Ontario Clean Water Agency
Agence Ontarienne Des Eaux

February 23rd, 2024

Tri-County Water Board

C/O Magda Badura
22413 Hoskins Line
Rodney ON, N0L 2C0

Re: Requirement Under the Safe Drinking Water Act for a Summary Report

Dear Mrs. Badura,

Attached is the 2023 Summary Report for the Tri-County Drinking Water System for January 1st to December 31st, 2023. This report is completed in accordance with Section 11 and Schedule 22 of O. Reg. 170/03, under the Safe Drinking Water Act.

This Summary Report is to be provided to the members of the Southwold Municipal Council. Please ensure this distribution by March 31, 2024.

Section 12 of O. Reg. 170/03, requires the Annual Report required under Section 11 of O. Reg. 170/03 and the Summary Report be made available for inspection by any member of the public during normal business hours, without charge. The reports should be made available for inspection at the office of the municipality, or at a location that is reasonably convenient to the users of the water system.

Please feel free to contact me should you require any additional information regarding these reports. I can be reached at 519-870-7841.

Sincerely,

Matthew Belding
Process and Compliance Technician

c.c. Terri Towstiuc, Municipality of West Elgin's Clerk
Dale LeBritton, OCWA's Regional Hub Manager
Sam Smith, OCWA's Senior Operations Manager
Maegan Garber, OCWA's Safety, Process and Compliance Manager

Tri-County Drinking Water System

Waterworks # 260091117
System Category – Large Municipal Residential

Annual Water Report

Prepared For: The Tri-County Water Board

Reporting Period of January 1st – December 31st 2023

Issued: February 23rd, 2024

Revision: 0

Operating Authority:

OCWA
ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

This report has been prepared to satisfy the annual reporting requirements in O.Reg 170/03 Section 11 and Schedule 22.

Table of Contents

Revision History

Date	Revision #	Revision Notes
02/23/2024	0	Report Issued

Report Availability

This system does not serve more than 10,000 residence and the annual reports will be available to residents at the West Elgin Municipal Office. Notification will be at the Municipal Office and copies provided free of charge, if requested. The West Elgin Municipal Office is located at, 22413 Hoskins Line in the Town of Rodney. The Table below lists the Drinking Water Systems, which receive all their drinking water from the Tri-County Drinking Water System:

Drinking Water System Name	Drinking Water System Number	Copy provided
West Elgin Distribution System	260094627	Yes

Compliance Report Card

Compliance Event	Date	# of Events
Ministry of Environment Inspections	January 24th, 2024	1
Ministry of Labour Inspections	N/A	0
QEMS External Audit	December 13th, 2023	1
AWQI's/BWA	N/A	0
Non-Compliance	N/A	0
Community Complaints	N/A	0
Spills	N/A	0
Watermain Breaks	N/A	0

System Process Description

Raw Source

The Tri-County Drinking Water System consists of the Tri-County Water Treatment Plant (WTP) and the

Tri-County Transmission Main. The Tri-County WTP is a membrane filtration surface water treatment facility with a total design capacity of 12,160m^3/day, located at 9210 Graham Road in the Municipality of West Elgin. The low lift pumping station is located south of the WTP at 8662 Graham Road, on the shores of Lake Erie.

The water treatment facility consists of an intake system, a low lift pumping station, a treatment system and distribution pumping system. The Tri-County Drinking Water System serves the following systems: Southwest Middlesex, West Elgin, Dutton-Dunwich, Newbury and Bothwell Distribution Systems. The Southwest Middlesex and West Elgin Distribution Systems receive all their water directly from the Tri-County Drinking Water System. Dutton-Dunwich receives a portion of their water supply from the Tri-County Drinking Water System with the remainder coming from the Southwold Distribution System. Newbury and Bothwell Distribution Systems receive water indirectly from the Tri-County Drinking Water System via the Southwest Middlesex Distribution System.

Intake:

The intake consists of one 700mm diameter polyethylene pipe extending approximately 610m into Lake Erie at a depth of 5.7m. A zebra mussel chemical control system is used seasonally. There is a second intake located at the shoreline, this is used only as a backup if required due to water quality or a blockage. The raw water is screened by two coarse screens.

Low Lift Pumping Station:

Raw water is pumped from the low lift wet wells by four low lift pumps to the Water Treatment Plant.

Treatment

Filtration:

At the water treatment plant the water is pre-filtered by four automatic strainers to protect the filter membranes from coarser particles and algae in the raw water. The raw water pH is lowered if required by the use of carbon dioxide.

After the water has been strained it enters the membrane filtration system which removes fine particles, sediment, algae, protozoa and bacteria. Filtered water can be directed through the UV advanced oxidation process (AOP) unit to the treated water storage tanks.

Disinfection:

Disinfection is achieved by the use of sodium hypochlorite for primary disinfection. Note that UV is intended for use with hydrogen peroxide (AOP) for taste and odor control. The treated water is stored in treated water storage tanks where it is pumped into the distribution network by the high lift pumps. Post chlorination of the treated water is done at two points. The first dosing point is upstream of the treated water storage tanks and the second dosing point is downstream of the four high lift pumps before the distribution header.

Process Drain Water:

Waste water from the floor drains and online analyzers are directed to the process water handling facilities that include a settling basin and constructed wetlands. Flush water that cleans the pre-strainers and the membranes is also sent to the process water handling facilities.

Treatment Chemicals used during the reporting year:

Chemical Name	Use	Supplier
Chlorine Gas	Zebra Mussel Treatment	Lavo
Sodium Hypochlorite 12%	Primary Disinfection	Lavo
Hydrogen Peroxide 50%	Advanced Oxidation	FloChem
Citric Acid 50%*	Cleaning of Membranes	FloChem
Caustic Soda 50%*	Cleaning of Membranes	FloChem
Calcium Thiosulfate (Captor) 30%*	Cleaning of Membranes	FloChem
Carbon Dioxide	pH Control/Adjustment	Air Liquide

*chemicals used in the cleaning process of membranes

Distribution

The Tri-County Drinking Water System consists of the Tri-County Water Treatment Plant (WTP) and the Tri-County Transmission Main. The Tri-County Drinking Water System serves the following systems: Southwest Middlesex, West Elgin, Dutton-Dunwich, Newbury and Bothwell Distribution Systems. The Southwest Middlesex and West Elgin Distribution Systems receive all their water directly from the Tri-County Drinking Water System. Dutton-Dunwich receives a portion of their water supply from the Tri-County Drinking Water System with the remainder coming from the Southwold Distribution System. Newbury and Bothwell Distribution Systems receive water indirectly from the Tri-County Drinking Water System via the Southwest Middlesex Distribution System.

Summary of Non-Compliance

Adverse Water Quality Incidents

Date	AWQI #	Location	Problem	Details	Legislation	Corrective Action Taken
There were no adverse water quality incidents reported during the reporting period.						

Non-Compliance

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
There were no non-compliance issues reported during the reporting period.				

Non-Compliance Identified in a Ministry Inspection:

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
There were no non-compliances identified during this period.				

The Tri-County Drinking Water System was inspected on January 24th, 2024 by Provincial Officer, Meghan Morgan of the Ministry of Environment, Conservation and Parks (MECP). The inspection has not yet been concluded. The previous MECP inspection was completed on March 20th, 2023. This inspection was also completed by Provincial Officer, Meghan Morgan.

The routine MECP inspections have an Inspection Rating Record, which evaluates the system to provide information for the owner/operator on areas that need to be improved. The particular areas that were evaluated for the Tri-county Drinking Water System were: Source, Capacity Assessment, Treatment Process, Treatment Process Monitoring, Operations Manuals, Logbooks, Security, Certification and Training, Water Quality Monitoring, Water Quality Assessment, and Reporting and Corrective Actions. The 2023 inspection report identified no non-compliances and thus received an Inspection Rating Record of 100%.

Flows

The Tri-County Drinking Water System is classified as a Large Municipal Residential System that operates under Municipal Drinking Water License #043-101, Issue 7, Drinking Water Works Permit #043-201, Issue 8, and Permit to Take Water #5062-C4UG4R. The Permit to Take Water (PTTW) specifies flow rates and total water takings permitted from Lake Erie. For the Tri-County DWS, the maximum flow rate limit is 9,400L/min. The total daily water taking is 13,500m^3/day. The rated capacity of the plant, as specified in the MDWL, is 12,160m^3/day of treated water.

Raw Water Flows

The raw water flows are regulated under Permit to Take Water #5062-C4UG4R. 2023 raw flow data was submitted to the Ministry of Environment, Conservation and Parks electronically. The confirmation and a copy of the data that was submitted are attached in Appendix B.

The following table is a summary of the raw flows including total, average, and maximum daily flows, and peak flow rates for the reporting period. As well, a comparison of flows to the Permit to Take Water limits. The overall daily taking of water was not exceeded during the reporting period. The Tri-County DWS is at 31.7% capacity for the average daily water taking limit, which is up by 2.6% from last year.

Month	Total Flow (m^3)	Average Day Flow (m^3/day)	% of PTTW Limit	Max Day Flow (m^3/day)	% of PTTW Limit	Max Day Flow Rates (L/s)	% of PTTW Limit
January	119,119.9	3,842.58	28.5	5,970.50	44.2	124.9	79.7
February	118,759.4	4,241.41	31.4	5,138.60	38.1	122.0	77.9
March	123,343.0	3,978.81	29.5	4,211.00	31.2	126.9	81.0
April	122,500.7	4,083.36	30.2	5,760.10	42.7	128.0	81.7
May	146,196.1	4,716.00	34.9	6,300.70	46.7	133.1	84.9
June	160,889.2	5,362.97	39.7	7,288.70	54.0	137.8	87.9
July	147,730.2	4,765.49	35.3	5,953.20	44.1	138.8	88.6
August	137,142.6	4,423.95	32.8	5,766.40	42.7	138.3	88.3
September	124,744.2	4,158.14	30.8	5,426.80	40.2	140.5	89.7
October	122,278.3	3,944.46	29.2	4,547.50	33.7	139.7	89.2
November	111,596.3	3,719.88	27.6	4,586.70	34.0	136.2	86.9
December	129,537.4	4,178.63	31.0	5,259.90	39.0	131.7	84.0
Total	1,563,837.3						
Average		4,284.49	31.7				
Maximum				7,288.70	54.0	140.5	89.7

Treated Water Flows

The treated water flows are regulated under the Municipal Drinking Water Licence.

The following table is a summary of treated water flows including total, average, and maximum daily flows for the reporting period. As well, a comparison of flows to the Municipal Drinking Water Licence (MDWL) rated capacities is provided. The daily average flow for 2023 was 4,030.72m^3/day, which is an increase by 5.39% from 2022. The maximum daily flow for the reporting period was 7,142.30m^3/day. The plant is operating at 33.1% of its rated capacity; this is up from 2022 by 12.6%. The Tri-County DWS is capable of meeting its current uses for the system. It is operating at well below the limits set out in the Permit to Take Water and the design capacity for the plant specified in the MDWL.

Month	Total Flow (m^3)	Average Day Flow (m^3/day)	% of Rated Capacity	Max Day Flow (m^3/day)	% of Rated Capacity
January	113,492.30	3,661.04	30.1	4,550.60	37.4
February	111,310.80	3,975.39	32.7	4,887.70	40.2
March	110,208.20	3,555.10	29.2	4,244.50	34.9
April	117,272.50	3,909.08	32.1	5,135.20	42.2
May	142,244.30	4,588.53	37.7	6,121.70	50.3
June	149,950.60	4,998.35	41.1	7,142.30	58.7
July	137,940.20	4,449.68	36.6	5,557.60	45.7
August	131,212.10	4,232.65	34.8	5,346.00	44.0
September	114,858.80	3,828.63	31.5	4,645.10	38.2
October	114,215.50	3,684.37	30.3	4,917.70	40.4
November	104,058.20	3,468.61	28.5	4,678.90	38.5
December	124,447.80	4,014.45	33.0	5,183.30	42.6
Total	1,471,211.30				
Average		4,030.72	33.1		
Maximum				7,142.30	58.7

Regulatory Sample Results Summary

Microbiological Testing

	No. of Samples Collected	Range of E.Coli Results		Range of Total Coliform Results		Range of HPC Results	
		Min	Max	Min	Max	Min	Max
Raw Water	52	0	<500	0	<15400		
Treated Water	53	0	0	0	0	<10	<30
Distribution Water	104	0	0	0	0	<10	<1000

Operational Testing

	No. of Samples Collected	Range of Results	
		Minimum	Maximum
Turbidity (Rack 1)	8760	0.00	9.68
Turbidity (Rack 2)	8760	0.00	9.99
Turbidity (Rack 3)	8760	0.00	10.00
Turbidity (Rack 4)	8760	0.00	9.80
Free Chlorine (Primary Disinfection)	8760	1.36	3.71
Free Chlorine (Secondary Disinfection)	8760	1.06	2.44
Free Chlorine (Distribution—Grab)	412	0.62	2.17

NOTE: spikes recorded by on-line instrumentation were a result of air bubbles and various maintenance/calibration activities. All spikes are reviewed for compliance with O.Reg 170/03.

Inorganic Parameters

These parameters are tested as a requirement under O.Reg. 170/03. Sodium and Fluoride are required to be tested every 60 months. Nitrate and Nitrite's are tested quarterly and the metals are tested annually as required under O.Reg. 170/03. In the event any of the parameters exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly.

- MAC = Maximum Allowable Concentration as per O.Reg 169/03
- BDL = Below the laboratory detection level

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Treated Water					
Antimony: Sb (ug/L) - TW	2023/01/16	<MDL 0.6	6.0	0	0
Arsenic: As (ug/L) - TW	2023/01/16	0.7	10.0	0	0
Barium: Ba (ug/L) - TW	2023/01/16	25.5	1000.0	0	0
Boron: B (ug/L) - TW	2023/01/16	20	5000.0	0	0
Cadmium: Cd (ug/L) - TW	2023/01/16	0.007	5.0	0	0
Chromium: Cr (ug/L) - TW	2023/01/16	<MDL 0.08	50.0	0	0
Mercury: Hg (ug/L) - TW	2023/01/16	<MDL 0.01	1.0	0	0
Selenium: Se (ug/L) - TW	2023/01/16	0.24	50.0	0	0
Uranium: U (ug/L) - TW	2023/01/16	0.375	20.0	0	0

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Additional Inorganics					
Fluoride (mg/L) - TW	2019/05/06	0.12	1.5	0	0
Nitrite (mg/L) - TW	2023/01/03	<MDL 0.003	1.0	0	0
Nitrite (mg/L) - TW	2023/04/04	<MDL 0.003	1.0	0	0
Nitrite (mg/L) - TW	2023/07/10	<MDL 0.003	1.0	0	0
Nitrite (mg/L) - TW	2023/10/03	<MDL 0.003	1.0	0	0
Nitrate (mg/L) - TW	2023/01/03	0.127	10.0	0	0
Nitrate (mg/L) - TW	2023/04/04	0.391	10.0	0	0
Nitrate (mg/L) - TW	2023/07/10	0.222	10.0	0	0
Nitrate (mg/L) - TW	2023/10/03	0.042	10.0	0	0
Sodium: Na (mg/L) - TW	2019/05/06	9.72	20*	0	0

*There is no "MAC" for Sodium. The aesthetic objective for sodium in drinking water is 200 mg/L.

Schedule 15 Sampling:

The Schedule 15 sampling is required under O.Reg 170/03. This system is under reduced sampling. No plumbing samples were collected.

Distribution System	Number of Sampling Points	Number of Samples	Range of Results		MAC (ug/L)	Number of Exceedances
			Minimum	Maximum		
Alkalinity (mg/L)	4	8	92	101	N/A	0
pH	4	8	7.04	7.76	N/A	0
Lead (ug/l)	-	-	-	-	10	-

Organic Parameters

These parameters are tested annually as a requirement under O.Reg 170/03. In the event any of the parameters exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly.

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Treated Water					
Alachlor (ug/L) - TW	2023/01/16	<MDL 0.02	5.0	0	0
Atrazine + N-dealkylated metabolites (ug/L) - TW	2023/01/16	0.09	5.0	0	0
Azinphos-methyl (ug/L) - TW	2023/01/16	<MDL 0.05	20.0	0	0
Benzene (ug/L) - TW	2023/01/16	<MDL 0.32	1.0	0	0
Benzo(a)pyrene (ug/L) - TW	2023/01/16	<MDL 0.004	0.01	0	0
Bromoxynil (ug/L) - TW	2023/01/16	<MDL 0.33	5.0	0	0
Carbaryl (ug/L) - TW	2023/01/16	<MDL 0.05	90.0	0	0
Carbofuran (ug/L) - TW	2023/01/16	<MDL 0.01	90.0	0	0
Carbon Tetrachloride (ug/L) - TW	2023/01/16	<MDL 0.17	2.0	0	0
Chlorpyrifos (ug/L) - TW	2023/01/16	<MDL 0.02	90.0	0	0
Diazinon (ug/L) - TW	2023/01/16	<MDL 0.02	20.0	0	0
Dicamba (ug/L) - TW	2023/01/16	<MDL 0.2	120.0	0	0

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
1,2-Dichlorobenzene (ug/L) - TW	2023/01/16	<MDL 0.41	200.0	0	0
1,4-Dichlorobenzene (ug/L) - TW	2023/01/16	<MDL 0.36	5.0	0	0
1,2-Dichloroethane (ug/L) - TW	2023/01/16	<MDL 0.35	5.0	0	0
1,1-Dichloroethylene (ug/L) - TW	2023/01/16	<MDL 0.33	14.0	0	0
Dichloromethane (Methylene Chloride) (ug/L) - TW	2023/01/16	<MDL 0.35	50.0	0	0
2,4-Dichlorophenol (ug/L) - TW	2023/01/16	<MDL 0.15	900.0	0	0
2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW	2023/01/16	<MDL 0.19	100.0	0	0
Diclofop-methyl (ug/L) - TW	2023/01/16	<MDL 0.4	9.0	0	0
Dimethoate (ug/L) - TW	2023/01/16	<MDL 0.06	20.0	0	0
Diquat (ug/L) - TW	2023/01/16	<MDL 1.0	70.0	0	0
Diuron (ug/L) - TW	2023/01/16	<MDL 0.03	150.0	0	0
Glyphosate (ug/L) - TW	2023/01/16	<MDL 1.0	280.0	0	0
Malathion (ug/L) - TW	2023/01/16	<MDL 0.02	190.0	0	0
2-Methyl-4chlorophenoxyacetic Acid (MCPA)	2023/01/16	0.02	50.0	0	0
Metolachlor (ug/L) - TW	2023/01/16	<MDL 0.02	80.0	0	0
Metribuzin (ug/L) - TW	2023/01/16	<MDL 0.3	80.0	0	0
Monochlorobenzene (Chlorobenzene) (ug/L) - TW	2023/01/16	<MDL 1.0	10.0	0	0
Paraquat (ug/L) - TW	2023/01/16	<MDL 0.04	3.0	0	0
PCB (ug/L) - TW	2023/01/16	<MDL 0.15	60.0	0	0
Pentachlorophenol (ug/L) - TW	2023/01/16	<MDL 0.01	2.0	0	0
Phorate (ug/L) - TW	2023/01/16	<MDL 1.0	190.0	0	0
Picloram (ug/L) - TW	2023/01/16	<MDL 0.03	1.0	0	0
Prometryne (ug/L) - TW	2023/01/16	<MDL 0.01	10.0	0	0
Simazine (ug/L) - TW	2023/01/16	<MDL 0.01	1.0	0	0
Terbufos (ug/L) - TW	2023/01/16	<MDL 0.35	10.0	0	0
Tetrachloroethylene (ug/L) - TW	2023/01/16	<MDL 0.2	100.0	0	0
2,3,4,6-Tetrachlorophenol (ug/L) - TW	2023/01/16	<MDL 0.01	230.0	0	0
Triallate (ug/L) - TW	2023/01/16	<MDL 0.44	5.0	0	0
Trichloroethylene (ug/L) - TW	2023/01/16	<MDL 0.25	5.0	0	0
2,4,6-Trichlorophenol (ug/L) - TW	2023/01/16	<MDL 0.00012	100.0	0	0
Trifluralin (ug/L) - TW	2023/01/16	<MDL 0.02	45.0	0	0
Vinyl Chloride (ug/L) - TW	2023/01/16	<MDL 0.17	1.0	0	0
Distribution Water					
Trihalomethane: Total (ug/L) Annual Average - DW	2023	48.75	100	0	0
HAA Total (ug/L) Annual Average - DW	2023	20.73	80	0	0

MAC = Maximum Allowable Concentration as per O.Reg 169/03
BDL = Below the laboratory detection level

Additional Legislated Samples

Date of legal instrument issued	Parameter	Date Sampled	Result	Maximum Annual Average	Unit of Measure
2019-07-16	Suspended Solids	2023-01-03 2023-02-06 2023-03-13 2023-04-11 2023-05-01 2023-06-05 2023-07-10 2023-08-08 2023-09-05 2023-10-16 2023-11-14 2023-12-04	6 16 12 13 8 <2 3 4 3 2 4 11 Avg.: 7.00	25	mg/L

Major Maintenance Summary

Details
-Replace block heater on plant generator -Replace actuator position sensor on rack#4 -New space heaters installed in generator -SCADA computer replacement -De-tuning plate added to low lift pump LLP-1040 -Replaced LCD display on raw flow meter -Replaced turbidimeter desiccant cartridges and flow sensors. -Replaced Trojan OptiView lamp -Replaced process drain pump PDP-9020 -Replaced outside lights and clean plant roof gutters -Replaced exhaust cap on lowlife generator -Replaced indoor office lights ballasts -Changed all air lines on all racks. -Repaired sinkhole in driveway to low lift -Replaced 4” butterfly valve on Rack #1 -Replaced UPS battery in low lift -Serviced and repaired SCBA equipment -Hach inspection of rack turbidimeters and controllers -Highlift header replacement -Electrical issue at standpipe. Eramosa remotely reprogrammed PLC. Had to come in after and manually reprogram again. -Installed new UPS at West Lorne standpipe -Upgraded optical fiber media converter in lowlift PLC cabinet -Replaced raw sample pump -Low lift VFD electrical work/replacement -Replaced power supply box at Eagle West

-West Lorne standpipe hydro meter replaced
-New battery for entry alarm panel
-Rack#3 membrane replacement
-HLP-7030 impeller replacement
-New Rockwell unit for plant remote SCADA VPN
-Change smart positioner on utility airline actuator in mechanical room
-New VFD for HLP-7020 and LLP-1020
-Rack#2 feed valve FCV-3201 and smart positioner replaced