Ontario Clean Water Agency
Agence Ontarienne Des Eaux

HEARST DRINKING WATER SYSTEM
2021 ANNUAL COMPLIANCE AND SUMMARY REPORT

Prepared by the Ontario Clean Water Agency
on behalf of the Town of Hearst

TABLE OF CONTENTS

INTRODUCTION

Municipalities throughout Ontario are required to comply with Ontario Regulation 170/03 made under the *Safe Drinking Water Act*, 2002. The Act was passed following recommendations made by Commissioner O'Conner after the Walkerton Inquiry. The Act's purpose is to protect human health through the control and regulation of drinking-water systems. O. Reg. 170/03 regulates drinking water testing, use of licensed laboratories, treatment requirements and reporting requirements.

O. Reg. 170/03 requires the owner to produce an Annual Report, under Section 11. This report must include the following:

1. Description of system and chemical(s) used
2. Description of any major expenses incurred to install, repair or replace equipment
3. Summary of all required testing
4. Summary of any adverse water quality reports and corrective actions

This Annual Report must be completed by February 28 of each year.

The regulation also requires a Summary Report which must be presented and accepted by Council by March 31 of each year for the preceding calendar year reporting period.

The report must list the requirements of the Act, its regulations, the system's Drinking Water Works Permit (DWWP), Municipal Drinking Water Licence (MDWL), Certificate of Approval (if applicable), and any Provincial Officer Order the system failed to meet during the reporting period. The report must also specify the duration of the failure, and for each failure referred to, describe the measures that were taken to correct the failure.

The *Safe Drinking Water Act*, 2002 and the drinking water regulations can be viewed at the following website: http://www.e-laws.gov.on.ca.

To enable the Owner to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report:

1. A summary of the quantities and flow rates of water supplied during the reporting period, including the monthly average and the maximum daily flows.
2. A comparison of the summary to the rated capacity and flow rates approved in the systems approval, drinking water works permit or municipal drinking water licence or a written agreement if the system is receiving all its water from another system under an agreement.

The two reports have been combined and presented to council as the Annual Compliance and Summary Report.

SECTION 11 ANNUAL REPORT

SYSTEM INFORMATION

Drinking-Water System Name:	HEARST DRINKING WATER SYSTEM
Drinking-Water System No.:	220002592
Drinking-Water System Owner:	The Corporation of the Town of Hearst
Drinking-Water System Category:	Large Municipal, Residential System
Population:	5,070
Reporting Period:	January 1 to December 31, 2021

REPORT AVAILABILITY

Hard Copy Available at:	Hearst Municipal Office, 925 Alexandra Street, Hearst ON P0L 1N0
Electronic Copy Available:	Town's website
Public Notification via:	Public access/notice

DESCRIPTION OF THE DRINKING WATER SYSTEM

The Hearst Drinking Water System is a stand-alone system, neither receiving drinking water from nor providing drinking water to another system.

The Hearst Water Treatment Plant is a surface water plant located at 1215 Edward Street. It serves a population of approximately 5,000 residents and has roughly 2,000 service connections. Raw water is obtained from the Mattawishkwia River through an intake pipe, an intake crib and secondary infiltration gallery. The intake system consists of a 48.8 m long, 400 mm diameter steel pipe with an intake capacity of 60,553 m^3/d and the infiltration gallery is comprised of twelve rows of 34 m long 150 mm diameter perforated pipes that extend into the river. A coffer dam was constructed in September 2005 to maintain water by the intake structure.

Raw water from the river is gravity fed to a wet well located in the old water treatment building adjacent to the river. The water level in the wet well is dependent on the water level of the river. Pre-chlorination is present at the raw water wet well providing treatment if needed. Water is pumped from the low lift station by three submersible low lift pumps. Only one pump is in operation at any given time, directing water to the main water treatment building where coagulation, flocculation, sedimentation, filtration and disinfection operations take place.

Water from the low lift pumps is received at the flocculation tanks by means of a 200 mm diameter pipe and has two trains providing spiral flow. Each train contains three cells to provide hydraulic mixing. Lime or soda ash is added in the raw water wet well to increase alkalinity. Liquid alum (coagulant) is added prior to an in-line mixer. The polymer is added at the head of the flocculation tanks to aid in flocculation.

The coagulation process is modified during the summer months because of increased suspended solids in the river. This results in better flocculation and settling of the floc. When water conditions permit, typically in winter months, the polymer is not required.

Sedimentation occurs in two rectangular settling tanks with sludge being removed to a holding tank on a daily basis. The sludge holding tank can hold 66 m^3 of sludge. Water from the settling tanks is directed to two settling tanks and is filtered through layers of anthracite, silica sand, and gravel. The filters are backwashed on alternate days and the backwash wastewater is stored in a wastewater holding tank.

Disinfection is provided by a gas chlorination system. Chlorine gas is added to the treated water using four V10K gas chlorinators; one duty and one standby for each of pre-chlorination and post-chlorination. Post-chlorination exists at the intake side of the clearwell and post-trim chlorination is present at the suction header to the high lift pumps. A caustic soda (or sodium hydroxide) feeding system is used to further regulate pH levels and an ammonium sulfate feed system is used to chloraminate the finished water. One of the four available high lift pumps delivers water to a 1,000 m^3 elevated storage tank which maintains pressure to the distribution system.

The plant is also equipped with a standby natural gas generator to permit the treatment plant to remain in operation should a power failure occur.

WATER TREATMENT CHEMICALS USED

- Alum – coagulation/flocculation process
- Polyelectrolyte (Polymer) – aids the coagulation and flocculation process
- Chlorine gas – disinfection
- Sodium hydroxide – pH adjustment
- Hydrated lime (calcium hydroxide) or soda ash – pH and alkalinity adjustment
- Ammonium sulphate – chloramination process

All treatment chemicals are NSF/ANSI approved.

MAJOR EXPENSES INCURRED TO INSTALL, REPAIR OR REPLACE EQUIPMENT

Capital Work – 2021

- Backwash pump VFD Installation
- Chemical pumps and analyzer parts
- Chlorine feed line replacement
- DWQMS third party audit
- Elevated tank recirculation flow switch and leak repair
- Fire hydrant winterizing
- Generator fault light repair
- Hearst Water Plant Garage Transformer
- Low lift #1 repair

- MCPA sampling
- Replacement batteries for intrusion alarm
- SCADA printer replacement

Reporting Adverse Test Results and Other Problems

Details on the notices required in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre:

Date	Details (Parameter, Limit, Result, Corrective Action, Date, etc.)
November 2	1 Total Coliform in the Distribution System (AWQI 156384) Re-samples were collected on November 4, all of which were free of total coliforms.

Please refer to the original Notices of Adverse Test Results and Issue Resolution (Schedule 16) for full details

Schedule 7 - Operational Testing with Continuous Monitoring

Analyzers in Treatment Process	Number of Samples	Range of Results (min to max)	Unit of Measure	Standard
Turbidity (Filter #1)	8760	0.04 – 0.99	NTU	<1.0
Turbidity (Filter #2)	8760	0.04 – 0.99	NTU	<1.0
Chlorine (Free)	8760	0.14 – 2.10	mg/L	-

NOTE: For continuous monitors use 8760 as the number of samples.

Effective backwash procedures, including filter to waste are in place to ensure that the effluent turbidity requirements are met all times. The plant is configured to shut down and creates a callout whenever turbidity reaches 0.90 NTU.

Schedule 7 - Operational Testing in the Distribution System

	Number of Samples	Range of Results (min to max)	Unit of Measure	Standard
Combined Chlorine	381	0.65 – 1.95	mg/L	> 0.25

Note: A total of seven operational checks for chlorine residual in the distribution system are required each week. The owner/operating authority can continue to test one sample per day or test four (4) samples one day and three (3) on a second day. The sample sets must be collected at least 48-hours apart and samples collected on the same day must be from different locations.

SCHEDULE 10 - MICROBIOLOGICAL TESTING

Sample Type	Number of Samples	*E.coli* Results (min to max)	Total Coliform Results (min to max)	Number of HPC Samples	Range of HPC Results (min to max)
Raw	52	<2 – 70	<2 – >1000	N/A	N/A
Treated	52	0 – 0	0 – 0	52	<10 – 140
Distribution	211	0 – 0	0 – 0	52	<10 – 10
MAC	-	0	0	-	-

Maximum Acceptable Concentration (MAC) applies only to treated or distribution samples

*NDOGHPC – no data, overgrown with HPC

SCHEDULE 13 - NITRATE AND NITRITE AT THE WATER TREATMENT PLANT

Date of Sample	Nitrate Result Value (mg/L)	Nitrite Result Value (mg/L)	Exceedance
January 19, 2021	<0.05	<0.05	No
April 13, 2021	0.27	<0.05	No
July 20, 2021	<0.05	<0.05	No
October 5, 2021	<0.05	<0.05	No
MAC	10	1	-

MAC – Maximum Acceptable Concentration

SCHEDULE 13 - TOTAL TRIHALOMETHANES IN THE DISTRIBUTION SYSTEM

Date of Sample	Result Value (ug/L)	Running Four Quarter Average	Exceedance
January 19, 2021	59.8	78.8	No
April 13, 2021	51.3	77.0	No
July 20, 2021	116	75.3	No
October 5, 2021	50	69.3	No

Maximum Acceptable Concentration (MAC) for Trihalomethanes = 100 ug/L Four Quarter Running Average

SCHEDULE 13 – HALOACETIC ACIDS (HAA) IN THE DISTRIBUTION SYSTEM

Date of Sample	Result Value (ug/L)	Running Four Quarter Average	Exceedance
January 19, 2021	72	60.0	No
April 13, 2021	33	59.8	No
July 20, 2021	143	73.3	No
October 5, 2021	49	74.3	No

Maximum Acceptable Concentration (MAC) for Haloacetic Acids = 80 ug/L Four Quarter Running Average

SCHEDULE 13 – SODIUM AT WATER TREATMENT PLANT

Date of Sample	Number of Samples	Result Value (ug/L)	Maximum Acceptable Concentration	Exceedance
October 18, 2017	1	67,500	20	Yes - AWQI
November 8, 2017	1	57,900	20	No (Re-sample)

Note: sample required every 60 months

SCHEDULE 13 – FLUORIDE TESTED AT WATER TREATMENT PLANT

Date of Sample	Number of Samples	Result Value (mg/L)	Maximum Acceptable Concentration	Exceedance
October 18, 2017	1	<0.1	1.5	No

Note: sample required every 60 months

SCHEDULE 15.1 – LEAD IN THE DISTRIBUTION

The Hearst water supply system qualified for the 'Exemption from Plumbing Sampling' as described in section 15.1-5 (9) and 15.1-5 (10) of Ontario Regulation 170/03

As such, the system was required to test for total alkalinity and pH in two distribution samples collected during the periods of December 15 to April 15 and June 15 to October 15. This testing is required in every 12-month period with lead testing in every third 12-month period.

Sampling Dates	Number of Samples	Range of Results (min to max)		
		Lead (ug/L)	pH	Alkalinity (mg/L)
Winter Period				
April 15, 2020	3	0.4 – 0.5	-	-
April 8, 2021	3	-	7.40 – 7.55	85 – 93
Summer Period				
September 8, 2020	3	<0.1 – 0.5	-	-
October 5, 2021	3	-	7.01 – 7.12	89 – 96

Lead MAC is 10 ug/L

SCHEDULE 23 - INORGANIC PARAMETERS SAMPLED AT THE WATER TREATMENT PLANT

Sample Date: October 5, 2021

Parameter	Result (ug/L)	MAC	MAC Exceedance	1/2 MAC Exceedance
Antimony	<0.5	6.0	No	No
Arsenic	<1	10.0	No	No
Barium	7	1000.0	No	No

Boron	<2	5000.0	No	No
Cadmium	<0.1	5.0	No	No
Chromium	<1	50.0	No	No
Mercury	<0.1	1.0	No	No
Selenium	0.2	50.0	No	No
Uranium	<1	20.0	No	No

No inorganic parameter(s) exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standards (ODWS) during the reporting period

SCHEDULE 24 - ORGANIC PARAMETERS SAMPLED AT THE WATER TREATMENT PLANT

Sample Date: October 5, 2021

Parameter	Result (ug/L)	MAC	MAC Exceedance	1/2 MAC Exceedance
1,1-Dichloroethylene	<0.5	14	No	No
1,2-Dichlorobenzene	<0.5	200	No	No
1,2-Dichloroethane	<0.5	5	No	No
1,4-Dichlorobenzene	<0.5	5	No	No
2,3,4,6-Tetrachlorophenol	<0.2	100	No	No
2,4,6-Trichlorophenol	<0.2	5	No	No
2,4-D (2,4-Dichlorophenoxy acetic acid)	<0.44	100	No	No
2,4-Dichlorophenol	<0.2	900	No	No
Alachlor	<0.394	5	No	No
Atrazine + N-dealkylated metabolites	<0.5	5	No	No
Azinphos-methyl	<0.295	20	No	No
Benzene	<0.2	1	No	No
Benzo(a)pyrene	<0.01	0.01	No	No*
Bromoxynil	<0.117	5	No	No
Carbaryl	<3	90	No	No
Carbofuran	<4	90	No	No
Carbon Tetrachloride	<0.2	2	No	No
Chlorobenzene (Monochlorobenzene)	<0.5	80	No	No
Chlorpyrifos	<0.295	90	No	No
Diazinon	<0.295	20	No	No
Dicamba	<0.103	120	No	No
Dichloromethane (Methylene Chloride)	<5	50	No	No
Diclofop-methyl	<0.147	9	No	No

Parameter	Result (ug/L)	MAC	MAC Exceedance	1/2 MAC Exceedance
Dimethoate	<0.295	20	No	No
Diquat	<0.2	70	No	No
Diuron	<10	150	No	No
Glyphosate	<20	280	No	No
Malathion	<0.295	190	No	No
MCPA (2-methyl-4-chlorophenoxyacetic acid)	<7.34	100	No	No
Metolachlor	<0.197	50	No	No
Metribuzin	<0.197	80	No	No
Paraquat	<0.3	10	No	No
Pentachlorophenol	<0.3	60	No	No
Phorate	<0.197	2	No	No
Picloram	<0.103	190	No	No
Prometryne	<0.0985	1	No	No
Simazine	<0.295	10	No	No
Terbufos	<0.197	1	No	No
Tetrachloroethylene	<0.5	10	No	No
Total PCBs	<0.06	3	No	No
Triallate	<0.197	230	No	No
Trichloroethylene	<0.5	5	No	No
Trifluralin	<0.197	45	No	No
Vinyl Chloride	<0.1	1	No	No

Note*: Benzo(a)pyrene – Schedule 13-5 of O. Reg. 170/03 requires increased frequency of sampling if an analytical result obtained for any of the parameters listed in Schedule 24 exceeds one half of the MAC. The Ministry has set the reporting detection limit (RDL) for Benzo[a]pyrene at 50 per cent or more of the MAC, due to the limitations of the current analytical methods to achieve lower detection limits. The RDL for benzo[a]pyrene is 0.01 ug/L. For this parameter, a licenced laboratory must be able to achieve a method detection limit (MDL) at least equal to the RDL. A positive result above their MDL would trigger increased frequency of sampling, but a result equal to their MDL would not

No organic parameter(s) exceeded half the standard found in Schedule 2 of the ODWS during the reporting period.

ADDITIONAL TESTING AND SAMPLING – MCPA (2-methyl-4-chlorophenoxyacetic acid)

If an analyte concentration exceeds half of the maximum acceptable concentration the sampling frequency is increased from annual to every three months. For surface water systems, sampling is conducted until four consecutive samples are below half of the maximum acceptable concentration.

MCPA exceeded half the standard found in Schedule 2 of the ODWS in October 2020. The required extra sampling was conducted as follows:

Sample Date	Result	MAC	MAC Exceedance	1/2 MAC Exceedance
January 19, 2021	<5.78	100	No	No
April 13, 2021	<5.57	100	No	No
July 20, 2021	<6.21	100	No	No
October 5, 2021	<7.34	100	No	No

None of the sample results exceeded half of the MAC thus quarterly sampling is no longer required.

ADDITIONAL TESTING AND SAMPLING – RESIDUE MANAGEMENT

Extra sampling required under Municipal Drinking Water Licence 211-101, issued February 15, 2021

Residue Management – Effluent Flows

Parameter	Cell	Value	Exceedance	Compliance Limit
Effluent Volume (m^3/a)	East	9,458	No	44,325 m^3/a
	West	18,211		
Average Flow Rate (L/s)	East	9.95	No	Annual Average 16.7 L/s
	West	11		

Residue Management - Effluent Quality

Parameter	Cell	Number of Samples	Range of Results (min to max)	Exceedance	Compliance Limit
Aluminum (ug/L)	East	3	1,230 – 5,860	-	-
	West	3	650 – 6,900	-	
BOD_5 (mg/L)	East	3	0.6 – 1.4	-	-
	West	3	0.6 – 1.2	-	
Total Suspended Solids (mg/L)	East	1	14	No	Max 25 mg/L
	West	2	23	No	
pH (units)	East	3	7.25 – 7.37	-	-
	West	3	7.24 – 7.31	-	

Discharge Periods: April 25 to June 15 (Spring) and October 1 to November 15 (Fall)

SCHEDULE 22 - SUMMARY REPORTS FOR MUNICIPALITIES

This report is a summary of water quality information for the Hearst Water Treatment System. It is published in accordance with Schedule 22 of Ontario's Drinking Water Systems Regulation 170/03 for the reporting period of January 1 to December 31, 2021 and must be submitted to members of council.

The report must include:

- Any requirements the system failed to meet during the reporting period
- A summary of quantities and flow rates and a comparison to the imposed limits

PERMITS AND LICENCES

Municipal Drinking Water Licence (MDWL)	211-101 Issued February 15, 2021
Drinking Water Works Permit (DWWP)	211-201 Issued February 15, 2021
Permit to Take Water (PTTW)	5460-AVWLEV Issued February 21, 2018

REQUIREMENTS THE SYSTEM FAILED TO MEET

The following table lists the requirements of the Safe Drinking Water Act (2002), the drinking water regulations, the system's approval, drinking water works permit, municipal drinking water works licence, and any other orders applicable to the system that were not met at any time during the reporting period. This table is based on documentation available to the Ontario Clean Water Agency. The duration of the failure and details of the actions that were taken to correct the failure must be described.

Legislation	Requirement(s) the System Failed to Meet, Corrective Actions and Status
None	There were no instances that OCWA is aware of at this time

SUMMARY OF FLOW RATES

For the purpose of enabling the owner of the system to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report. Under schedule 22-2(3) of Ontario Regulation 170/03, the Summary Report must include the following:

1. A summary of the quantities and flow rates of water supplied, including the monthly average and the maximum daily flows

2. A comparison of both the average and maximum flow rate summary to the rated capacity approved in the systems approval, drinking water works permit or municipal drinking water licence

The following tables indicate the quantities and flow rates of water taken and produced during the reporting period, including monthly average flows, maximum daily flows and the total monthly volumes. A comparison of the water data is made to the rated capacity and flow rates specified in the system's Municipal Drinking Water Licence.

DAILY RAW WATER USAGE

	Maximum (L/min)	Maximum (m^3/d)	Average (m^3/d)	Total Usage (m^3)
January	2,520	1,868	1,540	47,754
February	1,883	1,656	1,500	41,992
March	1,983	1,681	1,490	46,191
April	3,455	1,829	1,531	45,937
May	2,134	1,807	1,559	48,327
June	2,031	1,824	1,693	50,789
July	2,613	2,419	1,682	52,136
August	2,399	2,295	1,695	52,552
September	2,251	1,929	1,662	49,868
October	2,287	1,884	1,590	49,290
November	3,507	1,882	1,511	45,324
December	2,022	1,766	1,483	45,972

DAILY VOLUME OF TREATED WATER INTO THE DISTRIBUTION SYSTEM

	Total Usage (m^3)	Average (m^3/d)	Maximum (m^3/d)	% Rated Capacity
January	40,380	1,303	1,394	12.7
February	36,849	1,316	1,528	12.8
March	40,955	1,321	1,513	12.9
April	40,616	1,354	1,496	13.2
May	42,971	1,386	1,565	13.5
June	45,460	1,515	1,839	14.7
July	46,732	1,507	1,944	14.7
August	47,698	1,539	2,574	15.0
September	43,945	1,465	1,681	14.2
October	43,243	1,395	1,546	13.6
November	39,654	1,322	1,493	12.9
December	40,136	1,295	1,357	12.6

Comparison of Raw Flows to System's Permit to Take Water

Permit to Take Water Limits (PTTW) - maximum	**9,819.36 m^3/day**	**6,819 L/min**
Average Daily Flow for 2021	1,578 m^3/day	1,916 L/min
Maximum Daily Flow for 2021	2,419 m^3/day	3,507 L/min
Total Raw Water Used in 2021	576,132 m^3	-

Comparison of Treated Flow Summary to System's Municipal Drinking Water Licence

Rated Capacity of the Plant (MDWL)	**10,280 m^3/day**	
Average Daily Flow for 2021	1,393 m^3/day	13.6 % of the rated capacity
Maximum Daily Flow for 2021	2,574 m^3/day	25.0 % of the rated capacity
Total Treated Water Produced in 2021	508,639 m^3	

Based on the information above, the plant is able to meet the demands of the consumers.