Lake Huron Primary Water Supply System – 2020 4th Quarter Water Quality Report

There was one adverse test result for the Lake Huron Primary Water Supply System during this quarter.

List of Acronyms:

MAC – Maximum Acceptable Concentration; as identified in O.Reg. 169 (Ontario Drinking-Water Quality Standards)
IMAC - Interim Maximum Acceptable Concentration; as identified in 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
NR – Not Required
ND – Not Detected

Analytical Test Results: (All values are reported in mg/L unless otherwise noted; All results are for treated water leaving the Water Treatment Plant unless otherwise noted)

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

Microbiological Parameter	MAC or IMAC	No. of Samples	No. of Detectable Results	No. of Adverse Results	Method	Sampling Date	Min. Result	Max. Result	Comments
Total Coliform (counts/100ml) [i]	Not Detectable	67	0	0	Membrane Filtration	Oct-Dec	0	0	Parameter sampled is used to test for the possible presence of fecal matter. Zero detectable test results indicates that Total Coliforms were not detected.
E. coli (counts/100ml) [ii]	Not Detectable	67	0	0	Membrane Filtration	Oct-Dec	0	0	Parameter sampled is used to test for the possible presence of fecal matter. Zero detectable test results indicates that E.coli was not detected.
Heterotrophic Plate Count (counts/1ml)	N/A	67	4	0	Spread Plate Count	Oct-Dec	<10	10	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 Parameter	MAC or IMAC	Objective AO/OG	No. of Samples	Sampling Date	Min. Result	Max. Result	Avg. Result	Comments
Chlorine Residual, Free (mg/L) [iii]			Continuous monitoring plus 6 grab samples per day	Oct-Dec	0.85	1.58	1.29	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, Total (mg/L)			Continuous monitoring plus 6 grab samples per day	Oct-Dec	0.98	1.72	1.42	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	Oct-Dec	<3	<3	<3	Values reported are based on the 2 daily grab samples.
Conductivity (µS/cm)			Continuous monitoring plus 2 grab samples per day	Oct-Dec	175.2	248.0	218.4	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	Oct-Dec	7.05	8.42	7.99	Values reported are based on the 6 daily grab samples.
Turbidity (NTU) [iv] [v]			Continuous monitoring plus 6 grab samples per day	Oct-Dec	0.006	0.099	0.060	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 daily grab samples.

Operational Parameter	MAC or IMAC	Objective AO/OG	No. of Samples	Sampling Date	Min. Result	Max. Result	Avg. Result	Comments
Aluminum (mg/L)		< 0.1	2 grab samples per day	Oct-Dec	0.005	0.079	0.029	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	Oct-Dec	4.1	19.1	10.8	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 Parameter	MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
Antimony	0.006		12	0.00011	NT	NT	NT	0.00002	
Arsenic	0.010		12	ND	NT	NT	NT	0.0002	
Barium	1.0		12	0.0129	NT	NT	NT	0.00001	
Boron	5.0		12	0.014	NT	NT	NT	0.0002	
Cadmium	0.005		12	0.000005	NT	NT	NT	0.000003	
Chromium	0.05		12	0.00012	NT	NT	NT	0.0005	
Mercury	0.001		12	ND	NT	NT	NT	0.00002	
Selenium	0.05		12	0.00013	NT	NT	NT	0.001	
Uranium	0.02		12	0.000028	NT	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)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
Alachlor	0.005		12	ND	NT	NT	NT	0.00002	Herbicide
Atrazine + N-dealkylated metabolites	0.005		12	0.00002	NT	NT	NT	0.00001	Herbicide
Azinphos-methyl	0.02		12	ND	NT	NT	NT	0.00002	Insecticide
Benzene	0.005		12	ND	NT	NT	NT	0.00032	An aromatic hydrocarbon present in gasoline
Benzo(a)pyrene	0.00001		12	ND	NT	NT	NT	0.000004	A polycyclic aromatic hydrocarbon (PAH) that forms during the combustion of organic matter (e.g. emissions from burning fossil fuels)
Bromoxynil	0.005		12	ND	NT	NT	NT	0.00033	Herbicide
Carbaryl	0.09		12	ND	NT	NT	NT	0.00001	Insecticide
Carbofuran	0.09		12	ND	NT	NT	NT	0.00001	Insecticide
Carbon Tetrachloride	0.005		12	ND	NT	NT	NT	0.00016	An organic liquid that is primarily released from man-made sources; used in industrial and agricultural process
Chlorpyrifos	0.09		12	ND	NT	NT	NT	0.00002	Pesticide
Diazinon	0.02		12	ND	NT	NT	NT	0.00002	Insecticide
Dicamba	0.12		12	ND	NT	NT	NT	0.0002	Herbicide

Schedule 24 – Organic Parameters	MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
1,2-Dichlorobenzene	0.2	0.003	12	ND	NT	NT	NT	0.00041	An organic compound used in both industrial and commercial products (coolant, degreaser, solvent)
1,4-Dichlorobenzene	0.005	0.001	12	ND	NT	NT	NT	0.00036	An organic compound used in both industrial and commercial products (deodorizer, fungicide, lubricant)
1,2-Dichloroethane	0.005		12	ND	NT	NT	NT	0.00035	An organic chemical with many industrial and commercial applications (solvent, fumigant, ingredient in plastics etc.)
1,1-Dichloroethylene (vinylidene chloride)	0.014		12	ND	NT	NT	NT	0.00033	Volatile organic compound; imported for use in the food packaging and textile industries
Dichloromethane (Methylene Chloride)	0.05		12	ND	NT	NT	NT	0.00035	Volatile organic compound used in a variety of industries (electronics, textiles, pharmaceuticals, plastics etc.)
2,4-Dichlorophenol	0.9	0.0003	12	ND	NT	NT	NT	0.00015	An organic compound used in industry and chemical manufacturing
2,4-Dichlorophenoxy acetic acid (2,4-D)	0.1		12	ND	NT	NT	NT	0.00019	Herbicide
Diclofop-methyl	0.009		12	ND	NT	NT	NT	0.0004	Herbicide
Dimethoate	0.02		12	ND	NT	NT	NT	0.00003	Insecticide

Schedule 24 – Organic Parameters	MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
Diquat	0.07		12	ND	NT	NT	NT	0.001	Herbicide
Diuron	0.15		12	ND	NT	NT	NT	0.00003	Herbicide
Glyphosate	0.28		12	ND	NT	NT	NT	0.006	Herbicide
Malathion	0.19		12	ND	NT	NT	NT	0.00002	Insecticide
2 methyl-4-chlorophenoxyacetic acid (MCPA)	0.1		12	ND	NT	NT	NT	0.00012	Herbicide
Metolachlor	0.05		12	0.00002	NT	NT	NT	0.00001	Herbicide
Metribuzin	0.08		12	ND	NT	NT	NT	0.00002	Herbicide
Monochlorobenzene	0.08	0.03	12	ND	NT	NT	NT	0.0003	A man-made organic compound; primarily used as a solvent
Paraquat	0.01		12	ND	NT	NT	NT	0.001	Herbicide
Pentachlorophenol	0.06		12	ND	NT	NT	NT	0.00015	An organic compound; used as a pesticide and wood preservative (manufacture and use banned since the 1980's)
Phorate	0.002		12	ND	NT	NT	NT	0.00001	Insecticide
Picloram	0.19		12	ND	NT	NT	NT	0.001	Herbicide
Polychlorinated Biphenyls (PCB)	0.003		12	ND	NT	NT	NT	0.00004	An organic compound; used in electrical equipment and as a fire retardant (use has been banned since the 1980's)

Schedule 24 – Organic Parameters	MAC or IMAC (mg/L)	Objective AO/OG	O.Reg. 170/03 Required Frequency of Testing (months)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
Prometryne	0.001		12	ND	NT	NT	NT	0.00003	Herbicide
Simazine	0.01		12	ND	NT	NT	NT	0.00001	Herbicide
Terbufos	0.001		12	ND	NT	NT	NT	0.00001	Insecticide
Tetrachloroethylene (perchloroethylene)	0.01		12	ND	NT	NT	NT	0.00035	An organic compound; used as a solvent in dry cleaning and metal cleaning industries
2,3,4,6-Tetrachlorophenol	0.10	0.001	12	ND	NT	NT	NT	0.00014	An organic compound; currently used mainly as a wood preservative
Triallate	0.23		12	ND	NT	NT	NT	0.00001	Herbicide
Trichloroethylene	0.05		12	ND	NT	NT	NT	0.00044	Volatile organic compound; used in metal degreasing operations and chemical manufacturing
2,4,6-Trichlorophenol	0.005	0.002	12	ND	NT	NT	NT	0.00025	Volatile organic compound; used in the manufacture of pesticides
Trifluralin	0.045		12	ND	NT	NT	NT	0.00002	Herbicide
Vinyl Chloride	0.002		12	ND	NT	NT	NT	0.00017	Volatile organic compound; Used in making PVC (polyvinyl chloride) plastic items

Additional Organic Parameters (Removed from Schedule 24 as of January 1, 2016)

Organic Parameter	MAC or IMAC (mg/L)	Objective AO/OG	Required Frequency of Testing (months)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
Aldicarb			NR	ND	NT	NT	NT	0.00001	Insecticide
Aldrin + Dieldrin			NR	ND	NT	NT	NT	0.00001	Insecticide
Bendiocarb			NR	ND	NT	NT	NT	0.00001	Insecticide
Chlordane (total)			NR	ND	NT	NT	NT	0.00001	Pesticide
Cyanazine			NR	ND	NT	NT	NT	0.00003	Herbicide
Dichlorodiphenyltrichloroethane (DDT) + metabolites			NR	ND	NT	NT	NT	0.00001	Insecticide
Dinoseb			NR	ND	NT	NT	NT	0.00036	Insecticide, Herbicide
Heptachlor + Heptachlor Epoxide			NR	ND	NT	NT	NT	0.00001	Insecticide
Lindane (Total)			NR	ND	NT	NT	NT	0.00001	Pesticide
Methoxychlor			NR	ND	NT	NT	NT	0.00001	Insecticide
Parathion			NR	ND	NT	NT	NT	0.00002	Insecticide
Temephos			NR	ND	NT	NT	NT	0.00001	Insecticide
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)			NR	ND	NT	NT	NT	0.00022	Herbicide

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

General Chemistry or Physical Parameter	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)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
Alkalinity (Total as $CaCO_3$)		30 – 500	NR	6	80	90	83	85	2	Q4 value is based on 4 sample results
Calcium			NR	12	28.6	NT	NT	NT	0.01	
Chloride		250	NR	12	9.8	NT	NT	NT	0.04	
Copper		1.0	NR	12	0.0012	NT	NT	NT	0.00002	
Dissolved Organic Carbon (mg/L as C)		5	NR	12	1.2	1.3	1.3	1.3	1	Q4 value is based on 4 sample results
Dissolved Inorganic Carbon (mg/L as C)			NR	6	0.020	NT	0.016	0.021	1	
Ethylbenzene	0.14	0.0016	NR	12	ND	NT	NT	NT	0.00033	
Fluoride	1.5		60	NA	0.07	NT	NT	NT	0.06	
Geosmin (ng/L)		4.0	NR	Weekly as Required	ND	ND	ND	ND	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.
Haloacetic Acids (Arva Reservoir)	0.08	0.060	NR	3	ND	ND	0.0063	0.0098	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:

General Chemistry or Physical Parameter	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)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
										0.0040 mg/L The MAC takes effect January 1, 2020.
Haloacetic Acids (Exeter-Hensall)	0.08	0.060	NR	3	0.0076	0.0183	0.0154	0.0178	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: 0.0148 mg/L The MAC takes effect January 1, 2020.
Haloacetic Acids (Komoka-Mt. Brydges)	0.08	0.060	NR	3	ND	0.0131	0.0074	0.0166	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: 0.0093 mg/L The MAC takes effect January 1, 2020.
Haloacetic Acids (Strathroy-Caradoc)	0.08	0.060	NR	3	ND	0.0056	0.0077	0.0065	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: 0.0050 mg/L The MAC takes effect January 1,

General Chemistry or Physical Parameter	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)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
										2020.
Hardness (mg/L as $CaCO_3$)		80 – 100	NR	12	104	NT	NT	NT	0.05	
Iron		0.30	NR	12	ND	NT	NT	NT	0.007	
Lead	0.01		NR	6	ND	0.00001	0.00002	0.00001	0.00001	
Magnesium			NR	12	7.9	NT	NT	NT	0.001	
Manganese		0.05	NR	12	0.00063	NT	NT	NT	0.001	
Methane (L/m^3)		$3L/m^3$	NR	12	ND	NT	NT	NT	0.02	
2-Methylisoborneol (MIB) (ng/L)		8.5	NR	Weekly as Required	ND	ND	ND	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	0.297	0.655	0.293	0.287	0.006	
Nitrite	1.0		3	3	ND	ND	ND	ND	0.003	
Organic Nitrogen		0.15	NR	12	ND	NT	NT	NT	0.05	Organic nitrogen is calculated by subtracting Total Ammonia from Total Kjeldahl Nitrogen
Sodium		200	60	12	13.8	NT	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

General Chemistry or Physical Parameter	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)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
										their use with patients on sodium restricted diets.
Sulphate		500	NR	12	34	NT	NT	NT	0.04	
Sulphide		0.05	NR	12	ND	NT	NT	NT	0.06	
Toluene	0.06		NR	12	ND	NT	NT	NT	0.00036	
Total Dissolved Solids		500	NR	12	169	NT	NT	NT	30	
Trihalomethanes (Arva Reservoir)	0.100		3	3	0.015	0.022	0.024	0.026	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: 0.022 mg/L
Trihalomethanes (Exeter-Hensall)	0.100		3	3	0.028	0.034	0.038	0.053	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: 0.038 mg/L
Trihalomethanes (Komoka-Mt. Brydges)	0.100		3	3	0.019	0.027	0.031	0.035	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.

General Chemistry or Physical Parameter	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)	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Reportable Detection Limit (mg/L)	Comments
										Running annual average: 0.028 mg/L
Trihalomethanes (Strathroy-Caradoc)	0.100		3	3	0.017	0.024	0.029	0.030	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: 0.025 mg/L
Xylenes	0.09	0.02	NR	12	ND	NT	NT	NT	0.00043	
Zinc		5.0	NR	12	0.005	NT	NT	NT	0.001	

[i] Indicator of adverse water quality
[ii] Indicator of adverse water quality
[iii] In addition to the analytical samples noted, free chlorine residual is measured on a continuous basis at the treatment facility using on-line instrumentation.
[iv] In addition to the analytical samples noted, turbidity is measured on a continuous basis at the treatment facility using on-line instrumentation.
[v] 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.