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KINCARDINE

Kincardine Drinking Water System

2019 Annual Water Summary Report

1. INTRODUCTION AND BACKGROUND

The municipality owns and operates drinking water systems to provide residents with safe, potable water. These municipal drinking water systems are regulated under various legislation and legal documents including the Safe Drinking Water Act and Ontario Regulation 170/03 Drinking Water Systems. O. Reg. 170 requires that the municipality complete an annual water report (Section 11) and an annual summary report (Schedule 22). The information required for each of these reports has been combined into this one report.

The reports are available free of charge on the municipal website at www.kincardine.ca or by contacting the Water Services Department at waterservice@kincardine.ca. Requests will also be received in person or by telephone at the Municipal Administration Centre (1475 Concession 5, 519-396-3468) or the Water Services Office (155 Durham Street, Kincardine, 519-396-4660).

1.1. System Description

Drinking-Water System Number:	220002716
Drinking-Water System Name:	Kincardine Drinking Water System
Drinking-Water System Owner:	Municipality of Kincardine
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	Year 2019

The Kincardine Drinking Water System (DWS) takes water from Lake Huron and treats it using a surface water treatment plant. The water treatment plant provides conventional filtration and consists of 2 Actiflo clarifiers, 4 filters, a chlorination system and an underground reservoir. The intake capacity is 18,750 m^3/d and the treatment plant rated capacity is 11,563 m^3/d. The chemicals used for treatment are Clar+ion A5, Magnafloc LT27AG, Actisand and chlorine gas. The distribution system serves the town of Kincardine and residents north of the town via a pipeline, plus the Huronville Subdivision Distribution System owned by the Township of Huron-Kinloss, with a total of over 3800 connections. There is a 3,360 m^3 standpipe to provide water storage, pressure and fire protection for the distribution system. A Booster Chlorination Facility is located at the north end of the distribution system for the Inverhuron Provincial Park. In 2018, a Booster Station was commissioned for monitoring and increasing pressure and chlorination for lands to the north of Gary Street.

1.2. Major Expenses

The system incurred expenses necessary to install, repair or replace required equipment as follows:

Treatment and Monitoring Equipment ($11,200.00)

Distribution Repairs and Replacement ($112,500.00)

UV Disinfection ($57,500.00)

Standpipe upgrades ($15,400.00)

Highlift pump ($49,500.00)

Valve Turner and Trailer ($83,500.00)

Water Meters ($10,100.00)

2. WATER QUALITY MONITORING

Each municipal drinking water system is required to do testing to ensure that the water supplied to consumers is safe for consumption. Some of these tests such as chlorine residuals are done on site while others, like microbiological testing, must be performed by a licenced laboratory.

2.1. Microbiological Testing

O. Reg. 170 Schedule 10, requires the Kincardine DWS to take a minimum of one sample per week of raw, treated and distribution water with a minimum of eighteen distribution samples required every month. All raw, treated and distribution samples must be tested for Escherichia coli (E. coli) and total coliforms (TC). All the treated samples and twenty five percent of the distribution samples must also be tested for heterotrophic plate count (HPC). Our internal sampling schedule exceeds the minimum requirements by having operations staff collect one raw, one treated and five distribution sample every week and have them tested for E. coli, total coliform and HPC.

Any E. coli or total coliform results above 0 in treated or distribution water must be reported to the Ministry of Environment, Conservation and Parks (MECP) and the Medical Officer of Health (MOH).

Heterotrophic plate count is a colony count of general bacteria population. There is no adverse limit for HPC samples. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water.

The results from the 2019 sampling program are shown in the table below. Samples taken in addition to our sampling program for things like watermain repairs or construction projects are not included here.

Water Source	Number of Samples	Range of Total Coliform Results (#-#)	Range of E. coli Results (#-#)	Number of HPC Samples	Range of HPC Results (#-#)
Raw	52	0 – 4,400	0 – 15	52	7 – 1980
Treated	52	0 – 0	0 – 0	52	0 – 32
Distribution	260	0 – 3	0 – 0	260	0 – 49

2.2. Chemical Testing

The Safe Drinking Water Act Reg 170 Schedule 13 requires periodic testing of the water for chemical parameters. The Kincardine DWS is required to test for nitrite/nitrate, trihalomethanes and haloacetic acids on a quarterly basis. The tables below outline these as well as other inorganic and organic parameters that are required to be tested for annually and include the date and result of the most recent test. Any result displayed as less than (<) are below the method detection limit of the licenced lab.

Sodium and fluoride are not found in significant levels in the treated water and fluoride is not added to the drinking water. Sodium and fluoride are only required to be tested for every five years and were last tested for in 2018.

If the concentration of a parameter is above half of the Maximum Acceptable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by O. Regulation 170. There were no parameters above the half MAC that were required to be tested for quarterly in 2019.

Inorganic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	October 7/19	0.11	ug/L	No
Arsenic	October 7/19	0.2	ug/L	No
Barium	October 7/19	14.1	ug/L	No
Boron	October 7/19	16	ug/L	No
Cadmium	October 7/19	<0.003	ug/L	No
Chromium	October 7/19	0.20	ug/L	No
Mercury	October 7/19	<0.01	ug/L	No
Selenium	October 7/19	0.10	ug/L	No
Sodium	November 5/18	4.46	mg/L	No
Uranium	October 7/19	0.019	ug/L	No
Fluoride	October 15/18	< 0.06	mg/L	No
Nitrite	January 14/19 April 8/19 July 8/19 October 7/19	<0.003 <0.003 <0.003 <0.003	mg/L	No
Nitrate	January 14/19 April 8/19 July 8/19 October 7/19	0.512 0.423 0.296 0.290	mg/L	No

Organic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	October 7/19	< 0.02	ug/L	No
Atrazine + N-dealkylated metabolites	October 7/19	0.03	ug/L	No
Azinphos-methyl	October 7/19	< 0.05	ug/L	No
Benzene	October 7/19	< 0.32	ug/L	No
Benzo(a)pyrene	October 7/19	< 0.004	ug/L	No
Bromoxynil	October 7/19	< 0.33	ug/L	No
Carbaryl	October 7/19	< 0.05	ug/L	No
Carbofuran	October 7/19	< 0.01	ug/L	No
Carbon Tetrachloride	October 7/19	< 0.17	ug/L	No
Chlorpyrifos	October 7/19	< 0.02	ug/L	No
Diazinon	October 7/19	< 0.02	ug/L	No
Dicamba	October 7/19	< 0.20	ug/L	No
1,2-Dichlorobenzene	October 7/19	< 0.41	ug/L	No
1,4-Dichlorobenzene	October 7/19	< 0.36	ug/L	No

Organic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
1,2-Dichloroethane	October 7/19	< 0.35	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	October 7/19	< 0.33	ug/L	No
Dichloromethane	October 7/19	< 0.35	ug/L	No
2-4 Dichlorophenol	October 7/19	< 0.15	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	October 7/19	< 0.19	ug/L	No
Diclofop-methyl	October 7/19	< 0.40	ug/L	No
Dimethoate	October 7/19	< 0.06	ug/L	No
Diquat	October 7/19	< 1	ug/L	No
Diuron	October 7/19	< 0.03	ug/L	No
Glyphosate	October 7/19	< 1	ug/L	No
Malathion	October 7/19	< 0.02	ug/L	No
2 methyl-4-chlorophenoxyacetic acid (MCPA)	October 7/19	< 0.00012	mg/L	No
Metolachlor	October 7/19	< 0.01	ug/L	No
Metribuzin	October 7/19	< 0.02	ug/L	No
Monochlorobenzene	October 7/19	< 0.3	ug/L	No
Paraquat	October 7/19	< 1	ug/L	No
Pentachlorophenol	October 7/19	< 0.15	ug/L	No
Phorate	October 7/19	< 0.01	ug/L	No
Picloram	October 7/19	< 1	ug/L	No
Polychlorinated Biphenyls (PCB)	October 7/19	< 0.04	ug/L	No
Prometryne	October 7/19	< 0.03	ug/L	No
Simazine	October 7/19	< 0.01	ug/L	No
Terbufos	October 7/19	< 0.01	ug/L	No
Tetrachloroethylene	October 7/19	< 0.35	ug/L	No
2,3,4,6-Tetrachlorophenol	October 7/19	< 0.20	ug/L	No
Triallate	October 7/19	< 0.01	ug/L	No
Trichloroethylene	October 7/19	< 0.44	ug/L	No
2,4,6-Trichlorophenol	October 7/19	< 0.25	ug/L	No
Trifluralin	October 7/19	< 0.02	ug/L	No
Vinyl Chloride	October 7/19	< 0.17	ug/L	No

Trihalomethane (THM) distribution sampling is required quarterly and must also be expressed as a running annual average. The limit as set in the Ontario Drinking Water Quality Standards is 100 ug/L. Trihalomethanes are a by-product of the disinfection process.

Date Sampled	THM Result Value (ug/L)	Running Annual Average (ug/L)	Exceedance
January 14/19	20	20.3	No
April 8/19	26	22.8	No
July 8/19	19	23.3	No
October 7/19	31	24.0	No

Sampling and testing for haloacetic acids (HAA) in the distribution system was a new requirement as of 2017. The limit as set in the Ontario Drinking Water Quality Standards is 80 ug/L and starting in 2020 must also be expressed as a running annual average. Haloacetic acids are a by-product of the disinfection process.

Date Sampled	HAA Result Value (ug/L)	Running Annual Average (ug/L)	Exceedance
January 14/19	13.8	9.9	No
April 8/19	<5.3	9.9	No
July 8/19	<5.3	9.9	No
October 7/19	<5.3	7.4	No

The Kincardine DWS does not have significant levels of lead and so is currently under a reduced-sampling program. Under this sampling program, O. Reg 170 Schedule 15.1 requires sampling for lead every three years and lead-related parameters (pH and alkalinity) every year. Lead was not required to be sampled in 2019, however, one sample was collected along with a residential sample. The distribution lead result was 0.12 ug/L. In 2018, the lead results in the distribution water ranged from 0.03 to 0.56 ug/L.

Parameter	Location Type	Number of Samples	Range of Results
pH	Distribution	6	7.24 – 7.60
Alkalinity (mg/L)	Distribution	6	58 – 78

2.3. Operational Monitoring

The free chlorine residual must be monitored continuously on the treated water at the point of entry into the distribution system. A minimum of seven distribution grab samples are taken weekly and tested for free chlorine residual. In addition, free chlorine levels are monitored continuously within the treatment process and at two locations in the distribution system.

As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported to the Ministry of the Environment, Conservation and Parks Spills Action Centre and corrective action taken.

At the Kincardine Water Treatment Plant, turbidity is monitored continuously on the raw water, after each Actiflo unit, after each filter and at the point of entry into the distribution system. Turbidity is measured in nephelometric turbidity units (NTU).

Filter and point of entry turbidity is reported to the ministry's Spills Action Centre if it is greater than 1 NTU for greater than 15 minutes. There were no reportable turbidity events in 2019.

Treated Water at Point of Entry into the Distribution System	Number of Grab Samples	Range of Results (#-#)
Turbidity	Continuous monitoring	<0.05 – 1.029
Chlorine	Continuous monitoring	0.78 – 1.99

Distribution Water	Number of Grab Samples	Range of Results (#-#)
Free Chlorine Residual	365	0.51 – 1.25
Free Chlorine Residual	Continuous Monitoring	0.47 – 1.58

The Ministry of the Environment, Conservation and Parks *Procedure for Disinfection of Drinking Water in Ontario* requires that the turbidity on each filter effluent line is less than or equal to 0.3 NTU at least 95% of the time each month.

Month	Filter #1	Filter #2	Filter #3	Filter #4
January	99.65%	99.82%	Out of service	99.92%
February	99.86%	100.00%	Out of service	99.79%
March	99.93%	100.00%	Out of service	100.00%
April	99.96%	100.00%	Out of service	100.00%
May	100.00%	99.99%	Out of service	99.81%
June	99.95%	100.00%	98.91%	99.93%
July	99.88%	100.00%	99.96%	99.97%
August	99.88%	100.00%	99.92%	99.98%
September	99.90%	99.99%	99.62%	99.75%
October	100.00%	100.00%	99.79%	99.97%
November	99.99%	100.00%	Out of service	99.99%
December	99.91%	99.90%	Out of service	100.00%

3. WATER QUANTITY

The following tables list the quantities and flow rates of the water supplied to the distribution system during the reporting period covered by this report, including monthly average and maximum daily flows, and a comparison to the rated capacity specified in the system Municipal Drinking Water Licence. The rated capacity is 11,563 m^3/day. There is no maximum flow rate specified for water supplied to the distribution system.

Month	Average Daily Flow (m^3/day)	% Average Day Flow/ Rated Capacity	Maximum Daily Flow (m^3/day)	% Maximum Day Flow/ Rated Capacity
January	2,379.04	21%	2,792.950	24%
February	2,464.89	21%	2,747.620	24%
March	2,575.71	22%	3,260.270	28%
April	2,432.61	21%	2,810.700	24%
May	2,799.63	24%	3,256.570	28%
June	3,236.60	28%	4,388.510	38%
July	4,382.39	38%	5,250.800	45%
August	4,366.94	38%	5,382.980	47%
September	3,254.12	28%	4,444.930	38%
October	2,586.57	22%	3,831.220	33%
November	2,388.68	21%	3,100.500	27%
December	2,335.45	20%	2,979.110	26%
Annual	2,933.55	25%	5,382.980	47%

Month	Average Daily Flow Rate (L/s)	Maximum Daily Flow Rate (L/s)
January	27.5395	144.1500
February	28.5387	142.6500
March	29.8211	161.4190
April	28.1644	143.7000
May	32.4129	149.7940
June	37.4729	151.2750
July	50.7392	146.5880
August	50.5601	146.1750
September	37.6758	146.0630
October	29.9470	144.5810
November	27.6561	142.8750
December	27.0395	143.6060
Annual	33.9639	161.4190

4. ADVERSE WATER QUALITY INCIDENTS AND NON-COMPLIANCE FINDINGS

Any adverse results from microbiological samples, chemical samples or observations of operational conditions that indicate adverse water quality are reported to the Spills Action Centre (SAC) of the Ministry of the Environment, Conservation and Parks (MECP) and the Medical Officer of Health (MOH). All adverse conditions are responded to immediately and corrective actions taken.

The two adverse water quality incidents were due to watermain breaks and the possibility that improperly disinfected water was directed towards users of the system. As a precaution, the municipality issued a boil water notice to users in the affected area. Follow-up sampling showed that there was no contamination in the water and users were notified that the precautionary boil water notice was lifted.

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
March 31, 2019 AWQI #145082	Category 2 Watermain Break may have resulted in improperly disinfected water directed to users			The watermain was repaired, the distribution flushed, samples collected and a precautionary boil water advisory issued to affected users	March 31, 2019
September 10, 2019 AWQI #147951	Category 2 Watermain Break may have resulted in improperly disinfected water directed to users			The watermain was repaired, the distribution flushed, samples collected and a precautionary boil water advisory issued to affected users	September 10, 2019

The annual Ministry of the Environment, Conservation and Parks Inspection took place on September 18, 2019. The inspection report did not identify any non-compliance issues or report on any Best Practice suggestions and received a final inspection rating of 100.00%.

O. Reg 170 Schedule 22 requires the municipality to identify any requirements of the Act, Regulations, Drinking Water Works Permit, Municipal Drinking Water Licence and any Order that the system failed to meet during the reporting period. All requirements were met in 2019.