervals; therefore not complying with legislative requirements.

**Action(s) Required:**

No further actions required, however, the DWI recommends that the data be downloaded at least weekly.



**Response:**

When the new recorder was installed on April 14<sup>th</sup>, the factory settings were set to record every minute. This was only realized when downloading the data for the first time. The recorder was removed and sent back to the factory to be reprogrammed. The recorder was data logging every minute, instead of the requirement of every hour and was not calculating the minimum, maximum and mean results. The min max and mean results can be calculated manually for that time frame, from the 1440 data points collected per day from the analyzers. This option was explained during the inspection and not requested by the inspector.

**7. Corrective actions (as per Schedule 17) were not taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.**

O. Reg. 170/03 Schedule 17 - Corrective Action for Escherichia coli (E. coli) 17-5. If a report is required to be made under section 18 of the Act in respect of Escherichia coli (E. coli), the owner of the drinking water system and the operating authority for the system shall ensure that the following corrective action is taken:

1. Immediately resample and test.
2. Immediately increase the chlorine or chloramine dose and flush the watermains to ensure that,
  - i. a free chlorine residual of at least 0.2 milligrams per litre is achieved at all points in the affected parts of the distribution system, if the drinking water system provides chlorination and does not provide chloramination, or
3. Maintain the free chlorine residual or combined chlorine residual concentration referred to in paragraph 2 in the affected parts of the distribution system, and continue to resample and test, until Escherichia coli (E. coli) is not detected in any of the samples from two consecutive sets of samples taken 24 to 48 hours apart or as otherwise directed by the medical officer of health.
4. Take such other steps as are directed by the medical officer of health.

A weekly treated bacti sample reported EC= NDOG and TC = NDOG resulting in an AWQI being issued; and, subsequently, a Boil Water Advisory came into effect August 16 2011.

As per item 3 above, two consecutive sets of resamples are required to be collected; only one (1) set was collected, August. Therefore, a failure to comply with legislative requirements.

**Action Required:**

No further action required.

The DWI entered into a discussion with the operating authority regarding the requirements for corrective actions of Schedule 17. The DWI anticipates that Schedule 17 and its requirements for corrective actions will become a training session opportunity for the operators.

**Response:**

**This incident was overseen by the Eastern Ontario Health Unit. After receiving the results from the first set of samples the EOHU lifted the boil water order and no further action was required. Section 17 states**

**3) Maintain the free chlorine residual or combined chlorine residual concentration referred to in paragraph 2 in the affected parts of the distribution system, and continue to resample and test, until Escherichia coli (E. coli) is not detected in any of the samples from two consecutive sets of samples taken 24 to 48 hours apart or as otherwise directed by the Medical Officer of Health.**

**4) Take such other steps as are directed by the Medical Officer of Health**

**The operating authority has since been made aware that the Medical Officer of Health can give direction above the Regulation, but they cannot override the Regulation. In the future, when a sample tests positive for E.Coli, a minimum two sets of samples will be collected.**

The 2012-2013 Compliance Inspection was completed in January 2013 by the Ministry of the Environment and there were no issues of non compliance. Copies of the 2011-2012 and 2012-2013 Compliance Inspection Reports are available at the Township office.

**Maintenance:**

- Feb. 14 – installed new chlorine analyzer (Ken Harris Instrumentation)
- May 7 – Booster station - fire extinguisher and emergency lighting annual inspection (Tremblay Fire Services)
- May 7 – repaired cold water line at low lift (Morrisburg plumbing)
- June 6 – M.C. Marine on site to begin low lift well and intake inspections.
- - Eastern Welding on site to begin replacing stainless steel air lines in Chemical room.
- June 12&13 – Ken Harris on site to perform annual calibrations on analytical instruments and flow meters.
- June 28 – Eastern Welding on site to install isolation valves on air lines in blower room.
- June 29 – Capital Controls on site to begin new scada and PC set up.
- July 3 – installed and calibrated new turbidity analyzer on Zenon Train #1 (Ken Harris Instrumentation)
- July 4-5 – new SCADA system installed and functioning (Capital Controls)
- August 9 – Marleau Mechanical on site to look into programming of air dryer
- August 9 Capital Controls on site to trouble shoot chlorine pump controls and alarming issues.
- August 10 – TFS on site to change out strobe light in chemical room.
- August 13 – Neal's Heating and Cooling on site to look into air dryer issues.
- September 4-7 – performed chemical cleans on the all three trains (Caneau)
- September 12 – Began tower isolation (Caneau)
- September 14 – Landmark started work on the water tower
- September 20 – Landmark completed their tower work and tower was refilled (Caneau)
- Oct. 1 – noted multiple communication losses during plant operation – contacted WTC technician to troubleshoot – checked communication from low lift router to main plant and found minimal packet loss
- Oct. 3 – multiple communication losses – WTC technician remotely checked main plant router and found significant packet losses – re-booted modem and router and technician reset router and no further communication issues have occurred
- Oct. 15 – troubleshooting high lift pump #1 drive at booster station due to recurring stop faults – checked coils and tightened wiring connections – found that the disconnect switch was sticky and was not properly engaged – reset disconnect and activated high lift on hand – no further issues (Marleau Mechanical)
- Oct. 16 – repacked all low lift pumps (Surgeson Electric)
- Oct. 31 – replaced air/electric solenoid valves on flow valves
- November - Recovery cleans on Zenon Train #1
- Nov. 6/7 – installed new air dryer in mechanical room (Eastern Welding)
- Nov. 26 – troubleshooting uncommanded stop fault on low lift pump #1 – replaced large cooling fan on variable frequency drive – ordered spare fan (Marleau Mechanical)
- December - Installed 6 new Zeeweed modules on Zenon train #3
- Dec. 3 – installed small cooling fan on low lift pump #1 (Marleau Mechanical)
- Dec. 12 – checked lowlift pump #1 disconnect switch – checked voltages on exhaust fans #1 & 4 (at WTP) – doesn't seem to be any control loop for fans so they run continuously unless shut off at master control panel

- December 15 Annual Moe Inspection

#### Alarm Response:

- Jan. 17 @ 10:15pm – A/C power loss at Iroquois booster station – power was restored prior to arrival – all normal
- Feb. 19 @ 11:15 am – low high lift well – well level at 2852 mm while Iroquois boost reservoir was filling – all other checks normal – adjusted Iroquois tower stop setpoint to allow tower to fill without further alarms
- Feb. 21 @ 2:30am – A/C power loss – checked Zenon HMI and acknowledged alarms – plant was back in production upon arrival – all other checks were normal
- Mar. 4 @ 10:00am – strainer alarm – severe fouling by debris – seasonal weather conditions creates a growth of algae in the river which tends to plug the strainer – as the strainer becomes plugged, flow to the Zenon trains decreases and causes issues with the production of water – the Zenon trains were shut down for approximately half an hour to clean the strainer
- Mar. 4 @ 2:15pm – PLC alarm – low high-lift well – Iroquois tower being filled caused the high lift well to drop below alarm setpoint for a brief period – all Zenon trains were in production and the well level had restored to above alarm setpoint when operator arrived on site – plant checks normal
- Mar. 5 @ 7:30pm – PLC alarm – low high-lift well – Iroquois tower being filled – Zenon train #2 in recovery clean so was not available to produce water – Zenon trains #1 & 3 in production – plant checks normal
- Mar. 15 @ 5:50pm- PLC alarm – trouble fault on Glengarry security alarm panel – low battery – battery backup was replaced
- Mar. 15 @ 9:00pm – A/C power loss at plant and booster station due to thunderstorm – power was restored upon arrival – plant checks – all normal
- Apr. 6 @ 9:45am – PLC alarm – low high lift well alarm – well level was out of alarm upon arrival – all Zenon trains were in production and filling well – Iroquois boost was filling Iroquois tower at same time – tower finished filling without causing further low high lift well alarms – all normal
- Apr. 22 @ 11:55pm – PLC alarm – multiple alarms due to brief power outage – power restored prior to arrival – reset and acknowledged all alarms – all normal
- Apr. 23 @ 1:22am – A/C power loss at booster station – generator running upon arrival – tower communications loss – running high lift #1 manually – power restored at 1:30am – reset alarms - all normal
- Apr. 23 @ 4:15am – Iroquois booster station high lift #2 and 3 fault due to brief power loss – acknowledged alarms and reset – all other checks normal
- May 4 @ 12:55am – PLC alarm – intrusion alarm – checked all entrances and facility areas – no evidence of intrusion – reset alarm
- May 29 @ 4:00pm – A/C power loss – thunderstorms in area – plant and booster station checks all normal
- June 12 – chemical spill alarm – upon arrival operator determined that there was no chemical spill, but a shorted out chemical leak sensor. Sensor showed signs of corrosion due to the high humidity in chemical room. Sensor was replaced with spare and alarm was reset.
- June 26 – High chlorine alarm at Iroquois Booster Station. Upon arrival slug of chlorine had cleared due to the high lift pumps turning on to fill water tower. Pumps and injectors were checked, cleaned and put back into production.
- July 7 @ 1:00am – PLC alarm – Iroquois tower high high chlorine – trending showed unusual spike – tried to calibrate analyzer but unsuccessful due to high pH reading –

- chlorine returned to normal later in the morning – checked tower in the afternoon and readings remained normal – contacted Ken Harris Instrumentation to troubleshoot.
- July 15 @ 8:25am – PLC alarm – uncommanded stop fault – Iroquois boost high lift #1 switched to high lift #2 – no evident reason for fault on start up
  - July 23 @ 6:15pm – PLC alarms due to thunder storms in area – temporary communication loss to Iroquois tower and low lift but no power outage – communication restored and all alarms acknowledged – visited WTP and Iroquois booster station
  - August 4 @ 8:39pm – Iroquois Boost U.P.S. failure. Replaced U.P.S. in PLC panel and reset all alarms.
  - August 9 @ 12:00am – Zenon Abnormal Shutdown. Upon arrival all trains where in abnormal shutdown due to no air getting to the valves due to a frozen air dryer. Hoses where installed to the airlines to bypass the dyer to allow air to the valves so the plant can be put back in to operation.
  - August 11 @ 6:30pm – PLC alarm due to power failure. Power was back on upon arrival and generator was in cool down mode.
  - August 13 @ 2:00am – High Day Tank Alarm. Float malfunctioned causing pumps to overflow day tank. Shut pumps off on arrival and replaced float with a spare.
  - August 28 @ 4:00pm – Hi chlorine alarm. Chlorine was reading high on analyzer so a hand held was taken to verify calibration. System was flushed to reduce the chlorine levels and then put back into operation.
  - August 29 @ 5:15pm – Uncommand pump stop on Pump#1. Alarm was acknowledged and reset and pump began to run. Watched the pump perform a couple cycles before putting back into sequence.
  - September 7 @ 4:00pm - Low LRV on train #3. Adjusted air pressure and reset membrane integrity test.
  - September 16 @ 9:25am – All trains in abnormal shutdown due to loss of communications from Low Lift PLC. Communication was restored upon arrival. Reset all alarms and placed all three trains back into the run command.
  - September 18 @ 7:55am – Iroquois Boost communication failure due to brief power loss. Checked Iroquois boost pumps and reset all alarms.
  - September 20 @ 6:10am – Iroquois Boost pump #1 fault. Upon arrival system had switch to back up pump and continued tower fill. Double checked pump#1 pump panel and placed it back into production.
  - September 23 @ 11:59am – Iroquois Boost chemical feed pump fault due to a broken chemical line at the chlorine injection. Replaced poly line and re-primed system.
  - Oct. 8 @ 10:20am – PLC alarm – uncommanded stop fault for high lift pump #2 at Iroquois booster station – PLC had switched duty pump to #2 before operator had arrived – tower fill cycle wasn't interrupted and completed without further issues – a service technician will be contacted to troubleshoot pump stop fault (see October 15<sup>th</sup> maintenance)
  - Oct. 29 @ 6:30pm – PLC alarm – intrusion alarm at Iroquois booster station – alarm had restored upon arrival – acknowledged alarm – no evidence of forced entry – high winds had probably triggered door alarm – reset alarm and made sure door was securely closed and latched – all normal
  - Nov. 11 @ 2:55am – loss of communication – wasn't able to be restored – contacted WTC to investigate issue – WTC then contacted Bell Canada to provide a service technician to troubleshoot communication link on Bell side – communication link restored at approximately 9:30pm
  - Nov. 13 @ 8:10pm – communication loss – restored upon arrival – checked readings at Booster station and tower and all appeared normal

- Nov. 13 @ 10:30pm – PLC alarm – communication loss – restored upon arrival
- Nov. 14 @ 12:25am – multiple tower and chlorine pump alarms the rest of the day and into Nov. 15<sup>th</sup>. Iroquois booster station was manually filled by checking the panelview readings – on Nov. 15<sup>th</sup>, Bell technician found the connections to the modem was corroded and replaced all lines and junction box which resolved the problem
- Dec. 11 @ 5:00pm – communication loss from water plant to booster station – Rideau St. Lawrence cut bell line – waiting for line to be repaired – turned pump #1 on to begin filling tower – communication to tower repaired by 5:30pm – turned pump #1 back to manual – all normal

APPENDIX I  
Flow Data

# South Dundas Water Treatment Plant Summary Report

Municipality: Township of South Dundas

Year: 2012

Source: St. Lawrence River

Design Capacity: 9,495 m<sup>3</sup>

Description: Zenon Membrane Filtration, taste and odour control, chlorination

Month	Raw Flow		Treated Flow										Bacteria (Number of Samples)			
	Total Flow m <sup>3</sup>		Total Flow m <sup>3</sup>	Avg. Day m <sup>3</sup> /day	Max. Day m <sup>3</sup> /day	Free Chlorine Residual	Turbidity		NO <sub>2</sub> mg/L	NO <sub>3</sub> mg/L	THM ug/L	Raw Water	Safe		Unsafe or Poor	
						Avg. mg/L	Min. mg/L	Max. mg/L	Min. NTU	Max. NTU			Plant	Distribution	Plant	Distribution
January	127,688		115,094	3,713	6,561	1.19	0.94	1.43	0.02	0.09		5	5	13		
February	119,022		106,889	3,686	4,664	1.16	0.60	1.58	0.02	0.05	27.4	4	4	13		
March	124,951		113,816	3,671	4,589	1.23	0.72	1.45	0.02	0.09		4	4	13		
April	118,699		106,797	3,560	4,290	1.16	0.92	1.39	0.02	0.06		5	5	14		
May	120,213		106,970	3,451	3,893	1.25	0.90	1.79	0.02	0.08	29.2	4	4	13		
June	120,492		100,623	3,354	4,136	1.26	0.77	2.23	0.02	0.06		4	4	13		
July	135,603		106,773	3,444	4,084	1.32	1.15	1.56	0.02	0.27		5	5	15		
August	127,802		103,121	3,326	4,139	1.19	0.88	1.42	0.01	0.06	50.7	4	4	13		
September	122,863		99,695	3,323	4,004	1.26	0.86	1.54	0.01	0.05		4	4	13		
October	119,634		103,824	3,349	4,053	1.21	1.04	1.36	0.01	0.03		5	5	14		
November	116,372		103,373	3,446	4,120	1.20	1.07	1.34	0.01	0.07	37.8	4	4	13		
December	126,829		113,572	3,664	4,225	1.23	0.95	1.43	0.01	0.04		4	4	13		
<b>Total</b>	<b>1,480,168</b>		<b>1,280,547</b>									<b>52</b>	<b>52</b>	<b>160</b>		
Minimum							0.60		0.01							
Maximum					6,561			2.23		0.27						
Average				3,499		1.22										
<b>ODWS</b>												<b>52</b>	<b>52</b>	<b>156</b>		

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APPENDIX II  
2012 Annual Report  
Ministry of the Environment





**OPTIONAL ANNUAL REPORT TEMPLATE**

<b>Drinking-Water System Number:</b>	220001012
<b>Drinking-Water System Name:</b>	South Dundas Regional Water Treatment Plant
<b>Drinking-Water System Owner:</b>	Township of South Dundas
<b>Drinking-Water System Category:</b>	Large Municipal Residential
<b>Period being reported:</b>	January 1 – December 31, 2012

<p><b><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></b></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [ ] No [x]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [ x ] No [ ]</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Township of South Dundas 4296 County Road 31 Williamsburg, ON K0C 2H0</p> </div>	<p><b><u>Complete for all other Categories.</u></b></p> <p>Number of Designated Facilities served:  <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div> </p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [ ] No [ ]</p> <p>Number of Interested Authorities you report to: <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div></p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [ ] No [ ]</p>
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**Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report**

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?  
 Yes [ ] No [ ]

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Indicate how you notified system users that your annual report is available, and is free of charge.

- Public access/notice via the web
- Public access/notice via Government Office
- Public access/notice via a newspaper
- Public access/notice via Public Request
- Public access/notice via a Public Library
- Public access/notice via other method \_\_\_\_\_

**Describe your Drinking-Water System**

The South Dundas Regional Water Treatment Plant is located at 99 Augusta Street in the village of Morrisburg. The water treatment plant is a membrane filtration plant that began producing water in June 2006. The treatment process includes ultrafiltration (ZeeWeed membrane system manufactured by Zenon Environmental Inc) through one of three membrane cassettes which are housed in large concrete tanks, taste and odour removal through granular activated carbon (GAC) contactors, and primary disinfection provided by sodium hypochlorite, which is injected downstream of the GAC tanks. The water then passes through the chlorine contact chamber and a baffled clearwell into a high lift pumping well, all of which are located beneath the water treatment plant. An 11.5 km transmission main joins the distribution systems in Morrisburg and Iroquois. The original Iroquois Water Treatment Plant was converted into a booster station. The rated capacity is 158.6 L/s. The distribution system now services a combined population in Morrisburg and Iroquois of approximately 3,700.

**List all water treatment chemicals used over this reporting period**

Sodium Hypochlorite, sodium bisulfite, citric acid, sodium hydroxide

**Were any significant expenses incurred to?**

- Install required equipment - Yes
- Repair required equipment - Yes
- Replace required equipment - Yes

**Please provide a brief description and a breakdown of monetary expenses incurred**

7 Zeeweed Modules: \$8,000.00  
 Replaced chlorine analyzer at Iroquois booster station: \$2,000.00  
 Replaced low lift pump drive shafts: \$7,000.00  
 Inspected intake crib: \$4,500.00  
 Installed new air dryer and reconfigured compressed air lines and installed extra valves for isolations: \$5,000.00  
 Replaced Zenon train #1 turbidity analyzer: \$6,000.00  
 Refit of Morrisburg elevated water tower: \$43,000.00



**Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre**

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
26/09/12	Lead	29.5	ug/L	Resampled	11/10/12
26/09/12	Lead	23.6	ug/L	Resampled	11/10/12
26/09/12	Lead	26.4	ug/L	Resampled	11/10/12

**Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.**

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	52	0-2	0-160		
Treated	52	0	0	52	<2-46
Distribution	160	0	0	52	<2-12

**Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.**

	Number of Grab Samples	Range of Results (min #)-(max #)
Raw Turbidity	8760	0.08-9.99NTU
Permeate Turbidity		
Train #1	8760	0.01-0.27NTU
Train #2	8760	0.01-0.07NTU
Train #3	8760	0.02-0.05NTU
Chlorine	8760	0.60-2.23mg/L
Fluoride (If the DWS provides fluoridation)		

*NOTE: For continuous monitors use 8760 as the number of samples.*

*NOTE: Record the unit of measure if it is not milligrams per litre.*

**Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.**

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
Dec. 17/10	Total Suspended Solids	Feb. 6/12	2	mg/L
Dec. 17/10	Total Suspended Solids	May 9/12	4	mg/L
Dec. 17/10	Total Suspended Solids	Sept. 27/12	3	mg/L



Dec. 17/10	Total Suspended Solids	Dec. 4/12	12	mg/L
	<b>*Annual Average Concentration</b>		<b>5.3</b>	<b>mg/L</b>

**\* Municipal Drinking Water Licence – Schedule C – Residue Management 1.5.2**

**Summary of Inorganic parameters tested during this reporting period or the most recent sample results**

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	07/05/12	0.0002	mg/L	
Arsenic	07/05/12	0.0014	mg/L	
Barium	07/05/12	0.023	mg/L	
Boron	07/05/12	0.037	mg/L	
Cadmium	07/05/12	<0.00002	mg/L	
Chromium	07/05/12	<0.002	mg/L	
*Lead	07/05/12	0.00013	mg/L	
Mercury	07/05/12	<0.00002	mg/L	
Selenium	07/05/12	<0.001	mg/L	
Sodium	07/05/12	14.6	mg/L	
Uranium	07/05/12	0.00035	mg/L	
Fluoride	07/05/12	0.20	mg/L	
Nitrite	06/02/12	<0.1	mg/L	
	07/05/12	<0.1	mg/L	
	13/08/12	<0.1	mg/L	
	05/11/12	<0.1	mg/L	
Nitrate	06/02/12	0.30	mg/L	
	07/05/12	0.40	mg/L	
	13/08/12	0.20	mg/L	
	05/11/12	0.20	mg/L	

\*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential systems

**Summary of lead testing under Schedule 15.1 during this reporting period**

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	45	0.00008-0.0302	1
Distribution	11	<0.00002-0.0264	2



**Summary of Organic parameters sampled during this reporting period or the most recent sample results**

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	07/05/12	<0.3	ug/L	No
Aldicarb	07/05/12	<3	ug/L	No
Aldrin + Dieldrin	07/05/12	<0.02	ug/L	No
Atrazine + N-dealkylated metabolites	07/05/12	<0.5	ug/L	No
Azinphos-methyl	07/05/12	<1	ug/L	No
Bendiocarb	07/05/12	<3	ug/L	No
Benzene	07/05/12	<0.5	ug/L	No
Benzo(a)pyrene	07/05/12	<0.005	ug/L	No
Bromoxynil	07/05/12	<0.3	ug/L	No
Carbaryl	07/05/12	<3	ug/L	No
Carbofuran	07/05/12	<1	ug/L	No
Carbon Tetrachloride	07/05/12	<0.2	ug/L	No
Chlordane (Total)	07/05/12	<0.04	ug/L	No
Chlorpyrifos	07/05/12	<0.5	ug/L	No
Cyanazine	07/05/12	<0.5	ug/L	No
Diazinon	07/05/12	<1	ug/L	No
Dicamba	07/05/12	<5	ug/L	No
1,2-Dichlorobenzene	07/05/12	<0.1	ug/L	No
1,4-Dichlorobenzene	07/05/12	<0.2	ug/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	07/05/12	<0.01	ug/L	No
1,2-Dichloroethane	07/05/12	<0.1	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	07/05/12	<0.1	ug/L	No
Dichloromethane	07/05/12	<0.3	ug/L	No
2-4 Dichlorophenol	07/05/12	<0.1	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	07/05/12	<5	ug/L	No
Diclofop-methyl	07/05/12	<0.5	ug/L	No
Dimethoate	07/05/12	<1	ug/L	No
Dinoseb	07/05/12	<0.5	ug/L	No
Diquat	07/05/12	<5	ug/L	No
Diuron	07/05/12	<5	ug/L	No
Glyphosate	07/05/12	<25	ug/L	No
Heptachlor + Heptachlor Epoxide	07/05/12	<0.1	ug/L	No
Lindane (Total)	07/05/12	<0.1	ug/L	No
Malathion	07/05/12	<5	ug/L	No
Methoxychlor	07/05/12	<0.1	ug/L	No
Metolachlor	07/05/12	<3	ug/L	No
Metribuzin	07/05/12	<3	ug/L	No
Monochlorobenzene	07/05/12	<0.2	ug/L	No
Paraquat	07/05/12	<1	ug/L	No
Parathion	07/05/12	<3	ug/L	No
Pentachlorophenol	07/05/12	<0.1	ug/L	No
Phorate	07/05/12	<0.3	ug/L	No
Picloram	07/05/12	<5	ug/L	No
Polychlorinated Biphenyls(PCB)	07/05/12	<0.05	ug/L	No
Prometryne	07/05/12	<0.1	ug/L	No
Simazine	07/05/12	<0.5	ug/L	No



<b>THM</b> (NOTE: show latest annual average)		36.3	ug/L	No
<b>Temephos</b>	07/05/12	<10	ug/L	No
<b>Terbufos</b>	07/05/12	<0.3	ug/L	No
<b>Tetrachloroethylene</b>	07/05/12	<0.2	ug/L	No
<b>2,3,4,6-Tetrachlorophenol</b>	07/05/12	<0.1	ug/L	No
<b>Triallate</b>	07/05/12	<10	ug/L	No
<b>Trichloroethylene</b>	07/05/12	<0.2	ug/L	No
<b>2,4,6-Trichlorophenol</b>	07/05/12	<0.1	ug/L	No
<b>2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)</b>	07/05/12	<10	ug/L	No
<b>Trifluralin</b>	07/05/12	<0.5	ug/L	No
<b>Vinyl Chloride</b>	07/05/12	<0.2	ug/L	No

**List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.**

Parameter	Result Value	Unit of Measure	Date of Sample