

* There was one incident of adverse microbiological test results for the Lake Huron Primary Water Supply System during this quarter.

Analytical Test Results: (All values are reported in mg/L unless otherwise noted)

Microbiological Parameters (Required Testing Under O.Reg. 170/03)

Microbiological Parameters	MAC or IMAC	No. of Samples	No. of Detectable Results	No. of Adverse Results	Method	Sampling Date	Results		Comments
							Min.	Max.	
Total Coliform (counts/100ml) *	Not Detectable	56	1	1	Membrane Filtration	Jul-Sep	0	1	Coliforms are used as an indicator of fecal contamination of drinking water, as well as to determine the efficiency of treatment and the integrity of the water distribution system. * During the third quarter of 2019 there was one adverse result reported, investigated and resolved. It is suspected the adverse result was due to post-sampling contamination. The resampling results support this conclusion.
<i>E. coli</i> (counts/100ml) *	Not Detectable	56	1	1	Membrane Filtration	Jul-Sep	0	1	E. coli is an indicator of fecal contamination of drinking water. * During the third quarter of 2019 there was one adverse result reported, investigated and resolved It is suspected the adverse result was due to post-sampling contamination. The resampling results support this conclusion.
Heterotrophic Plate Count (counts/1ml)	N/A	56	4	0	Spread Plate Count	Jul-Sep	<10	230	Test parameter is used as an indicator of possible deterioration of water quality. Increases in HPC concentrations above baseline levels are considered undesirable.

Operational Parameters:

Operational Parameters	MAC or IMAC	Objective AO/OG	No. of Samples	Sampling Date	Results			Comments
					Min.	Max.	Avg.	
Chlorine Residual ¹ , Free (mg/L)			Continuous monitoring plus 6 grab samples per day	Jul-Sep	0.77	1.56	1.25	The maintenance of an adequate free chlorine residual is essential to the protection of public health. Values reported are based on the 6 daily grab samples. The regulated minimum for free chlorine residual concentration in a water distribution system is 0.05mg/L; however the contractual obligation of the water system is to achieve 0.5mg/L at the point of supply to the municipalities.
Chlorine Residual ¹ , Total (mg/L)			Continuous monitoring plus 6 grab samples per day	Jul-Sep	0.90	1.69	1.40	The maintenance of an adequate free chlorine residual in essential to the protection of public health. Values reported are based on the 6 daily grab samples.
Colour (TCU)		5	2 grab samples per day	Jul-Sep	<3	<3	<3	Values reported are based on the 2 daily grab samples.
Conductivity (µS/cm)			Continuous monitoring plus 2 grab samples per day	Jul-Sep	177	222	216	Values reported based on daily minimum, maximum and average that have been recorded electronically.
pH (no units)		6.5 – 8.5	Continuous monitoring plus 6 grab samples per day	Jul-Sep	7.12	8.57	8.11	Values reported are based on the 6 daily grab samples.
Turbidity ^{1, 2} (NTU)			Continuous monitoring plus 6 grab samples per day	Jul-Sep	0.026	0.099	0.051	Turbidity (cloudiness) of water is an indication of the presence of particles in the water. If excessive, it may interfere with proper disinfection. Values reported are based on the 6

Operational Parameters	MAC or IMAC	Objective AO/OG	No. of Samples	Sampling Date	Results			Comments
					Min.	Max.	Avg.	
								daily grab samples.
Aluminum (mg/L)		< 0.1	2 grab samples per day	Jul-Sep	0.013	0.122	0.066	Aluminum levels are slightly elevated during treatment as a result of the use of alum to help in the removal of particulates.
Temperature (Celsius)		15	Continuous monitoring plus 6 grab samples per day	Jul-Sep	11.8	24.0	19.6	Raw Water Temperature. Values reported are based on the 6 daily grab samples.

Inorganic Parameters (Required Testing Under O.Reg. 170/03 – Schedule 23):

Schedule 23 - Inorganic Parameters		MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
1.	Antimony	0.006		12	NT	0.00012	NT	NT	0.00002	
2.	Arsenic	0.010		12	NT	ND	NT	NT	0.0002	
3.	Barium	1.0		12	NT	0.0157	NT	NT	0.00001	
4.	Boron	5.0		12	NT	0.016	NT	NT	0.0002	
5.	Cadmium	0.005		12	NT	0.000003	NT	NT	0.000003	
6.	Chromium	0.05		12	NT	0.00012	NT	NT	0.0005	
7.	Mercury	0.001		12	NT	ND	NT	NT	0.00002	
8.	Selenium	0.05		12	NT	0.00013	NT	NT	0.001	
9.	Uranium	0.02		12	NT	0.000072	NT	NT	0.000001	

Organic Parameters (Required Testing Under O.Reg. 170/03 – Schedule 24):

Schedule 24 – Organic Parameters		MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
1.	Alachlor	0.005		12	NT	ND	NT	NT	0.00002	Herbicide
2.	Atrazine + N-dealkylated metabolites	0.005		12	NT	0.00001	NT	NT	0.00001	Herbicide
3.	Azinphos-methyl	0.02		12	NT	ND	NT	NT	0.00002	Insecticide
4.	Benzene	0.005		12	NT	ND	NT	NT	0.00032	An aromatic hydrocarbon present in gasoline
5.	Benzo(a)pyrene	0.00001		12	NT	ND	NT	NT	0.000004	A polycyclic aromatic hydrocarbon (PAH) that forms during the combustion of organic matter (eg. emissions from burning fossil fuels)
6.	Bromoxynil	0.005		12	NT	ND	NT	NT	0.00033	Herbicide
7.	Carbaryl	0.09		12	NT	ND	NT	NT	0.00001	Insecticide
8.	Carbofuran	0.09		12	NT	ND	NT	NT	0.00001	Insecticide
9.	Carbon Tetrachloride	0.005		12	NT	ND	NT	NT	0.00016	An organic liquid that is primarily released from man-made sources; used in industrial and agricultural process
10.	Chlorpyrifos	0.09		12	NT	ND	NT	NT	0.00002	Pesticide
11.	Diazinon	0.02		12	NT	ND	NT	NT	0.00002	Insecticide

Schedule 24 – Organic Parameters		MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
12.	Dicamba	0.12		12	NT	ND	NT	NT	0.0002	Herbicide
13.	1,2-Dichlorobenzene	0.2	0.003	12	NT	ND	NT	NT	0.00041	An organic compound used in both industrial and commercial products (coolant, degreaser, solvent)
14.	1,4-Dichlorobenzene	0.005	0.001	12	NT	ND	NT	NT	0.00036	An organic compound used in both industrial and commercial products (deodorizer, fungicide, lubricant)
15.	1,2-Dichloroethane	0.005		12	NT	ND	NT	NT	0.00035	An organic chemical with many industrial and commercial applications (solvent, fumigant, ingredient in plastics etc.)
16.	1,1-Dichloroethylene (vinylidene chloride)	0.014		12	NT	ND	NT	NT	0.00033	Volatile organic compound; imported for use in the food packaging and textile industries
17.	Dichloromethane (Methylene Chloride)	0.05		12	NT	ND	NT	NT	0.00035	Volatile organic compound used in a variety of industries (electronics, textiles, pharmaceuticals, plastics etc.)
18.	2,4-Dichlorophenol	0.9	0.0003	12	NT	ND	NT	NT	0.00015	An organic compound used in industry and chemical manufacturing
19.	2,4-Dichlorophenoxy acetic acid (2,4-D)	0.1		12	NT	ND	NT	NT	0.00019	Herbicide

Schedule 24 – Organic Parameters		MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
20.	Diclofop-methyl	0.009		12	NT	ND	NT	NT	0.0004	Herbicide
21.	Dimethoate	0.02		12	NT	ND	NT	NT	0.00003	Insecticide
22.	Diquat	0.07		12	NT	ND	NT	NT	0.001	Herbicide
23.	Diuron	0.15		12	NT	ND	NT	NT	0.00003	Herbicide
24.	Glyphosate	0.28		12	NT	ND	NT	NT	0.006	Herbicide
25.	Malathion	0.19		12	NT	ND	NT	NT	0.00002	Insecticide
26.	Metolachlor	0.05		12	NT	ND	NT	NT	0.00001	Herbicide
27.	Metribuzin	0.08		12	NT	ND	NT	NT	0.00002	Herbicide
28.	Monochlorobenzene	0.08	0.03	12	NT	ND	NT	NT	0.0003	A man-made organic compound; primarily used as a solvent
29.	Paraquat	0.01		12	NT	ND	NT	NT	0.001	Herbicide
30.	Pentachlorophenol	0.06		12	NT	ND	NT	NT	0.00015	An organic compound; used as a pesticide and wood preservative (manufacture and use banned since the 1980's)
31.	Phorate	0.002		12	NT	ND	NT	NT	0.00001	Insecticide
32.	Picloram	0.19		12	NT	ND	NT	NT	0.001	Herbicide

Schedule 24 – Organic Parameters		MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
33.	Polychlorinated Biphenyls (PCB)	0.003		12	NT	ND	NT	NT	0.00004	An organic compound; used in electrical equipment and as a fire retardant (use has been banned since the 1980's)
34.	Prometryne	0.001		12	NT	ND	NT	NT	0.00003	Herbicide
35.	Simazine	0.01		12	NT	ND	NT	NT	0.00001	Herbicide
36.	Terbufos	0.001		12	NT	ND	NT	NT	0.00001	Insecticide
37.	Tetrachloroethylene (perchloroethylene)	0.01		12	NT	ND	NT	NT	0.00035	An organic compound; used as a solvent in dry cleaning and metal cleaning industries
38.	2,3,4,6-Tetrachlorophenol	0.10	0.001	12	NT	ND	NT	NT	0.00014	An organic compound; currently used mainly as a wood preservative
39.	Triallate	0.23		12	NT	ND	NT	NT	0.00001	Herbicide
40.	Trichloroethylene	0.05		12	NT	ND	NT	NT	0.00044	Volatile organic compound; used in metal degreasing operations and chemical manufacturing
41.	2,4,6-Trichlorophenol	0.005	0.002	12	NT	ND	NT	NT	0.00025	Volatile organic compound; used in the manufacture of pesticides
42.	Trifluralin	0.045		12	NT	ND	NT	NT	0.00002	Herbicide
43.	Vinyl Chloride	0.002		12	NT	ND	NT	NT	0.00017	Volatile organic compound; Used in making PVC (polyvinyl chloride) plastic items

Schedule 24 – Organic Parameters		MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
44.	2 methyl-4-chlorophenoxyacetic acid (MCPA)	0.1 *		12	NT	ND	NT	NT	0.00012	Herbicide *The MAC takes effect on January 1, 2017

Additional Organic Parameters (Removed from Schedule 24 as of January 1, 2016)		MAC or IMAC (mg/L)	Objective AO/OG	Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
1.	Aldicarb			NR	NT	ND	NT	NT	0.00001	Insecticide
2.	Aldrin + Dieldrin			NR	NT	ND	NT	NT	0.00001	Insecticide
3.	Bendiocarb			NR	NT	ND	NT	NT	0.00001	Insecticide
4.	Chlordane (total)			NR	NT	ND	NT	NT	0.00001	Pesticide
5.	Cyanazine			NR	NT	ND	NT	NT	0.00003	Herbicide
6.	Dichlorodiphenyltrichloroethane (DDT) + metabolites			NR	NT	ND	NT	NT	0.00001	Insecticide
7.	Dinoseb			NR	NT	ND	NT	NT	0.00036	Insecticide, Herbicide
8.	Heptachlor + Heptachlor Epoxide			NR	NT	ND	NT	NT	0.00001	Insecticide
9.	Lindane (Total)			NR	NT	ND	NT	NT	0.00001	Pesticide
10.	Methoxychlor			NR	NT	ND	NT	NT	0.00001	Insecticide
11.	Parathion			NR	NT	ND	NT	NT	0.00002	Insecticide
12.	Temephos			NR	NT	ND	NT	NT	0.00001	Insecticide
13.	2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)			NR	NT	ND	NT	NT	0.00022	Herbicide

General Chemistry and Physical Parameters (Additional Regulatory and Contractual Testing)

General Chemistry and Physical Parameters	MAC or IMAC (mg/L)	Objective AO/OG (mg/L)	O.Reg. 170/03 Required Frequency of Testing (months)	Contractual Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
Alkalinity (Total as CaCO ₃)		30 – 500	NR	6	83	82	92	75	2	Q3 value is based on 1 sample results
Calcium			NR	12	NT	28	NT	NT	0.01	
Chloride		250	NR	12	NT	9.5	NT	NT	0.04	
Copper		1.0	NR	12	NT	0.00084	NT	NT	0.00002	
Dissolved Organic Carbon (mg/L as C)		5	NR	12	1.2	1.3	1.3	1.0	1	Q3 value is based on 1 sample results
Dissolved Inorganic Carbon (mg/L as C)			NR	6	NT	0.024	0.014	0.022	1	
Ethylbenzene	0.14	0.0016	NR	12	NT	ND	NT	NT	0.00033	
Fluoride	1.5		60	NA	NT	0.07	NT	NT	0.06	
Geosmin (ng/L)		4.0	NR	Weekly as Required	0.6	ND	NT	0.7	3.0 ng/L	Geosmin is tested weekly from July 1-Oct 31. Results are expressed as the average per quarter when testing is required.

General Chemistry and Physical Parameters	MAC or IMAC (mg/L)	Objective AO/OG (mg/L)	O.Reg. 170/03 Required Frequency of Testing (months)	Contractual Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
Haloacetic Acids (Arva Reservoir)	0.08 *	0.060	NR	3	ND	ND	0.0164	0.0134	0.0053	The standard is expressed as a running annual average of quarterly samples measured at a point reflecting the maximum residence time in the distribution system. Running annual average: 0.0075 mg/L *The MAC takes effect January 1, 2020.
Haloacetic Acids (Exeter-Hensall)	0.08 *	0.060	NR	3	0.0144	0.0197	0.0191	0.0206	0.0053	The standard is expressed as a running annual average of quarterly samples measured at a point reflecting the maximum residence time in the distribution system. Running annual average: 0.0185mg/L *The MAC takes effect January 1, 2020.
Haloacetic Acids (Komoka-Mt. Brydges)	0.08 *	0.060	NR	3	0.0061	0.0121	0.0202	0.0177	0.0053	The standard is expressed as a running annual average of quarterly samples measured at a point reflecting the maximum residence time in the Running annual average: 0.0140mg/L *The MAC takes effect January 1, 2020.

General Chemistry and Physical Parameters	MAC or IMAC (mg/L)	Objective AO/OG (mg/L)	O.Reg. 170/03 Required Frequency of Testing (months)	Contractual Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
Haloacetic Acids (Strathroy-Caradoc)	0.08 *	0.060	NR	3	0.0065	0.0105	0.0168	0.0156	0.0053	The standard is expressed as a running annual average of quarterly samples measured at a point reflecting the maximum residence time in the distribution system. Running annual average: 0.0124mg/L *The MAC takes effect January 1, 2020.
Hardness (mg/L as CaCO ₃)		80 – 100	NR	12	NT	102	NT	NT	0.05	
Iron		0.30	NR	12	NT	ND	NT	NT	0.007	
Lead	0.01		NR	6	NT	ND	NT	0.00004	0.00001	
Magnesium			NR	12	NT	7.85	NT	NT	0.001	
Manganese		0.05	NR	12	NT	0.00008	NT	NT	0.001	
Methane (L/m ³)		3L/m ³	NR	12	NT	ND	NT	NT	0.02	
2-Methylisoborneol (MIB) (ng/L)		8.5	NR	Weekly as Required	ND	ND	NT	ND	3.0 ng/L	MIB is tested weekly from July 1-Oct 31. Results are expressed as the average per quarter when testing is required.
Nitrate	10.0		3	3	0.299	1.11	1.29	0.341	0.006	
Nitrite	1.0		3	3	ND	ND	ND	ND	0.003	

General Chemistry and Physical Parameters	MAC or IMAC (mg/L)	Objective AO/OG (mg/L)	O.Reg. 170/03 Required Frequency of Testing (months)	Contractual Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
Organic Nitrogen		0.15	NR	12	NT	ND	NT	NT	0.05	Organic nitrogen is calculated by subtracting Total Ammonia from Total Kjeldahl Nitrogen
Sodium		200	60	12	NT	10.2	NT	NT	0.01	The local Medical Officer of Health must be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.
Sulphate		500	NR	12	NT	29	NT	NT	0.04	
Sulphide		0.05	NR	12	NT	ND	NT	NT	0.06	
Toluene	0.06		NR	12	NT	ND	NT	NT	0.00036	
Total Dissolved Solids		500	NR	12	NT	131	NT	NT	30	
Trihalomethanes (Arva Reservoir)	0.100		3	3	0.020	0.015	0.024	0.028	0.00037	The standard is expressed as a running annual average of quarterly samples measured at a point reflecting the maximum residence time in the distribution system. Running annual average: 0.022mg/L

General Chemistry and Physical Parameters	MAC or IMAC (mg/L)	Objective AO/OG (mg/L)	O.Reg. 170/03 Required Frequency of Testing (months)	Contractual Required Frequency of Testing (months)	2018	2019			Reportable Detection Limit (mg/L)	Comments
					Q4	Q1	Q2	Q3		
Trihalomethanes (Exeter-Hensall)	0.100		3	3	0.038	0.031	0.033	0.045	0.00037	The standard is expressed as a running annual average of quarterly samples measured at a point reflecting the maximum residence time in the distribution system. Running annual average: 0.037mg/L
Trihalomethanes (Komoka-Mt. Brydges)	0.100		3	3	0.027	0.021	0.028	0.039	0.00037	The standard is expressed as a running annual average of quarterly samples measured at a point reflecting the maximum residence time in the distribution system. Running annual average: 0.029mg/L
Trihalomethanes (Strathroy-Caradoc)	0.100		3	3	0.022	0.018	0.026	0.029	0.00037	The standard is expressed as a running annual average of quarterly samples measured at a point reflecting the maximum residence time in the distribution system. Running annual average: 0.024mg/L
Xylenes	0.09	0.02	NR	12	NT	ND	NT	NT	0.00043	
Zinc		5.0	NR	12	NT	0.002	NT	NT	0.001	

Discussion of Analytical Results:

* Indicator of adverse water quality

¹ In addition to the analytical samples noted above, chlorine residual, and turbidity are measured on a continuous basis at the treatment facility using on-line instrumentation.

² Turbidity is both regulated by the Province of Ontario, and specified in accordance with the operating agreement with the Contracted Operating Authority. The turbidity reported (6 daily grab samples) is taken from the plant treated water discharge, which is not explicitly regulated in Provincial Regulations. Provincial Standards recommend an aesthetic objective of 5 NTU within a distribution system, and Provincial Regulation specifies a maximum of 1 NTU on individual filter effluent. The contract with the Operating Authority specifies a maximum turbidity of 0.2 NTU on treated water discharge from the water treatment plant and 0.1 NTU on individual filter effluent. There is currently no standard for combined filter effluent.

MAC or IMAC – Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration; as identified in O.Reg. 169 (Ontario Drinking-Water Quality Standards) and the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines

AO/OG – Aesthetic Objective/Operational Guideline; as identified in the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines

NT – Not Tested during this quarter

NR – Not Required

ND – Not Detected