
The 2023 Annual Drinking Water Quality Report

Kenora Water Treatment Plant



February 2024

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Introduction

The City of Kenora (City) continually provides safe drinking water to all of our customers. As mandated by the *Safe Drinking Water Act 2002, Ontario Regulation 170/03* this annual Water Quality Report includes:

- a description of the water treatment process and chemicals used;
- any major expenses to install, repair or upgrade equipment in the system;
- the results of our water tests and how they compare to provincial regulatory standards;
- a summary of incidents of regulatory non-compliance and the corrective actions taken; and,
- a summary of the quantities and water production rates of water supplied, with a comparison to the rated capacity and approved flow rates of the system

Kenora Water Treatment Plant

Municipal Drinking Water License: 228-101

Drinking Water System: 220001423

The Kenora Water Treatment Plant (WTP) is located at 5 7th Street South and has a rated capacity of 25 ML/d (Mega-Litres or Million-Litres per day) of treated drinking water. The raw water source is Lake of the Woods under *Permit to Take Water 442-9W7KXC*.

This facility is a conventional Filtration Treatment Plant. The treatment process consists of coagulation, up-flow pulsator clarification, dual media filtration (anthracite/sand), fluoridation, pH adjustment, and chloramination for secondary disinfection. The treatment chemicals used in the current reporting year were:

- chlorine gas (seasonal intake chlorination, disinfection, chloramination)
- sodium silicofluoride (fluoridation)
- aluminum sulphate (coagulation)
- polymer (coagulation aid)
- sodium hydroxide (pH adjustment)
- ammonium sulphate (chloramination for secondary disinfection)

The WTP is controlled through a Supervisory Control and Data Acquisition (SCADA) system that is monitored twenty-four hours per day, seven days per week. The treated drinking water is pumped into the Kenora Drinking Water System and is distributed to connected customers or can be collected at Bulk Water Fill stations by customers.

Kenora Water Distribution System

The City's Water Distribution System consists of 136km of piping, 3 standpipes (4th St N, Valley Dr, Keewatin), and 5 booster stations (9th Ave N, Donbrock Dr, Airport Rd, Norman, Pine Portage Rd) for pressurization and distribution of water between zones.

The Drinking Water System also provides drinking water to two private sub-systems which are located on Rocky Heights Road, and on Wauzhushk Onigum Nation.

2023 Capital Improvements

In the current reporting year, approximately \$947,200 was spent on capital upgrades at the Kenora WTP and outlying Booster Station and Standpipes. Projects included:

Project	Expense Type	Location	Value
5th St S Watermain Project	Replacement	Distribution	\$880,000
Window and Roof Repair	Repair/Replacement	WTP	\$27,000
Online Raw Water Monitoring Equipment	Install	WTP	\$26,000
Benchtop Spectrophotometer	Replacement	WTP	\$10,000
Pine Portage Booster Station	Repair	Distribution	\$4,200

In addition to capital upgrades, the City continues to enhance public health protection across the system, from the Water Treatment Plant to customer taps, through water sample monitoring, ongoing upgrades to the SCADA monitoring and infrastructure management systems, oversight of water connections to the distribution system, and backflow prevention. These practices undergo continual improvement through the annual review of the Drinking Water Quality Management System. Maintaining and updating the City's Drinking Water Quality Management System is a legislated requirement of a licensed municipal drinking water system.

Water Quality Testing

The City performs water quality tests each and every day, in accordance with the *Safe Drinking Water Act, 2002* and related regulations. The following sections provide a summary of the test results.

Terminology:

CFU/100 mL: Colony-forming units per 100 millilitres of water

µg/L: micrograms per litre

mg/L: milligrams per litre

Standard: Ontario Drinking Water Quality Standard, O.Reg. 169/03

E. Coli: Escherichia coli; Bacteria associated with the intestinal tracts of humans and animals

Coliforms: Bacteria that can be associated with human or animal waste

Summary of Microbiological Testing Results

	Number of Samples	<i>E. coli</i> Results (min - max)	Total Coliform Results (min - max)	Number of Heterotrophic Plate Count* Samples	Heterotrophic Plate Count Results (min - max)
Raw Water	52	0 – 10	0 – 921	N/A	N/A
Treated Water	52	Absent	Absent	50	0 - 1
Distribution System	417	Absent	0 – 200	104	0 - 2

Microbiological standards for treated and distributed water:

E.coli Not Detectable

Total Coliforms Not Detectable

HPC Heterotrophic Plate Counts are conducted on some treated and distribution system samples. The HPC test is used as a tool to monitor overall quality, but the results are not indicators of water safety. There is no Drinking Water Quality Standard for HPC.

Operational Testing

Kenora’s WTP uses continuous analyzers to measure and record the results of residual chlorine, turbidity and residual fluoride in the treated water throughout the treatment process several times per minute, twenty-four hours per day, seven days per week. The readings are validated by an operator and reviewed by the Ministry of the Environment, Conservation and Parks (MECP) Inspector. Kenora operators measure the residual chlorine throughout the drinking water system. Adverse test results must be reported to the Ministry if there is an indication that primary inactivation (disinfection) may not have been achieved, if the turbidity of filtered water is greater than 1.0 Nephelometric Turbidity unit (NTU), if the residual fluoride is greater than 1.5 mg/L or if a free residual chlorine in the distribution system is greater than 0.25 mg/L.

Summary of Operational Testing Results

In-Plant Monitoring Results

Parameter	Units	Samples	WTP Result Minimum	WTP Result Maximum	Adverse
Raw Water Turbidity	NTU	274	0.539	5.25	
Raw Water pH	pH	52	6.83	8.53	
Raw Water Colour	PtCo	52	6	109	
Raw Water Alkalinity	mg/L CaCO ₃	52	37	56	
Dissolved Organic Carbon	mg/L	4	10.3	11.1	
Filter #1 Effluent Turbidity	NTU	Continuous Monitoring	0.021	0.670	No
Filter #2 Effluent Turbidity	NTU	Continuous Monitoring	0.021	0.574	No
Filter #3 Effluent Turbidity	NTU	Continuous Monitoring	0.018	0.279	No
Filter #4 Effluent Turbidity	NTU	Continuous Monitoring	0.021	0.683	No
Fluoride Residual	mg/L	Continuous Monitoring	0.20	0.83	No
Clearwell Effluent Residual Chlorine	mg/L	Continuous Monitoring	0.72	2	No

Operational standards for treated water:

Chlorine Residual Reportable: <0.25 mg/L, >4 mg/L

NTU >1.0

Fluoride Residual Reportable: >1.5 mg/L

Terminology:

Residual: Concentration of active component in the water

NTU: Nephelometric Turbidity unit – Measures the presence of suspended material in water no greater than 1 unit (>1.0)

PtCo: Platinum Cobalt Colour Scale – Assesses organic levels in water

CaCO₃: Calcium Carbonate – Assesses hardness of water

CFU/100ml – Number of colony forming microbial cells per 100ml of water sample

Distribution System Monitoring Results

Sample Type	Units	Samples	Minimum Result	Maximum Result	Adverse
Routine Residual Chlorine	mg/L	468	0.80	2.19	No
Non-Routine Residual Chlorine	mg/L	250	0.23	2.15	1*

*Noted in Adverse Results Notifications

Operational standards for distribution water:

Reportable when Residual Chlorine is less than 0.25 mg/L or greater than 3 mg/L

Terminology:

Non-Routine Sampling is driven by watermain repairs, construction, and water quality complaints.

Summary of Chemical Testing Results

Inorganic Testing Parameters – Treated Water (unless otherwise noted)

Parameter	Sample Date	Units	WTP Result	Standard Limit	Exceedance of Standard
Antimony	01/16/23	µg/L	<0.60	6	No
Arsenic	01/16/23	µg/L	<1.0	10	No
Barium	01/16/23	µg/L	<10	1000	No
Boron	01/16/23	µg/L	<50	5000	No
Cadmium	01/16/23	µg/L	0.10	5	No
Chromium	01/16/23	µg/L	<1.0	50	No
Mercury	01/16/23	µg/L	<0.100	1	No
Selenium	01/16/23	µg/L	<1.0	50	No
Sodium	01/16/23	µg/L	14.2	20	No
Uranium	01/16/23	µg/L	<2.0	20	No
Nitrite (Maximum)	Quarterly	mg/L	0.140	10	No
Nitrate (Maximum)	Quarterly	mg/L	<0.010	1	No

Organic Parameters – Treated Water (unless otherwise noted)

Parameter	Sample Date	Units	WTP Result	Standard Limit	Exceedance of Standard
Alachlor	01/16/23	µg/L	<0.10	5	No
Atrazine + N-dealkylated metabolites	01/16/23	µg/L	<0.20	5	No
Azinphos-methyl	01/16/23	µg/L	<0.10	20	No
Benzene	01/16/23	µg/L	<0.50	1	No
Benzo(a)pyrene	01/16/23	µg/L	<0.0050	0.01	No
Bromoxynil	01/16/23	µg/L	<0.200	5	No
Carbaryl	01/16/23	µg/L	<0.20	90	No
Carbofuran	01/16/23	µg/L	<0.20	90	No
Carbon Tetrachloride	01/16/23	µg/L	<0.20	2	No
Chlorpyrifos	01/16/23	µg/L	<0.10	90	No
Diazinon	01/16/23	µg/L	<1.0	20	No
Dicamba	01/16/23	µg/L	<0.20	120	No
1,2-Dichlorobenzene	01/16/23	µg/L	<0.50	200	No
1,4-Dichlorobenzene	01/16/23	µg/L	<0.50	5	No
1,2-Dichloroethane	01/16/23	µg/L	<0.50	5	No
1,1-Dichloroethylene (vinylidene chloride)	01/16/23	µg/L	<0.50	14	No
Dichloromethane	01/16/23	µg/L	<1.0	50	No

2-4 Dichlorophenol	01/16/23	µg/L	<0.30	900	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	01/16/23	µg/L	<0.050	100	No
Diclofop-methyl	01/16/23	µg/L	<0.10	9	No
Dimethoate	01/16/23	µg/L	<0.10	20	No
Diquat	01/16/23	µg/L	<1.0	70	No
Diuron	01/16/23	µg/L	<1.0	150	No
Glyphosate	01/16/23	µg/L	<0.20	200	No
Distribution HAA (Running Annual Average)	Quarterly	µg/L	44.9	80	No
2-Methyl-4- chlorophenoxyacetic acid (MCPA)	01/16/23	µg/L	<0.200	100	No
Malathion	01/16/23	µg/L	<0.10	190	No
Metolachlor	01/16/23	µg/L	<0.10	50	No
Metribuzin	01/16/23	µg/L	<0.10	80	No
Monochlorobenzene	01/16/23	µg/L	<0.50	80	No
Distribution N-Nitrosodimethylamine (NDMA Maximum)	Quarterly	µg/L	2.9	9	No
Paraquat	01/16/23	µg/L	<1.0	10	No
Pentachlorophenol	01/16/23	µg/L	<0.50	60	No
Phorate	01/16/23	µg/L	<0.10	2	No
Picloram	01/16/23	µg/L	<0.20	190	No
Polychlorinated Biphenyls (PCB)	01/16/23	µg/L	<0.030	3	No
Prometryne	01/16/23	µg/L	<0.10	1	No
Simazine	01/16/23	µg/L	<0.10	10	No
Distribution THM (Running Annual Average)	Quarterly	µg/L	55.4	100	No
Terbufos	01/16/23	µg/L	<0.10	1	No
Tetrachloroethylene (perchloroethylene)	01/16/23	µg/L	<0.50	10	No
2,3,4,6-Tetrachlorophenol	01/16/23	µg/L	<0.50	100	No
Triallate	01/16/23	µg/L	<0.10	230	No
Trichloroethylene	01/16/23	µg/L	<0.50	5	No
2,4,6-Trichlorophenol	01/16/23	µg/L	<0.50	5	No
Trifluralin	01/16/23	µg/L	<0.100	45	No
Vinyl Chloride	01/16/23	µg/L	<0.50	1	No

Notifications of Adverse Results

The following tables show the notices of adverse water quality results submitted in accordance with the *Safe Drinking Water Act, 2002* to the MECP and the Medical Officer of Health.

Sample Date	Location	Adverse Condition	Corrective Action	Notice of Issue Resolution
September 1st, 2023	Distribution	Low Chlorine	System flushed, resampled, and resample results passed	September 19th, 2023
September 10, 11, 18, 19, 20, 22 2023	Distribution	Total Coliform Present Total Coliform =5, 200 CFU/100mls	System flushed, resampled, and resample results passed	October 3rd, 2023

Terminology:

CFU/100 mL - Colony-forming units per 100 milliliters of water

Community-Wide Lead Sampling Program Results

Under Schedule 15.1 of O. Reg. 170/03 the City of Kenora meets the requirements for reduced sampling. Previous rounds of residential plumbing sampling indicated lead levels did not meet the threshold required for continued annual testing, so lead samples are currently taken from distribution locations every three years. Sampling requirements in 2023 were limited to alkalinity and pH, so no lead sampling data is available for this reporting period.

Microcystin Sampling Results

Under the direction of the MECP, Microcystin-LR samples were collected on a weekly basis from June to October from the WTP. The treated water samples contained Microcystin concentrations at or above the minimum detection limit of 0.1µg/L on July 17th. Re-tests were conducted, and all other results indicated less than the detection limit of 0.1µg/L.

Sample Type	Samples Taken	Microcystin Results Range (ug/L)		Microcystin Regulation (ug/L)
Raw	26	0	0.2	N/A
Treated	26	0	0.1	1.5

Water Production

Effluent Flow Data

In 2023 the Kenora WTP pumped a total of 2,332,904 cubic meters (m³) of water to the distribution system. The highest daily flow took place in May, with a total of 8,204 m³ being pumped on the 30th. This is 33% of the plants rated capacity of 25,270m³/d.

Month	Total Monthly Flow (m ³)	Average Daily Flow (m ³ /d)	Maximum Daily Flow (m ³ /d)
January	196,318	6,333	7,058
February	185,129	6,612	7,791
March	208,458	6,724	7,403
April	192,874	6,429	7,602
May	200,695	6,474	8,204
June	209,866	6,996	8,196
July	211,658	6,828	7,936
August	213,388	6,883	7,557
September	176,088	5,870	6,703
October	176,851	5,705	6,561
November	175,281	5,843	6,535
December	186,298	6,010	6,745

Influent Flow Data

In 2023 the Kenora WTP pumped a total of 2,384,270 m³ of raw water from Lake of the Woods. The highest daily flow took place in May, with a total of 8,927 m³ being pumped on the 31st. This is 34% of the plants water taking limit of 26,000 m³/d as set out in the Permit to Take Water (PTTW). The highest instantaneous rate at which water was taken from Lake of the Woods was 22,307 m³/day, which occurred on July 20th. This is also 86% of the limit set out in the PTTW.

Month	Total Monthly Flow (m ³)	Average Daily Flow (m ³ /d)	Maximum Daily Flow (m ³ /d)
January	200,397	6,464	7,050
February	188,744	6,741	7,876
March	212,663	6,860	7,676
April	199,721	6,657	7,936
May	207,444	6,692	8,927
June	215,010	7,167	8,429
July	217,248	7,008	8,356
August	217,263	7,008	8,045
September	179,412	5,980	7,521
October	179,298	5,784	6,722
November	178,259	5,942	6,781
December	188,811	6,091	6,840

Historic Flow Data

Total effluent flow has remained relatively stable over the past 10 years. There is no expectation of significant greater demand on the system in the near future.

Year	Total Effluent Flow (m ³)	Average Daily Flow (m ³ /d)	Annual Change	2023 Comparison
2013	2,435,713	6,673	N/A	104%
2014	2,621,655	7,183	+7.6%	112%
2015	2,452,926	6,720	-6.4%	105%
2016	2,066,260	5,646	-15.8%	89%
2017	2,151,431	5,894	+4.1%	92%
2018	2,247,301	6,157	+4.5%	96%
2019	2,229,036	6,107	-0.8%	96%
2020	2,182,328	5,963	-2.1%	94%
2021	2,274,543	6,232	+4.2%	98%
2022	2,329,057	6,381	+2.4%	100%
2023	2,332,904	6,392	+0.2%	

Operational Compliance

An inspection was conducted by the Ministry of Environment Conservation and Parks (MECP) on April 27th and 28th 2023. The final inspection rating was 93.29%. Five non-compliances were identified in the inspection report.

Non-Compliance – Operator In Charge (OIC)

Issue: OIC designation was not clearly or properly logged into operational logbooks as per the regulation

Corrective Action: Logbook adjustments were made and are reviewed daily to ensure compliance. May and June logbook entries were resubmitted to the MECP for review and the corrections satisfied the Ministry. No further action is required.

Non-Compliance – Logbook Entries

Issue: Logbooks were not properly maintained or did not contain the required information with respect to clear signatures or initials identifying the operator's entry.

Corrective Action: The City asked the MECP inspector to conduct a training session on proper log book entries. Procedural changes were made to ensure compliance. May and June logbook entries were resubmitted for review and the

corrections satisfied the Ministry. No further action is required.

Non-Compliance – OIC identified were not always performing the functions of an OIC

Issue: Operators signing in as OIC's were not performing the functions of an OIC.

Corrective Action: An operator will only log in as an OIC in the logbook when performing OIC duties. May and June logbook entries were resubmitted for review and the corrections satisfied the Ministry. No further action is required.

Non-Compliance – Notification of Adverse Water Quality Was Not Immediately Provided

Issue: Notification of Adverse Water Quality was not immediately provided to the MECP as required.

Corrective Action: All Category 2 watermain breaks subject to a Boil Water Advisory will be reported immediately as per the Watermain Disinfection Procedure (2020).

Non-Compliance – Violation of the Permit to Take Water

Issue: The owner was not compliant with all the conditions of the permit to take water, exceeding the maximum allowable rate during a maintenance activity. When recommissioning a portion of the plant, the allowable rate was exceeded while re-starting the process.

Corrective Action: A Standard Operating Procedure was developed to prevent the plant from exceeding the flow rate by restricting pumping rates.

In all compliance issues identified by the MECP, the quality and safety of the water was not compromised meeting all treatment standards and requirements.

More Information or Questions

This report is available free of charge to anyone who requests a copy. An electronic copy is available on the City of Kenora website, and anyone wanting to be provided a paper copy can make arrangements to pick one up from the Water Treatment Plant. Any inquiries or concerns or request for copies of this report can be directed to:

Bill Mundy C.E.T.
General Manager of Utilities
807-467-2004
bmundy@kenora.ca
www.kenora.ca