Killaloe Drinking Water System

Waterworks # **220006026**
System Category – Large Municipal Residential

Annual Water Report

Prepared For: Township of Killaloe, Hagarty and Richards

Reporting Period of January 1st – December 31st 2019

Issued: February 20th, 2020

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

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Report Availability

This system does not serve more than 10,000 residence and the annual reports will be available to residents at the Township of Killaloe, Hagarty and Richards Municipal Office. Notification will be at the Municipal Office and copies provided free of charge if requested. The Township of Killaloe, Hagarty and Richards is located at, 1 John Street in the Village of Killaloe.

Compliance Event	# of Events
Ministry of Environment Inspections	1 – Inspection February 26, 2019. Inspection rating 91.64%. See details in the *Summary of Non-Compliance* section of this report.
Ministry of Labour Inspections	There were no events during the reporting period.
QEMS External Audit	1 - SAI Global external audit on January 14, 2019. No major or minor non-conformances were identified.
AWQI's/BWA	There were no events during the reporting period.
Non-Compliance	1 – Related to sampling. See details in the *Summary of Non-Compliance* section of this report.
Community Complaints	There were no events during the reporting period.
Spills	There were no events during the reporting period.
Watermain Breaks	There were no events during the reporting period.

System Process Description

Raw Source

Raw water source for the Killaloe Drinking Water System is a well located at the Treatment Plant.



Treatment

Killaloe Water Treatment Plant is a single well, groundwater system equipped with greensand contactors that provide iron and manganese removal.

Primary disinfection is provided using sodium hypochlorite and ultraviolet light. Secondary disinfection is being provided using stabilized hydrogen peroxide. The peroxide is injected prior to the clearwells and a residual is maintained through the distribution system.

Treatment Chemicals used during the reporting year:

Chemical Name	Use	Supplier
Potassium Permanganate	Contactor	Cariox
Sodium Hypochlorite	Disinfection	Brenntag
Hydrogen Peroxide (Huwa San)	Disinfection	San Eco Tech

Distribution

The distribution system consists of an assortment of plastic piping. Various valves are installed on the distribution lines to allow for isolation and flow direction control. The distribution piping runs as far north as Mill Street, east as Coll Street, south as Cameron Street and west as Angus Street. Fire hydrants are located throughout the distribution system.

The entire treatment process, distribution pressure, free chlorine residuals and peroxide residuals are monitored 24 hrs/day by a SCADA computer. This system has trending and alarm capabilities.

Summary of Non-Compliance

Adverse Water Quality Incidents

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

Non-Compliance

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
MDWL #259-101	missed pH grab samples of the Backwash Pond Effluent	November and December of 2018	Revisions to the chain of custody have been made to ensure that these samples are collected and tested in the future.	Complete

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
O.Reg 170	To prepare Form 2 documents required by the Drinking Water Works Permit prior to equipment installation.	N/A	Provided inspector with a completed Form 2 for the installation of the Metcon ProMinent Dulcometer Hydrogen Peroxide Residual on-line analyzer.	Complete
MDWL	All continuous analyzers were not calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.	N/A	The SPI P170 analyzer cannot be calibrated accurately for the required low range. Changed compliance analyzer to the Metcon ProMinent Dulcometer Hydrogen Peroxide Residual on-line analyzer.	Complete
DWWP and MDWL	The operations and maintenance manuals did not meet the requirements of the Drinking Water Works Permit and Municipal Drinking Water License issued under Part V of the SDWA.	N/A	OCWA provided the Ministry Inspector with the Standard Operating Procedure "Well Inspections" issued April 1, 2019 and a Form "Above Grade Well Inspection" issued April 1, 2019. The UV Validation curve is available in the O&M Manual provided during the upgrades.	Complete
Section 27 O. Reg. 128/04 Schedule 6 to O. Reg. 170/03.	Records or other record keeping mechanisms did not confirm that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.	N/A	Provide to the undersigned Provincial Officer for her review and acceptance, a written action plan which detailed what training would be included to ensure that the minimum record keeping standards for logs are met.	Complete

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
Condition 1.6.4 of the MDWL	A monthly summary report shall be prepared at the end of each calendar month which sets out the time, date and duration of each UV equipment alarm, the volume of water treated during each alarm period and the actions taken by the operating authority to correct the alarm situation.	N/A	A UV alarm summary was added to the monthly operational summary sheet.	Complete
Section 10.1 of O. Reg. 170/03	The DWS Profile Information was not updated with the most recent operational contacts.	N/A	The DWS profile information was updated.	Completed
Schedule D of the DWWP	It is noted that this bypass valve is not included in the DWWP.	N/A	Provided to the undersigned Provincial Officer a revised Process Flow Diagram (PFD) showing the existing by-pass valve/pipe for the raw water.	Completed

Flows

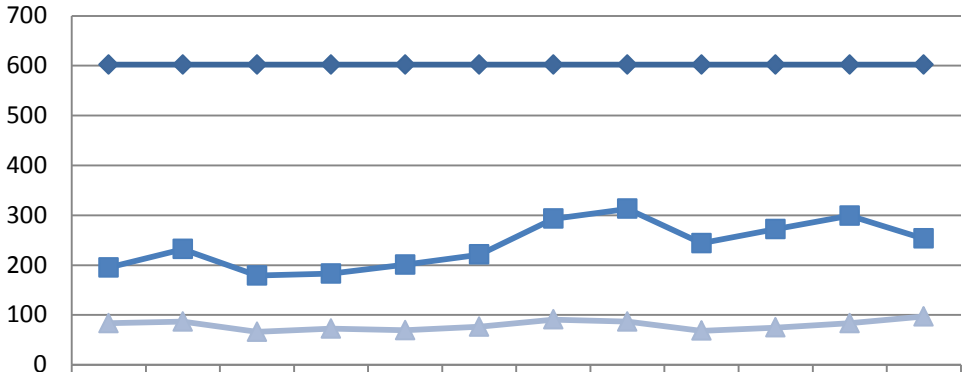
The Killaloe Drinking Water System is operating on average under half the rated capacity.

Raw Water Flows

The Raw Water flows are regulated under the Permit to Take Water. 2019 Raw Flow Data was submitted to the Ministry electronically under permit #2835-9LMRUZ. The confirmation and a copy of the data that was submitted are attached in Appendix A.

Total Monthly Flows (m3/d)

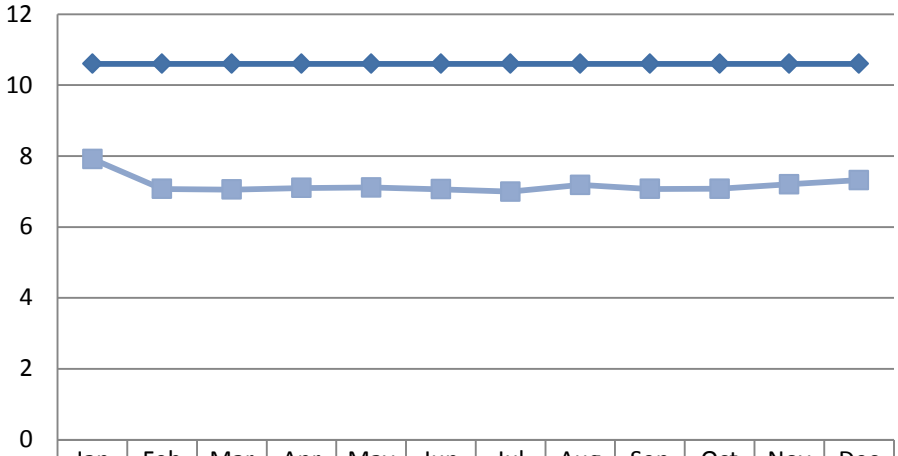
Max Allowable PTTW



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max Allowable (m3/d)	601.9	601.9	601.9	601.9	601.9	601.9	601.9	601.9	601.9	601.9	601.9	601.9
Max Flow (m3/d)	195	232	179	183	201	221	293	313	244	272	299	253
Avg (m3/d)	83.55	86.64	66.00	72.50	69.43	76.37	90.71	86.74	68.31	74.60	83.53	96.90

Monthly Rated Flows (L/s)

Max allowable rate - PTTW



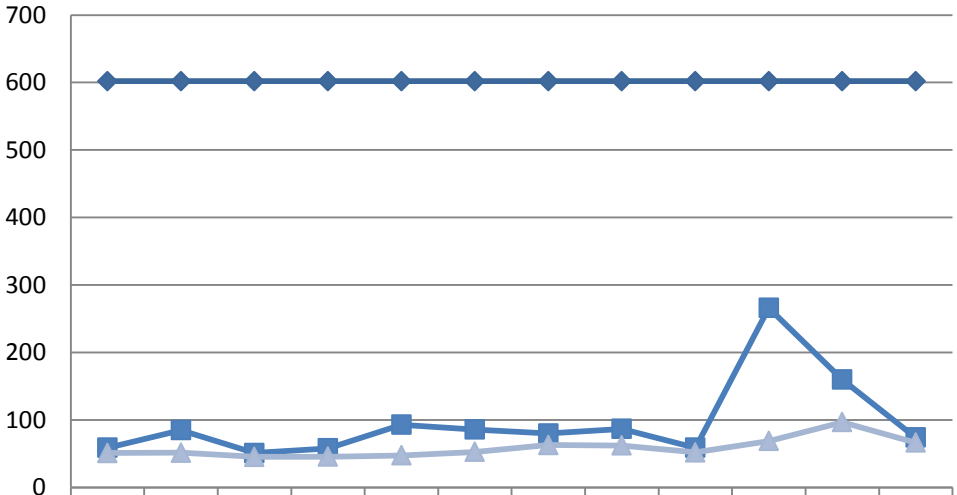
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max Allowable Rate (L/sec)	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
Max Rate (L/s)	7.92	7.07	7.05	7.10	7.11	7.07	7.00	7.18	7.07	7.08	7.20	7.32

Treated Water Flows

The Treated Water flows are regulated under the Municipal Licence.

Monthly Rated Flows

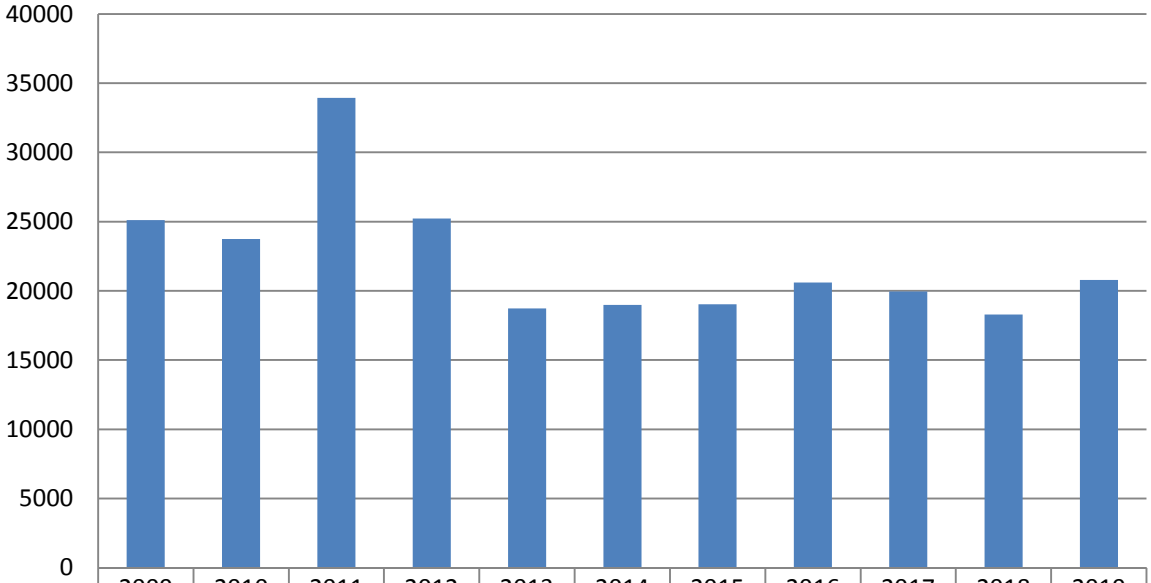
Rated Capacity - MDWL



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rated Capacity (m3/d)	602	602	602	602	602	602	602	602	602	602	602	602
Max Daily Flow (m3/d)	59	85	51	58	93	86	80	87	59	266	160	74
Avg (m3/d)	51.16	51.64	45.52	45.63	47.47	52.77	62.86	62.16	51.96	68.90	96.80	66.42

Annual Total Flow Comparison

Total Annual m3



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
WTP (m3)	25113	23747	33929	25221	18725	18982	19027	20594	19948	18292	20780

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	53	0	0	0	0		
Treated Water	53	0	0	0	0	0	244
Distribution Water	108	0	0	0	0	0	2000

Operational Testing

Online

Parameter	Range of Results (min # - max #)
Primary Free Chlorine	0.55 – 1.0 mg/L
Post Clearwell Peroxide	5.5 – 8.3 ppm
Distribution Peroxide	0.39 – 11.52 ppm

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

In-House

Parameter	# of grab samples taken	Range of Results (min # - max #)
Primary Free Chlorine	248	0.5 – 1.32 mg/L
Raw Colour	104	3-5 TCU
Raw Iron	104	0.117 – 0.263 mg/L
Raw Manganese	104	0.156 – 0.279 mg/L
Raw Turbidity	241	0.15 – 0.3 NTU
Raw pH	104	8.0 – 8.1
Treated Turbidity	247	0.1 – 0.19 NTU
Treated Colour	104	1 – 2 TCU
Treated pH	104	8.13 – 8.18
Treated Iron	104	0.002 - 0.02 mg/L
Treated Manganese	104	0.022 - 0.45 mg/L
Distribution pH	12	7.91 – 8.32
Distribution Peroxide Residual	147	1.3 – 4.8 ppm

Laboratory

Parameter	# of Samples	Range of Results (min # - max #)
Raw Alkalinity	12	211 - 268 mg/L
Raw Colour	12	6 - 10 TCU
Raw pH	12	7.83 – 8.2

Parameter	# of Samples	Range of Results (min # - max #)
Raw Total Dissolved Solids	12	383 – 480 mg/L
Raw Hardness	12	298 – 448 mg/L
Treated Alkalinity	12	253 - 277 mg/L
Treated Colour	12	3 - 7 TCU
Treated pH	12	7.95 – 8.17
Treated Total Dissolved Solids	12	403 – 483 mg/L
Treated Hardness	12	292 – 460 mg/L
Distribution Alkalinity	14	250-264 mg/L
Distribution Colour	12	3 - 8 TCU
Distribution pH	12	7.99 – 8.20
Distribution Total Dissolved Solids	12	411 – 460 mg/L
Distribution Hardness	12	294 – 469 mg/L
Production Well Benzene	1	<0.32 ug/L
Production Well Ethylbenzene	1	<0.33 ug/L
Production Well m/p-xylene	1	<0.43 ug/L
Production Well o-xylene	1	<0.17 ug/L
Production Well Xylene: Total	1	<0.43 mg/L
Production Well Toluene	1	<0.36 ug/L
Test Well Benzene	1	<0.32 ug/L
Test Well Ethylbenzene	1	<0.33 ug/L
Test Well m/p-xylene	1	<0.43 ug/L
Test Well o-xylene	1	<0.17 ug/L
Test Well Xylene: Total	1	<0.43 mg/L
Test Well Toluene	1	<0.36 ug/L

Additional Legislated Samples

Appendix C has monthly summary data for the Additional Legislated Samples.

Legal Document	Date of Issuance	Parameter	Date Sampled	Result	Unit of measure
Municipal License #259-101	02-Dec-2015	Backwash Effluent Suspended Solids	Annual Avg	2.69	mg/L
		Backwash Effluent pH	Annual Avg	7.82	no units
		Distribution Copper	January 2019	69.3	ug/L
			July 2019	87.5	ug/L
		Distribution Lead	January 2019	0.06	ug/L
			July 2019	0.33	ug/L

- Hydrogen peroxide residuals see Operational Testing
- HPC Testing Results see Microbiological testing
- pH testing results see Operational Testing

Inorganic Parameters

These parameters are tested as a requirement under 170/03. Sodium and Fluoride are required to be tested every 5 years. Nitrate and Nitrite are tested quarterly and the metals are tested annually as required under 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	2019/01/08	<MDL 0.02	6.0	No	No
Arsenic: As (ug/L) - TW	2019/01/08	<MDL 0.2	10.0	No	No
Barium: Ba (ug/L) - TW	2019/01/08	161.0	1000.0	No	No
Boron: B (ug/L) - TW	2019/01/08	105.0	5000.0	No	No
Cadmium: Cd (ug/L) - TW	2019/01/08	<MDL 0.003	5.0	No	No
Chromium: Cr (ug/L) - TW	2019/01/08	0.13	50.0	No	No
Mercury: Hg (ug/L) - TW	2019/01/08	<MDL 0.01	1.0	No	No
Selenium: Se (ug/L) - TW	2019/01/08	<MDL 0.04	50.0	No	No
Uranium: U (ug/L) - TW	2019/01/08	1.94	20.0	No	No
Additional Inorganics					
Fluoride (mg/L) - TW	2018/01/09	0.26	1.5	No	No
Nitrite (mg/L) - TW	2019/01/02	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2019/04/01	0.004	1.0	No	No
Nitrite (mg/L) - TW	2019/07/02	0.006	1.0	No	No
Nitrite (mg/L) - TW	2019/10/01	0.006	1.0	No	No
Nitrate (mg/L) - TW	2019/01/02	0.016	10.0	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Nitrate (mg/L) - TW	2019/04/01	0.013	10.0	No	No
Nitrate (mg/L) - TW	2019/07/02	0.012	10.0	No	No
Nitrate (mg/L) - TW	2019/10/01	0.009	10.0	No	No
Sodium: Na (mg/L) - TW	2018/01/16	26.5	20*	Yes	Yes

*There is no "MAC" for Sodium. The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified mg/L 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.

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)	2	14	250	264	n/a	n/a
pH	2	12	7.99	8.2	n/a	n/a
Lead (ug/l)	2	5	0.06	0.26	10	0

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	2019/01/08	<MDL 0.02	5.0	No	No
Atrazine + N-dealkylated metabolites (ug/L) - TW	2019/01/08	<MDL 0.01	5.0	No	No
Azinphos-methyl (ug/L) - TW	2019/01/08	<MDL 0.05	20.0	No	No
Benzene (ug/L) - TW	2019/01/08	<MDL 0.32	1.0	No	No
Benzo(a)pyrene (ug/L) - TW	2019/01/08	<MDL 0.004	0.01	No	No
Bromoxynil (ug/L) - TW	2019/01/08	<MDL 0.33	5.0	No	No
Carbaryl (ug/L) - TW	2019/01/08	<MDL 0.05	90.0	No	No
Carbofuran (ug/L) - TW	2019/01/08	<MDL 0.01	90.0	No	No
Carbon Tetrachloride (ug/L) - TW	2019/01/08	<MDL 0.16	2.0	No	No
Chlorpyrifos (ug/L) - TW	2019/01/08	<MDL 0.02	90.0	No	No
Diazinon (ug/L) - TW	2019/01/08	<MDL 0.02	20.0	No	No
Dicamba (ug/L) - TW	2019/01/08	<MDL 0.2	120.0	No	No
1,2-Dichlorobenzene (ug/L) - TW	2019/01/08	<MDL 0.41	200.0	No	No
1,4-Dichlorobenzene (ug/L) - TW	2019/01/08	<MDL 0.36	5.0	No	No
1,2-Dichloroethane (ug/L) - TW	2019/01/08	<MDL 0.35	5.0	No	No
1,1-Dichloroethylene (ug/L) - TW	2019/01/08	<MDL 0.33	14.0	No	No
Dichloromethane (Methylene Chloride) (ug/L) - TW	2019/01/08	<MDL 0.35	50.0	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
2,4-Dichlorophenol (ug/L) - TW	2019/01/08	<MDL 0.15	900.0	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW	2019/01/08	<MDL 0.19	100.0	No	No
Diclofop-methyl (ug/L) - TW	2019/01/08	<MDL 0.4	9.0	No	No
Dimethoate (ug/L) - TW	2019/01/08	<MDL 0.03	20.0	No	No
Diquat (ug/L) - TW	2019/01/08	<MDL 1.0	70.0	No	No
Diuron (ug/L) - TW	2019/01/08	<MDL 0.03	150.0	No	No
Glyphosate (ug/L) - TW	2019/01/08	<MDL 1.0	280.0	No	No
Malathion (ug/L) - TW	2019/01/08	<MDL 0.02	190.0	No	No
2-Methyl-4chlorophenoxyacetic Acid (MCPA)	2019/01/08	<MDL 0.00012	0.1	No	No
Metolachlor (ug/L) - TW	2019/01/08	<MDL 0.01	50.0	No	No
Metribuzin (ug/L) - TW	2019/01/08	<MDL 0.02	80.0	No	No
Monochlorobenzene (Chlorobenzene) (ug/L) - TW	2019/01/08	<MDL 0.3	80.0	No	No
Paraquat (ug/L) - TW	2019/01/08	<MDL 1.0	10.0	No	No
PCB (ug/L) - TW	2019/01/08	<MDL 0.04	3.0	No	No
Pentachlorophenol (ug/L) - TW	2019/01/08	<MDL 0.15	60.0	No	No
Phorate (ug/L) - TW	2019/01/08	<MDL 0.01	2.0	No	No
Picloram (ug/L) - TW	2019/01/08	<MDL 1.0	190.0	No	No
Prometryne (ug/L) - TW	2019/01/08	<MDL 0.03	1.0	No	No
Simazine (ug/L) - TW	2019/01/08	<MDL 0.01	10.0	No	No
Terbufos (ug/L) - TW	2019/01/08	<MDL 0.01	1.0	No	No
Tetrachloroethylene (ug/L) - TW	2019/01/08	<MDL 0.35	10.0	No	No
2,3,4,6-Tetrachlorophenol (ug/L) - TW	2019/01/08	<MDL 0.2	100.0	No	No
Triallate (ug/L) - TW	2019/01/08	<MDL 0.01	230.0	No	No
Trichloroethylene (ug/L) - TW	2019/01/08	<MDL 0.44	5.0	No	No
2,4,6-Trichlorophenol (ug/L) - TW	2019/01/08	<MDL 0.25	5.0	No	No
Trifluralin (ug/L) - TW	2019/01/08	<MDL 0.02	45.0	No	No
Vinyl Chloride (ug/L) - TW	2019/01/08	<MDL 0.17	1.0	No	No
Distribution Water					
Trihalomethane: Total (ug/L) Annual Average – DW	2019/01/01	30.5	100.0	No	No
HAA Total (ug/L) Annual Average - DW	2019/01/01	8.375	80.0*	No	No

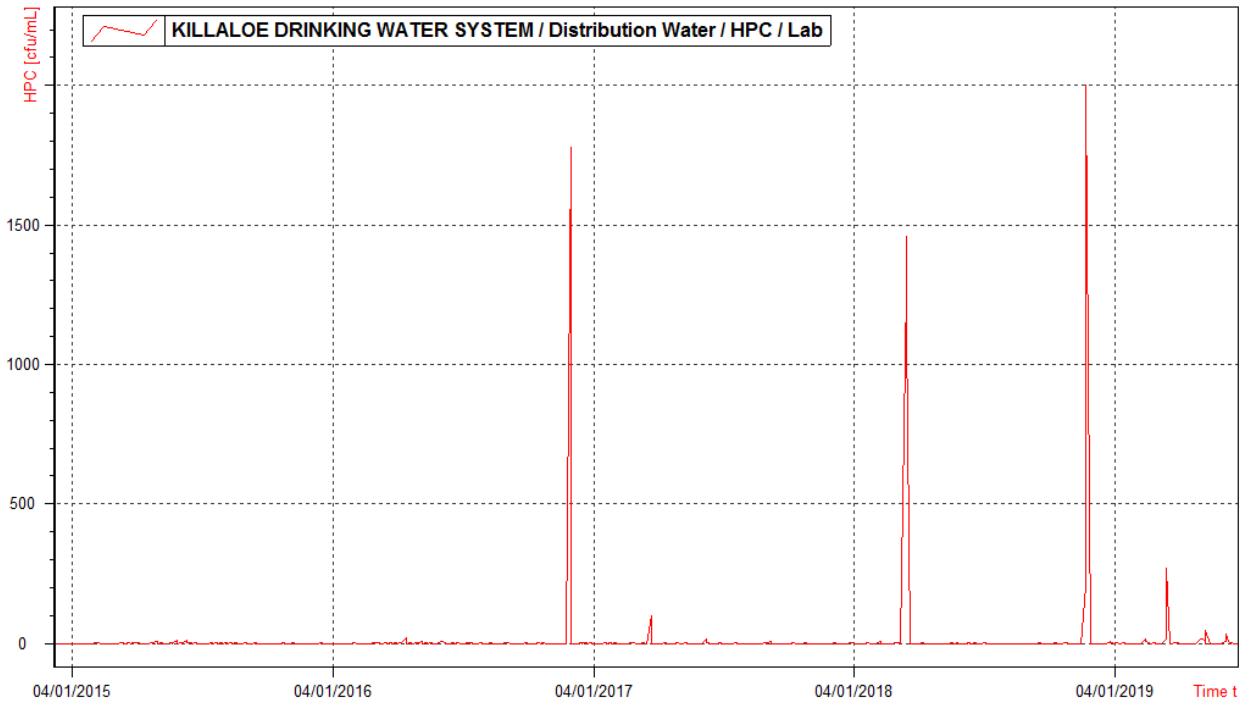
MAC = Maximum Allowable Concentration as per O.Reg 169/03
BDL = Below the laboratory detection level
* This limit comes into force January 2020. It will be calculated as an annual rolling average.

Evaluation of the Effectiveness of Secondary Disinfectant

The hydrogen peroxide continues to work well as a secondary disinfectant while producing reduced THM's within the distribution system. All parameters that are being monitored are remaining within compliance and normal operating limits. There have been no significant anomalies in any tested levels. A trend is becoming evident in which we receive HPC results that are unusually high on approximately a yearly basis. Hydrogen peroxide residuals taken during the sampling are within the normal range and no

connections are evident to these high HPC results in regards to operational activities, time of year, operational performance, or weather. In the week following these unusual HPC results, the samples collected from the Killaloe system result in HPC results of 0 cfu/1mL on all samples. Upon review of the 2019 HPC data this sample did not appear to be representative of the overall system.

It should be noted that no regulatory limits were exceeded.



Major Maintenance Summary

WO #	Description
1379194	Killaloe WTP Dehumidifier Repair
1463591	Killaloe WTP Replace alarm dialer
1499269	Killaloe WTP Fire Pump Check valve replacement
1340406	Killaloe Water Annual H202 Service

Appendix A

WTRS Data and Submission Confirmation

Ontario

Location: WTRS / WT DATA / Input WT Record WTRS-WT-008

Water Taking Data submitted successfully.

Confirmation:

Thank you for submitting your water taking data online.

Permit Number: 2835-9LMRUZ
Permit Holder: THE CORPORATION OF THE TOWNSHIP OF KILLALOE, HAGARTY AND RICHARDS.
Received on:Feb 6, 2020 11:06 AM

This confirmation indicates that your data has been received by the Ministry,but should not be construed as acceptance of this data if it differs from that specified on the Permit Number, assigned to the Permit Holder stated above.

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