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 2023

Issued: February 5th, 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

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Report Availability

The annual report will be available to residents at the Township of Killaloe, Hagarty and Richards Municipal Office and copies provided free of charge if requested. The Township of Killaloe, Hagarty and Richards Municipal Office is located at, 1 John Street, Killaloe, Ontario.

There are no additional drinking water systems that receive water from this facility.

Compliance Report Card

Compliance Event	# of Events
Ministry of Environment Inspections	1 MECP Inspection on October 5th 2023 with a rating of 100%
Ministry of Labour Inspections	0
QEMS External Audit	1 Audit completed on February 23rd 2023 by SAI Global. No major or minor non-conformances were identified.
AWQI's/BWA	1/0 – See Summary of Non-Compliance for details
Non-Compliance	0
Community Complaints	0
Spills	0
Watermain Breaks	0

System Process Description

Raw Source

The Killaloe Drinking Water System's raw water is drawn from a ground water production well. The well is located approximately 33 m east of the treatment plant in a prefabricated steel building. The well was drilled in 1989 measuring 200 mm in diameter, 56 m deep and is equipped with a submersible pump rated at 418 L/min at a total dynamic head (TDH) of 57.5 metres.

Treatment

Groundwater is directed to the treatment plant through a 100 mm diameter discharge line where sodium hypochlorite is added to aid in the primary disinfection process. The water then flows through a dual media Green Sand Contactor for iron and manganese removal. Potassium permanganate is added to assist in the recharging of the greensand contactor. The water is then directed to a pair of UV disinfection systems (one duty, one standby) to achieve CT. Prior to entering the clearwells, stabilized hydrogen peroxide is added to achieve secondary disinfection.

Treated water is discharged into a clear well with a total storage 620 m^3. Five high lift pumps consisting of 3 vertical turbine pumps, one vertical turbine fire pump and one vertical turbine jockey pump provide water to the distribution system. Two 1400 L hydropneumatic pressure tanks maintain distribution system pressure and provide some storage.

The process wastewater and filter to waste water from the green sand contactor discharges into a wastewater 75 m^3 settling pond located 20 metres southwest of the treatment plant.

Distribution

This Class 1 Water Distribution system supplies treated water to an estimated of population of 660 people. 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. 12 fire hydrants are located throughout the distribution system.

Treatment Chemicals used during the reporting year:

Chemical Name	Use	Supplier
Potassium Permanganate (granular 97.5%)	Manganese Control	Cariox via Brenntag
Sodium Hypochlorite (12%)	Disinfection	Brenntag
Hydrogen Peroxide (Huwa San)	Disinfection	Arbourdale

Summary of Non-Compliance

Adverse Water Quality Incidents

Date	AWQI #	Location	Problem	Details	Legislation	Corrective Action Taken
01/16/2023	161156	Treated Water	Exceeded Sodium MAC of 20 mg/L	Result of 22.4 mg/L	0.Reg 170/03	Resampled treated water, result of 26 mg/L

Non-Compliance

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
None to report.				

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
None to report.				

Flows

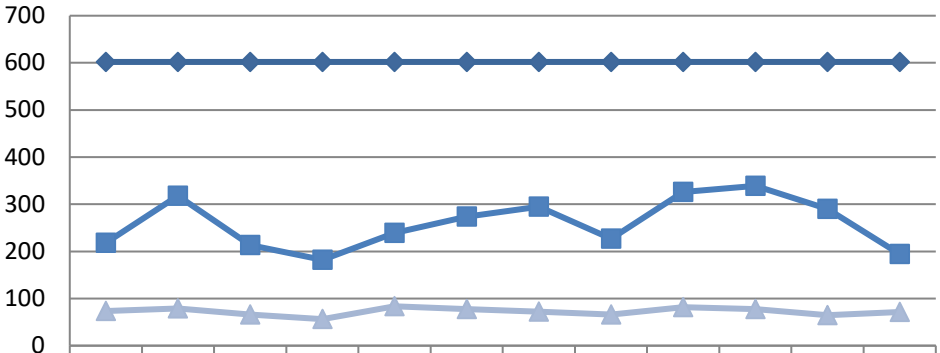
The Killaloe Drinking Water System is operating on average under half the rated capacity.

Raw Water Flows

The Raw Water flows are regulated under the Permit to Take Water (PTTW). 2023 Raw Flow Data was submitted to the Ministry electronically under permit #2835-9LMRUZ. The confirmation that the data that was submitted is attached in Appendix A.

Total Monthly Flows

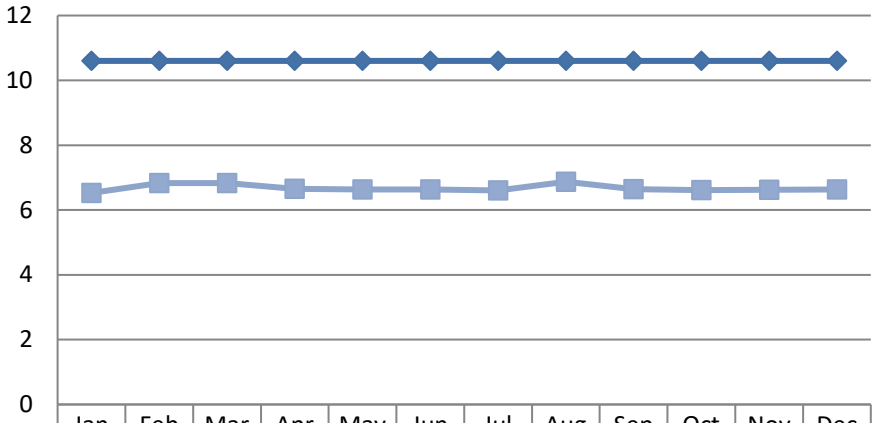
Max Allowable - PTTW



	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)	218	318	213	182	239	274	295	227	326	339	290	194
Avg (m3/d)	73	79	66	56	83	77	72	66	82	78	65	71

Monthly Rated Flows

Max Allowable Rate - PTTW



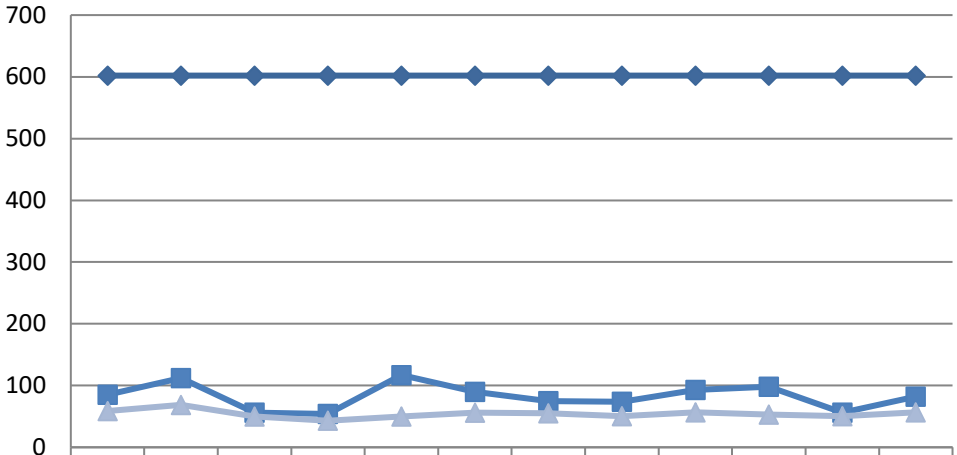
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max Allowable Rate (L/sec)	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
Max Rate (L/s)	6.53	6.83	6.83	6.65	6.63	6.63	6.60	6.87	6.64	6.62	6.62	6.64

Treated Water Flows

The Treated Water flows are regulated under the Municipal Drinking Water Licence (MDWL).

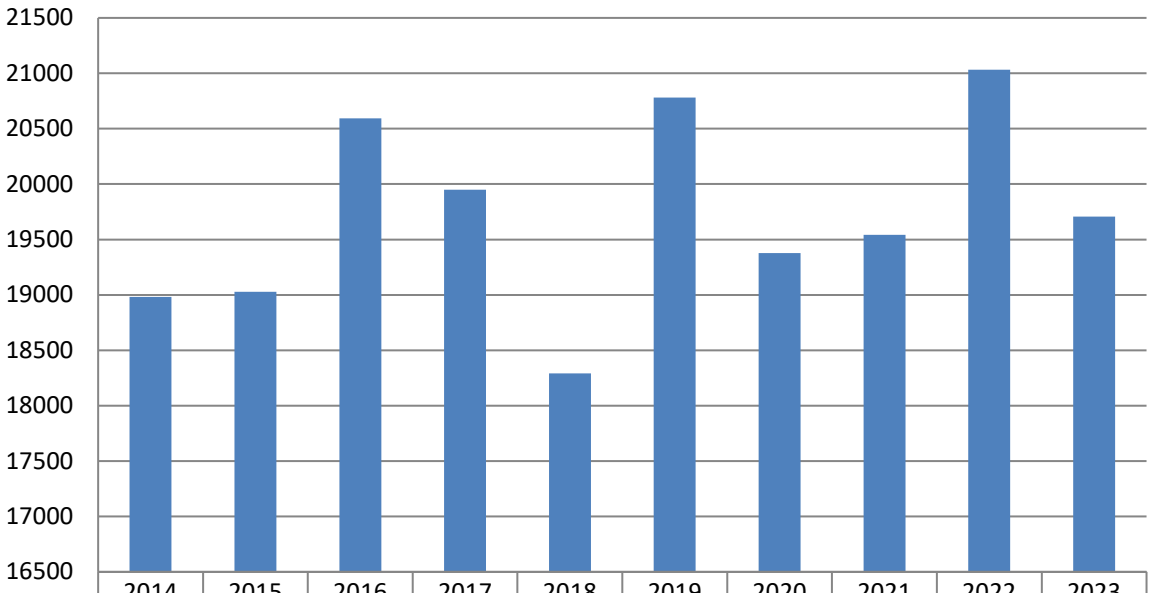
Monthly Rated Flows

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)	85	112	56	54	117	90	75	74	93	98	56	82
Avg (m3/d)	59	69	50	43	50	56	55	50	57	53	50	57

Annual Total Flow Comparison



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WTP (m3)	18982	19027	20594	19948	18292	20780	19378	19541	21033	19708

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	0	0	0	N/A	N/A
Treated Water	52	0	0	0	0	0	40
Distribution Water	113	0	0	0	0	0	131

Operational Testing

	No. of Samples Collected	Range of Results	
		Minimum	Maximum
Turbidity, In-House (NTU) - RW	197	0.11	0.57
Turbidity, In-House (NTU) - TW	245	0.11	0.51
Free Chlorine Residual, On-Line (mg/L) - TW	8760	0.55	1.00
Free Chlorine Residual, In-House (mg/L) - TW	195	0.58	1.20
Post Clearwell Peroxide Residual, On-Line (mg/L) - TW	8760	1.98	10.46
Distribution Peroxide Residual, In-House (mg/L) - DW	218	1.00	4.80
Distribution Peroxide Residual, On-Line (mg/L) - DW	8760	1.22	5.29
Distribution pH, In-House - DW	52	7.40	7.81
UV Transmittance (%)- RW	52	85.0	87.3

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 are tested quarterly and metals are tested annually as required under O. Reg. 170/03. In the event any parameter exceeds half the maximum allowable concentration the parameter is required to be sampled quarterly.

- MAC = Maximum Allowable Concentration as per O. Reg. 169/03
- <MDL = Less than Method Detection Limit

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Treated Water					
Antimony: Sb (ug/L) - TW	2023/01/09	<MDL 0.6	6.0	No	No
Arsenic: As (ug/L) - TW	2023/01/09	<MDL 0.2	10.0	No	No
Barium: Ba (ug/L) - TW	2023/01/09	178.0	1000.0	No	No
Boron: B (ug/L) - TW	2023/01/09	108.0	5000.0	No	No
Cadmium: Cd (ug/L) - TW	2023/01/09	0.004	5.0	No	No
Chromium: Cr (ug/L) - TW	2023/01/09	0.19	50.0	No	No
Mercury: Hg (ug/L) - TW	2023/01/09	<MDL 0.01	1.0	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Selenium: Se (ug/L) - TW	2023/01/09	<MDL 0.04	50.0	No	No
Uranium: U (ug/L) - TW	2023/01/09	2.22	20.0	No	No
Additional Inorganics					
Nitrite (mg/L) - TW	2023/01/09	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2023/04/03	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2023/07/10	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2023/10/03	<MDL 0.003	1.0	No	No
Nitrate (mg/L) - TW	2023/01/09	0.011	10.0	No	No
Nitrate (mg/L) - TW	2023/04/03	0.009	10.0	No	No
Nitrate (mg/L) - TW	2023/07/10	0.01	10.0	No	No
Nitrate (mg/L) - TW	2023/10/03	0.011	10.0	No	No
Fluoride (mg/L) - TW	2023/01/09	0.22	1.5	No	No
Sodium: Na (mg/L) - TW	2023/01/16	26	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 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)	1	3	254	265	N/A	N/A
pH	1	2	7.59	7.69	N/A	N/A
Lead (ug/l)	1	2	0.11	0.25	10	0

Organic Parameters

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

- MAC = Maximum Allowable Concentration as per O. Reg. 169/03
- <MDL = Less than Method Detection Limit

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Treated Water					
Alachlor (ug/L) - TW	2023/01/09	<MDL 0.02	5.0	No	No
Atrazine + N-dealkylated metabolites (ug/L) - TW	2023/01/09	<MDL 0.01	5.0	No	No
Azinphos-methyl (ug/L) - TW	2023/01/09	<MDL 0.05	20.0	No	No
Benzene (ug/L) - TW	2023/01/09	<MDL 0.32	1.0	No	No
Benzo(a)pyrene (ug/L) - TW	2023/01/09	<MDL 0.004	0.01	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Bromoxynil (ug/L) - TW	2023/01/09	<MDL 0.33	5.0	No	No
Carbaryl (ug/L) - TW	2023/01/09	<MDL 0.05	90.0	No	No
Carbofuran (ug/L) - TW	2023/01/09	<MDL 0.01	90.0	No	No
Carbon Tetrachloride (ug/L) - TW	2023/01/09	<MDL 0.17	2.0	No	No
Chlorpyrifos (ug/L) - TW	2023/01/09	<MDL 0.02	90.0	No	No
Diazinon (ug/L) - TW	2023/01/09	<MDL 0.02	20.0	No	No
Dicamba (ug/L) - TW	2023/01/09	<MDL 0.2	120.0	No	No
1,2-Dichlorobenzene (ug/L) - TW	2023/01/09	<MDL 0.41	200.0	No	No
1,4-Dichlorobenzene (ug/L) - TW	2023/01/09	<MDL 0.36	5.0	No	No
1,2-Dichloroethane (ug/L) - TW	2023/01/09	<MDL 0.35	5.0	No	No
1,1-Dichloroethylene (ug/L) - TW	2023/01/09	<MDL 0.33	14.0	No	No
Dichloromethane (Methylene Chloride) (ug/L) - TW	2023/01/09	<MDL 0.35	50.0	No	No
2,4-Dichlorophenol (ug/L) - TW	2023/01/09	<MDL 0.15	900.0	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW	2023/01/09	<MDL 0.19	100.0	No	No
Diclofop-methyl (ug/L) - TW	2023/01/09	<MDL 0.4	9.0	No	No
Dimethoate (ug/L) - TW	2023/01/09	<MDL 0.06	20.0	No	No
Diquat (ug/L) - TW	2023/01/09	<MDL 1.0	70.0	No	No
Diuron (ug/L) - TW	2023/01/09	<MDL 0.03	150.0	No	No
Glyphosate (ug/L) - TW	2023/01/09	<MDL 1.0	280.0	No	No
Malathion (ug/L) - TW	2023/01/09	<MDL 0.02	190.0	No	No
Metolachlor (ug/L) - TW	2023/01/09	<MDL 0.01	50.0	No	No
Metribuzin (ug/L) - TW	2023/01/09	<MDL 0.02	80.0	No	No
Monochlorobenzene (Chlorobenzene) (ug/L) - TW	2023/01/09	<MDL 0.3	80.0	No	No
Paraquat (ug/L) - TW	2023/01/09	<MDL 1.0	10.0	No	No
PCB (ug/L) - TW	2023/01/09	<MDL 0.04	3.0	No	No
Pentachlorophenol (ug/L) - TW	2023/01/09	<MDL 0.15	60.0	No	No
Phorate (ug/L) - TW	2023/01/09	<MDL 0.01	2.0	No	No
Picloram (ug/L) - TW	2023/01/09	<MDL 1.0	190.0	No	No
Prometryne (ug/L) - TW	2023/01/09	<MDL 0.03	1.0	No	No
Simazine (ug/L) - TW	2023/01/09	<MDL 0.01	10.0	No	No
Terbufos (ug/L) - TW	2023/01/09	<MDL 0.01	1.0	No	No
Tetrachloroethylene (ug/L) - TW	2023/01/09	<MDL 0.35	10.0	No	No
2,3,4,6-Tetrachlorophenol (ug/L) - TW	2023/01/09	<MDL 0.2	100.0	No	No
Triallate (ug/L) - TW	2023/01/09	<MDL 0.01	230.0	No	No
Trichloroethylene (ug/L) - TW	2023/01/09	<MDL 0.44	5.0	No	No
2,4,6-Trichlorophenol (ug/L) - TW	2023/01/09	<MDL 0.25	5.0	No	No
2-methyl-4-chlorophenoxyacetic acid (MCPA) (ug/L) - TW	2023/01/09	<MDL 0.12	100.0	No	No
Trifluralin (ug/L) - TW	2023/01/09	<MDL 0.02	45.0	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Vinyl Chloride (ug/L) - TW	2023/01/09	<MDL 0.17	1.0	No	No

Distribution samples are tested quarterly for THM's and HAA's in accordance with O. Reg. 170/03.

	Sample Year	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Distribution Water					
Trihalomethane (THM): Total (ug/L) – DW*	2023	33.0	100.0	No	No
Haloacetic Acid (HAA): Total (ug/L) - DW*	2023	6.2	80.0	No	No

*Running Annual Average
<MDL = Less than Method Detection Limit
MAC = Maximum Allowable Concentration as per O. Reg. 169/03

Additional Legislated Samples

BTEX Parameters

A monitoring well was constructed adjacent to Water Street to monitor the potential migration of a petroleum products contaminated plume toward the source water/production well. Sampling of the ground water from the single purpose constructed monitoring well is conducted annually. These contaminants have not been detected since the beginning of the sampling program in 1998.

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Production Well					
Benzene (ug/L) - RW	2023/05/02	<MDL 0.5	1	No	No
Ethylbenzene (ug/L) - RW	2023/05/02	<MDL 0.5	140	No	No
Toluene (ug/L) - RW	2023/05/02	<MDL 0.5	60	No	No
Xylene: Total (ug/L) - RW	2023/05/02	<MDL 0.5	90	No	No
m/p-xylene (ug/L) - RW	2023/05/02	<MDL 0.5	N/A	No	No
o-xylene (ug/L) - RW	2023/05/02	<MDL 0.5	N/A	No	No
Monitoring Well					
Benzene (ug/L) - RW	2023/05/02	<MDL 0.5	1	No	No
Ethylbenzene (ug/L) - RW	2023/05/02	<MDL 0.5	140	No	No
Toluene (ug/L) - RW	2023/05/02	<MDL 0.5	60	No	No
Xylene: Total (ug/L) - RW	2023/05/02	<MDL 0.5	90	No	No
m/p-xylene (ug/L) - RW	2023/05/02	<MDL 0.5	N/A	No	No
o-xylene (ug/L) - RW	2023/05/02	<MDL 0.5	N/A	No	No

<MDL = Less than Method Detection Limit
MAC = Maximum Allowable Concentration as per O. Reg. 169/03

Schedule C: System-Specific Conditions of Municipal Drinking Water License #259-101 requires the Killaloe Drinking Water System to monitor the effluent discharged to the natural environment for the parameters listed blow.

Legal Document	Date of Issuance	Parameter	Limit	Result	Unit of measure
MDWL #259-101	30-Nov-2020	Backwash Effluent Suspended Solids	Annual Avg < 15 mg/L	3.33	mg/L
		Backwash Effluent pH	Annual Avg 6.5-8.5	7.77	N/A
		Backwash Effluent Total Chlorine Residual	Annual Avg < 0.02 mg/L	0.01	mg/L

Schedule D: Conditions for Relief from Regulatory Requirements of Municipal Drinking Water License #259-101 requires the Killaloe Drinking Water System to monitor the distribution system for the parameters listed below when using Huwa-San NSF Certified Stabilized Hydrogen Peroxide as a disinfectant.

Legal Document	Date of Issuance	Parameter	Date Sampled	Result	Unit of measure
MDWL #259-101	30-Nov-2020	Distribution pH	2023/01/16	7.44	N/A
			2023/07/04	7.66	N/A
		Distribution Copper	2023/01/16	81.0	ug/L
			2023/07/04	73.1	ug/L
		Distribution Lead	2023/01/16	0.06	ug/L
			2023/07/04	0.06	ug/L

The Operational Testing section of this report contains the minimum and maximum hydrogen peroxide residuals measured using a continuous monitoring analyzer, as well as residuals measured using a portable analyzer for the weekly grab samples and for the grab samples collected at the same time as a microbiological sample as required by the Municipal Drinking Water Licence.

Evaluation of the Effectiveness of Secondary Disinfectant

Hydrogen peroxide continues to work well as a secondary disinfectant while producing reduced THM's and HAA's within the distribution system. All parameters that are being monitored are remaining within compliance and normal operating limits. Additionally, there were no adverse water quality incidents in the distribution system during the reporting year. The trend from past years of HPC results reading unusually high once again did not occur in 2023, the highest HPC result measured was 131 CFU/100 mL.

Schedule D, Section 1.2.3 of the MDWL indicates that the hydrogen peroxide residuals cannot drop below 0.5 mg/L in the distribution system, or it must be reported as an observations under O.Reg 170/03 Section 16-4. Schedule D, Section 1.2.5 of the MDWL also states that the maximum hydrogen peroxide residual at any time at any location within the distribution system should not exceed 8 mg/L. The distribution peroxide residual measured at the Killaloe Tourist Booth averaged at 2.79 mg/L in 2023, with the minimum residual being 1.22 mg/L and the maximum being 5.29 mg/L.

Major Maintenance Summary

WO #	Description
3431506	Replaced defective hot water tank
3245301	Replaced UPS at tourist booth
3245566	Replaced UPS for PLC at treatment plant
3665886	Manufacturer calibrated UV reference sensor
3205719	Replaced probe in post hydrogen peroxide analyzer
3702962	Replaced jockey pump motor
3206325	Replaced air compressor that operates pneumatic valves
3247867	Replaced check valve on highlift pump #3

Distribution Maintenance

Date	Location Reference	Category	Details
January 5th 2023	154 & 160 Queen Street	N/A	Repaired curbstops damaged from snow plow operations
February 2nd 2023	156 & 158 Queen Street	N/A	Repaired leaking curbstops to building being demolished
May 5th 2023	4 Coll Street	N/A	Lowered curbstop and replaced missing top
May 26th 2023	Entire System	N/A	Spring flushing program
September 8th 2023	31 Lake Street	N/A	Repaired curbstop

Date	Location Reference	Category	Details
September 30th 2023	30 Lake Street	N/A	Lowered curbstop and replaced missing top
October 19th 2023	Entire System	N/A	Fall flushing program

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:Jan 19, 2024 9:07 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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KAYLEE SAAR | 2024/01/19
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