# **Annual Report**

Balmertown, Cochenour & McKenzie Island Drinking Water System



Prepared by Northern Waterworks Inc. on behalf of the Municipality of Red Lake





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# 1 Introduction

# 1.1 Annual Reporting Requirements

This consolidated Annual Report (the Report) has been prepared in accordance with both section 11 (Annual Reports) and Schedule 22 (Summary Reports for Municipalities) of Ontario Regulation 170/03 (Drinking Water Systems Regulation). This Report is intended to inform both the public and Municipal Council about the operation of the system over the previous calendar year (January 1 to December 31, 2022).

Section 11 of O. Reg. 170/03 requires the development and distribution to the public of an annual report summarizing water quality monitoring results, adverse water quality incidents, system expenses and chemicals used in the water treatment process.

Schedule 22 of O. Reg. 170/03 requires the development and distribution to Council of an annual report summarizing incidents of regulatory non-compliance and associated corrective actions, in addition to providing flow monitoring results for the purpose of enabling the Owner to assess the capability of the system to meet existing and planned demand.

# 1.2 Report Availability

In accordance with section 11 of O. Reg. 170/03, this Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public at the Red Lake Municipal Office and on the Municipality's website.

In accordance with Schedule 22 of O. Reg. 170/03, this Report must be given to the members of Municipal Council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's *Safe Drinking Water Act* (SDWA) also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system. The examination of this Report is one of the methods by which municipal officials may fulfil the obligations required by section 19 of the SDWA.

System users and members of Council should contact a representative of NWI for assistance in interpreting this Report. Questions and comments may be directed to the local NWI Operations Manager or by email to compliance@nwi.ca.

# 2 System Overview & Expenses

## 2.1 System Description

The Balmertown, Cochenour & McKenzie Island (BCMI) Drinking Water System must meet extensive treatment and testing requirements to ensure that human health is protected. The operation and maintenance of the system is governed by Ontario's *Safe Drinking Water Act* and the regulations therein, in addition to requirements within system-specific environmental approvals. Important system information is summarized in Table 1.

Table 1: System information					
Drinking-Water System Name:	Balmertown, Cochenour & McKenzie Island (BCMI) Drinking Water System				
DWS Number:	210000522				
DWS Category:	Large Municipal Residential				
DWS Owner:	The Corporation of the Municipality of Red Lake				
DWS Operating Authority:	Northern Waterworks Inc.				
DWS Components:	<ul> <li>Raw water pumping station</li> <li>Cochenour Water Treatment Plant</li> <li>Balmertown Reservoir Pumping Station</li> <li>Cochenour &amp; McKenzie Island water distribution system</li> <li>Balmertown water distribution system</li> </ul>				
Treatment Processes:	<ul> <li>Chemical coagulation, flocculation and clarification</li> <li>Dual media (rapid sand) filtration</li> <li>Free chlorine disinfection</li> <li>pH adjustment</li> </ul>				

Water production begins as raw water flows by gravity from the intake structure located in Bruce Channel (Red Lake) and into an underground reservoir located at the raw water pumping station. Pumps at the station transfer water from the reservoir and through a transmission line directly to the treatment units at the Cochenour Water Treatment Plant. Aluminum sulphate (coagulant) and sodium carbonate solution (pH/alkalinity adjustment) are injected and rapidly mixed into the raw water immediately upstream from the three package treatment units, which each include a two-stage flocculation tank, clarifier and filter. To promote floc formation water is gently mixed as it passes through the flocculation basins. Polymer solution (flocculant) is also added to the water at this stage of treatment to form larger and more stable floc aggregates. Process water then enters the clarifier where its velocity is reduced to allow for the separation and settling of floc. Supernatant overflows into the clarifier effluent launders and is directed to the filter unit; settled floc (sludge) is automatically removed from the bottom of the clarifier.

Impurities that were not captured and settled as floc in the clarifier are removed by passing water through a dual media filter composed of anthracite and silica sand. Chlorine gas (disinfectant) and sodium carbonate solution are added to the filtrate as it is directed from the filters to the treated water storage reservoir. The filters are periodically cleaned by using an air scour to agitate the entire media bed and reversing the flow of water through the filter.

A majority of the water produced is transferred through a transmission line from the Cochenour Water Treatment Plant (WTP) to the reservoir at the Balmertown Reservoir Pumping Station (RPS). Primary disinfection is achieved as disinfectant mixes with the water in the reservoirs at both facilities. Pumps located at the Balmertown RPS and Cochenour WTP then transfer treated water from the facility reservoirs to the Balmertown and Cochenour/McKenzie Island water distribution systems, respectively. Secondary disinfection requirements in the distribution systems are achieved by maintaining a free chlorine residual at all locations.

## 2.2 Water Treatment Chemicals

In accordance with section 11 of O. Reg. 170/03, this Report must include a list of all water treatment chemicals used by the system during the period covered by the report (summarized in Table 2). All chemicals used in the treatment process are NSF/ANSI 60 certified for use in potable water, as required by system approvals.

Table 2: Water treatment chemicals used in 2022						
Treatment Chemical Application						
aluminum sulphate coagulant						
sodium carbonate pH/alkalinity adjustment						
polymer (Polyfloc CP1160P) flocculant						
chlorine gas disinfectant						

# 2.3 System Expenses

In accordance with section 11 of O. Reg. 170/03, this Report must describe any major expenses incurred during the reporting period to install, repair, or replace required equipment. This Report also summarizes those expenses related to strengthening equipment inventories and to maintenance activities undertaken by subcontracted service providers. Major expenses incurred in 2022 are summarized in Table 3.

Table 3: Major expenses incurred in 2022					
Category	Description	Expense			
Inventory	Industrial Shelving	\$10,000			
Maintenance/Repairs/Inventory	Heating	\$9,300			
Maintenance/Repairs	SCADA PLC programming and upgrades	\$9,000			
Replace/Upgrade	Videographic Chart Recorder	\$6,190			
Inventory/Replace	Post Soda Metering Pump	\$6,000			
Maintenance	Generator Tri-Annual Load Testing and Servicing	\$3290			
Maintenance	Flow meter calibration verifications	\$1,500			
Maintenance/Repairs	Lighting	\$1,500			
Inventory/Replace	Assorted tools	\$1,000			
Maintenance	Backflow prevention device inspection and testing	\$800			



# 3 Water Quality

# 3.1 Overview

Water quality monitoring is conducted to determine and confirm that drinking water delivered to the consumer is safe and aesthetically pleasing. Monitoring is also required to assess compliance with legislation and to control the treatment process. In accordance with section 11 of O. Reg. 170/03, this Report must summarize the results of water quality tests required by regulations, approvals, and orders. The following sections summarize the results of all required water quality tests and compare the results to applicable water quality standards.

# 3.2 Microbiological Parameters

Microbiological sampling and testing requirements are provided in Schedule 10 (Microbiological sampling and testing) of O. Reg. 170/03. In 2022, a total of 311 routine source, treated and distribution water samples were collected for microbiological analysis by an accredited laboratory. Samples were collected on a weekly basis and included tests for E. coli (EC), total coliforms (TC) and heterotrophic plate counts (HPC). Results from microbiological analyses are summarized in Table 4. All results were below the associated Ontario Drinking Water Quality Standards.

Table 4: Results summary for microbiological parameters							
Sample Type	# of Samples	EC Results Range <sup>1</sup> (MPN/ 100mL)	TC Results Range <sup>1</sup> (MPN/ 100mL)	# of HPC Samples	HPC Results Range (CFU/mL)		
Raw Water	52	0 to 4	0 to 1300				
Treated Water (CWTP)	52	absent	absent	52	0 to 1		
Balmertown (BRPS)	51	absent	absent	51	0 to 3		
Treated Water (CWTP non routine)	4	absent	absent				
Distribution (routine)	156	absent	absent	53	0 to > 10		
Distribution (nonroutine)	19	absent	absent				

1. The Ontario Drinking Water Quality Standard for E. Coli and Total Coliforms in a treated or distribution sample is 'not detectable'. The presence of either parameter in a treated or distribution sample constitutes an exceedance.

## 3.3 Operational Parameters

In accordance with Schedule 7 (Operational checks) of O. Reg. 170/03, regulated operational parameters that must be monitored include raw water turbidity, filtrate turbidity and the free chlorine residuals associated with primary and secondary disinfection. Table 5 summarizes water quality results for regulated and selected unregulated operational parameters. In accordance with Schedule 6 (Operational checks, sampling, and testing – general) of O. Reg. 170/03, certain operational parameters are continuously monitored. No Adverse Water Quality Incidents (AWQIs) pertaining to operational parameters occurred during the reporting period.

Table 5: Results summary for operational parameters						
Parameter (Sample Type) <sup>1</sup>	Number of Samples	Units	Min. Result	Max. Result	Annual Avg.	Adverse Result
Turbidity (Raw Water)	83	NTU	0.47	3.64	1.11	n/a
Turbidity (Filter 1)	Continuous	NTU	0.035	0.520	0.104	>1.0
Turbidity (Filter 2)	Continuous	NTU	0.040	0.320	0.089	>1.0
Turbidity (Filter 3)	Continuous	NTU	0.037	0.690	0.115	>1.0
Turbidity (Treated)	365	NTU	0.05	0.25	0.13	n/a
pH (Treated)	365		6.5	8.3	7.4	n/a
Alkalinity (Treated)	243	mg/L	23	64	47	n/a
Aluminum Residual (Treated)	237	mg/L	0.020	0.089	0.041	n/a
FCR (Treated - CWTP) <sup>2</sup>	Continuous	mg/L	0.85	3.64	1.93	n/a
FCR (Treated - BRPS) <sup>2</sup>	Continuous	mg/L	0.63	2.15	1.53	n/a
FCR (CMI Distribution) <sup>3</sup>	350+	mg/L	0.68	2.16	n/a	<0.05
FCR (Balm. Distribution) <sup>3</sup>	400+	mg/L	0.72	2.05	n/a	<0.05

1. FCR = free chlorine residual; CMI = Cochenour & McKenzie Island; Balm. = Balmertown.

2. There is no adverse result corresponding to the treated water free chlorine residual. However, an observation of adverse water quality occurs if the residual is low enough such that water has not been disinfected in accordance with the system's *Municipal Drinking Water Licence*.

3. Free chlorine residuals are tested at various locations in the distribution systems. The free chlorine residual varies with water age and distribution system location, and the values in the table pertain to the minimum and maximum results collected across all locations in the calendar year.

# 3.4 Conventional Filtration Performance

In accordance with the system's *Municipal Drinking Water Licence*, conventional filtration facilities must meet certain performance criteria in order to claim removal credits for Cryptosporidium oocysts and Giardia cysts. In addition to continuously monitoring filtrate turbidity and other requirements, filtrate turbidity must be less than or equal to 0.3 NTU in at least 95% of the measurements each month. Table 6 summarizes filtrate turbidity compliance against the <0.3 NTU/95% performance criterion. Minimum and maximum values in the table correspond to the proportion of time that filtered water turbidity was less than or equal to 0.3 NTU in a calendar month in 2022. No AWQIs related to conventional filtration performance occurred during the reporting period.

Table 6: Filtration performance summary						
Filter	Minimum Result	Maximum Result	Adverse Result			
Filter 1	100%	100%	<95%			
Filter 2	100%	100%	<95%			
Filter 3	100%	100%	<95%			



## 3.5 Nitrate & Nitrite

Treated water is tested for nitrate and nitrite concentrations on a quarterly basis in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. Nitrate and nitrite results are provided in Table 7. All results were below the Ontario Drinking Water Quality Standards.

Table 7: Nitrate and nitrite results						
	Niti	rate	Nitrite			
Sample Date	Result	ODWQS	Result	ODWQS		
	(mg/L)	(mg/L)	(mg/L)	(mg/L)		
16-Feb-2022	0.147	10	< 0.010	1		
16-May-2022	0.112		< 0.010			
16-Aug-2022	<0.020		<0.010	I		
14-Nov-2022	0.063		<0.010			

## 3.6 Trihalomethanes & Haloacetic Acids

Trihalomethanes (THMs) and haloacetic acids (HAAs) are sampled on a quarterly basis from a distribution system location that is likely to have an elevated potential for their formation, in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. Total THM and HAA results are provided in Table 8 and Table 9, respectively. Compliance with the provincial standards for trihalomethane and haloacetic acid concentrations is determined by calculating a running annual average (RAA). The 2022 RAA for THMs were below the Ontario Drinking Water Quality Standards. The 2022 RAA for HAAs exceeded the Ontario Drinking Water Quality Standards and is associated with AWQI #161078. Refer to the *Compliance* section of this report for more details.

Table 8: Total THM results		Table 9: Total HAA results		
Sample Date	Result (µg/L)	Sample Date Result (µg/L)		
16-Feb-2022	61.6	16-Feb-2022 66.3		
16-May-2022	59.0	16-May-2022 71.8		
16-Aug-2022	86.2	16-Aug-2022 110		
14-Nov-2022	60.5	14-Nov-2022 84.6		
		05-Dec-2022 69.5		
Regulatory Average (RAA)	66.8	Regulatory Average (RAA) 81.3		
ODWQS (RAA)	100	ODWQS (RAA) 80		

# 3.7 Lead Sampling

Based upon favourable sampling results in the community, the BCMI DWS previously qualified for reduced lead sampling and ultimately became exempt from sampling at plumbing locations in accordance with Schedule 15.1 (Lead) of O. Reg. 170/03. Four (4) distribution system samples must now be collected every year and analyzed for pH and alkalinity. Additionally, these distribution system samples must be analyzed for lead in every third 12-month period after the plumbing sample exemption was activated. Table 10 summarizes the results of community lead sampling and related required tests.

Table 10: Distribution pH, alkalinity, and lead sampling results						
Sample Date	Distribution Sampling Location	рН	Alkalinity (mg/L)	Lead Result (µg/L)	Lead ODWQS (µg/L)	
05-Apr-2022	McMarmac Bleeder	7.40	46.2			
05-Apr-2022	Balmertown Waste Plant	7.50	49.6		10	
06-Sep-2022	50.6		10			
06-Sep-2022	McMarmac Bleeder	7.27	43.3			

1. Lead will next be tested in distribution samples during the Winter 2024 sampling period.



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## 3.8 Environmental Discharge Sampling

The *Municipal Drinking Water Licence* for the BCMI Drinking Water System requires additional sampling associated with discharges to the natural environment. Specifically, samples must be collected from settling tank effluent on a monthly basis and tested for the parameter total suspended solids (TSS). This effluent is discharged to Bruce Channel and originates from the onsite treatment of the wastewater produced during plant operation. The *Licence* also requires that the effluent discharged to the environment has an annual average TSS concentration below 25 mg/L. Table 11 summarizes 2022 environmental discharge sampling results.

Table 11: Environmental discharge sampling results summary						
Number of Samples	Minimum TSS Result (mg/L)	Maximum TSS Result (mg/L)	TSS Annual Average (mg/L)			
12 <3.0 34.8 11.1						



## 3.9 Inorganic & Organic Parameters

Most inorganic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 (Chemical sampling and testing) and 23 (Inorganic parameters) of O. Reg. 170/03. The inorganic parameters sodium and fluoride are sampled every five (5) years in treated water in accordance with Schedules 13 and 23 of O. Reg. 170/03. The most recent inorganic parameter sampling results are provided in Table 12. All results were below the associated Ontario Drinking Water Quality Standards.

Table 12: Inorganic parameter sampling results						
Parameter	Most Recent Sample Date	Units	Result	ODWQS		
Antimony	16-Aug-2022	µg/L	<0.60	6		
Arsenic	16-Aug-2022	µg/L	<1.0	10		
Barium	16-Aug-2022	µg/L	<10	1000		
Boron	16-Aug-2022	µg/L	<50	5000		
Cadmium	16-Aug-2022	µg/L	<0.10	5		
Chromium	16-Aug-2022	µg/L	<1.0	50		
Fluoride	15-Feb-2018	mg/L	0.028	1.5		
Mercury	16-Aug-2022	µg/L	<0.10	1		
Selenium	16-Aug-2022	µg/L	<1.0	50		
Sodium	16-Aug-2022	mg/L	25.2 <sup>1</sup>	20		
Uranium	16-Aug-2022	µg/L	<2.0	20		

 The parameter sodium is not considered a toxic element and is not associated with a Standard as prescribed in O. Reg. 169/03, although an exceedance of 20 mg/L requires reporting and corrective actions. The result in the table was reported as an Adverse Water Quality Incident. See the *Compliance* section of this report for more information. Organic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 (Chemical sampling and testing) and 24 (Organic parameters) of O. Reg. 170/03. These parameters include various organic acids, pesticides, herbicides, PCBs, volatile organics, and other chemicals. Sampling for all organic parameters was conducted on August 26, 2022, total PCBs was collected September 6, 2022, and results are provided in Table 13. All results were below the associated Ontario Drinking Water Quality Standards.

Table 13: Organic parameter sampling results							
Parameter	Result (µg/L)	ODWQS (µg/L)	Parameter	Result (µg/L)	ODWQS (µg/L)		
Alachlor	<0.10	5	Diuron	<1.0	150		
Atrazine & Metabolites	<0.20	5	Glyphosate	<5.0	280		
Azinphos-methyl	<0.10	20	Malathion	<0.10	190		
Benzene	<0.50	1	МСРА	<0.20	100		
Benzo(a)pyrene	<0.005	0.01	Metolachlor	<0.10	50		
Bromoxynil	<0.20	5	Metribuzin	<0.10	80		
Carbaryl	<0.20	90	Monochlorobenzene	<0.50	80		
Carbofuran	<0.20	90	Paraquat	<1.0	10		
Carbon Tetrachloride	<0.20	2	Pentachlorophenol	<0.50	60		
Chlorpyrifos	<0.10	90	Phorate	<0.10	2		
Diazinon	<0.10	20	Picloram	<0.20	190		
Dicamba	<0.20	120	Total PCBs	<0.035	3		
1,2-Dichlorobenzene	<0.50	200	Prometryne	<0.10	1		
1,4-Dichlorobenzene	<0.50	5	Simazine	<0.10	10		
1,2-Dichloroethane	<0.50	5	Terbufos	<0.20	1		
1,1-Dichloroethylene	<0.50	14	Tetrachloroethylene	<0.50	10		
Dichloromethane	<5.0	50	2,3,4,6-Tetrachlorophenol	<0.50	100		
2,4-Dichlorophenol	<0.30	900	Triallate	<0.10	230		
2,4-D	<0.20	100	Trichloroethylene	<0.50	5		
Diclofop-methyl	<0.20	9	2,4,6-Trichlorophenol	<0.50	5		
Dimethoate	<0.10	20	Trifluralin	<0.10	45		
Diquat	<1.0	70	Vinyl Chloride	<0.20	1		

# 4 Water Production

# 4.1 Overview

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Annual Report must include certain information for the purpose of enabling the Owner to assess the capability of the system to meet existing and planned uses. Specifically, this Report must include a summary of the quantities and flow rates of the water supplied during the reporting period, including monthly average and maximum daily flows. The Report must also include a comparison of flow monitoring results to the rated capacity and flow rates approved in the system's *Municipal Drinking Water Licence*.

# 4.2 Flow Monitoring Results

Throughout the reporting period the BCMI DWS operated within its rated capacity and supplied a total of 376,897 m<sup>3</sup> of treated water. On an average day in 2022, 1,033 m<sup>3</sup> of treated water was supplied to the communities of Balmertown, Cochenour & McKenzie Island, which represents 17% of the rated capacity of the Cochenour Water Treatment Plant (6,065 m<sup>3</sup>/day). The maximum daily flow in 2022 was 2,201 m<sup>3</sup>/day, which represents 36% of the rated capacity of the treatment facility. Flow monitoring results are summarized in Figure 1 and Table 14. The capacity assessments provided in the table compare the average and maximum daily treated water flows to the rated capacity of the treatment facility.



Table 14: 2022 water production summary							
Month	Total Volumes (m <sup>3</sup> )		Daily Flows (m <sup>3</sup> /day)		Capacity Assessments		
	Raw Water	Treated Water	Average - Treated	Maximum - Treated	Average - Treated	Maximum - Treated	
Jan	35,600	31,507	1,016	1,468	17%	24%	
Feb	35,069	29,213	1,043	1,300	17%	21%	
Mar	38,259	31,115	1,004	1,296	17%	21%	
Apr	36,758	31,620	1,054	2,201	17%	36%	
May	34,302	29,923	965	1,313	16%	22%	
Jun	33,446	28,979	966	1,210	16%	20%	
Jul	38,952	33,862	1,092	1,415	18%	23%	
Aug	38,414	33,035	1,066	1,363	18%	22%	
Sep	33,930	29,696	990	1,197	16%	20%	
Oct	37,072	32,166	1,038	1,436	17%	24%	
Nov	39,718	33,728	1,124	1,379	19%	23%	
Dec	37,140	32,053	1,034	1,192	17%	20%	
Total	438,660	376,897					
Average	36,555	31,408	1,033		17%		



Over the reporting period, 67% (252,813 m<sup>3</sup>) of the total amount of treated water produced was distributed to the community of Balmertown, with the remaining 33% (124,084 m<sup>3</sup>) being distributed to the communities of Cochenour and McKenzie Island. On an average day in 2022, 693 m<sup>3</sup> of treated water was supplied to Balmertown and 340 m<sup>3</sup> was supplied to Cochenour & McKenzie Island. Table 15 provides a summary of flow monitoring results organized by the respective water distribution systems.

Table 15: 2022 water production summary – results by water distribution system							
		Balmertown		Cochenour & McKenzie Island			
Month	Total Volume (m³)	Average Daily Flow (m <sup>3</sup> /day)	Proportion of Total (%)	Total Volume (m³)	Average Daily Flow (m <sup>3</sup> /day)	Proportion of Total (%)	
Jan	22,610	729	72%	8,897	287	28%	
Feb	20,797	743	71%	8,416	301	29%	
Mar	21,485	693	69%	9,630	311	31%	
Apr	19,715	657	62%	11,905	397	38%	
May	20,140	650	67%	9,783	316	33%	
Jun	19,607	654	68%	9,372	312	32%	
Jul	24,220	781	72%	9,642	311	28%	
Aug	23,387	754	71%	9,648	311	29%	
Sep	20,439	681	69%	9,257	309	31%	
Oct	20,503	661	64%	11,663	376	36%	
Nov	19,842	661	59%	13,886	463	41%	
Dec	20,068	647	63%	11,985	387	37%	
Total	252,813			124,084			
Average	21,068	693	67%	10,340	296	33%	

## 4.3 Recent Historical Flows

Table 16 summarizes recent historical flow monitoring results for the BCMI DWS. There was a moderate decrease in the volume treated water supplied in 2022 when compared to 2021, and flows have generally remained stable over the previous decade. Total annual volumes of treated water supplied in the near future may be expected to be between 300,000 m<sup>3</sup> and 450,000 m<sup>3</sup>, which represents approximately 14% to 20% of the rated capacity of the Cochenour Water Treatment Plant.

Table 16: Recent historical water production summary							
Year	Total Volumes (m <sup>3</sup> )		Daily Flows (m <sup>3</sup> /day)		Annual % Change		
	Raw Water	Treated Water	Average – Treated Water	Maximum – Treated Water	Raw Water	Treated Water	
2009	481,351	406,151	1,113	2,007	-13.8%	-9.3%	
2010	515,274	424,549	1,163	2,232	+7.0%	+4.5%	
2011	471,032	409,384	1,122	2,240	-8.6%	-3.6%	
2012	439,530	389,828	1,065	2,007	-6.7%	-4.8%	
2013	443,266	408,492	1,119	2,369	+0.8%	+4.8%	
2014	412,234	360,120	987	2,061	-7.0%	-11.8%	
2015	439,868	390,982	1,071	1,878	+6.7%	+8.6%	
2016	419,949	337,245	921	1,557	-4.5%	-13.7%	
2017	436,670	341,391	935	2,015	+4.0%	+1.2%	
2018	425,326	358,995	984	1,947	-2.6%	+5.2%	
2019	422,149	363,215	995	1,874	-0.7%	+1.2%	
2020	473,891	386,712	1,057	2,009	+12.3%	+6.5%	
2021	477,708	419,903	1,150	2,213	+0.8%	+8.6%	
2022	438,660	376,897	1,033	2,201	-8.2%	-10.2%	

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# 5 Compliance

# 5.1 Overview

Northern Waterworks Inc. and the Municipality of Red Lake employ an operational strategy that is committed to achieving the following goals:

- Providing a safe and reliable supply of drinking water to the communities of Balmertown, Cochenour & McKenzie Island;
- Meeting or exceeding all applicable legislative and regulatory requirements; and,
- Maintaining and continually improving the operation and maintenance of the system.

The following sections will summarize incidents of adverse water quality and regulatory noncompliance that occurred during the reporting period. NWI is committed to employing timely and effective corrective actions to prevent the recurrence of identified incidents of adverse water quality and noncompliance.

# 5.3 Regulatory Compliance

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Report must list any requirements of the *Act*, the regulations, the system's approval, drinking water works permit, municipal drinking water licence, and any orders applicable to the system that were not met at any time during the period covered by the report (i.e., an incident of regulatory noncompliance). Additionally, this Report must specify the duration of the failure and the measures that were taken to correct the failure.

The most recent inspection by Ontario's Ministry of the Environment, Conservation and Parks was conducted on August 10, 2022. The final inspection rating was 93.37%, and four (4) incidents of noncompliance were identified. Information concerning the incidents is provided below.

# Noncompliance item no. 1

The requirement for treatment equipment to be operated in a manner that achieved the design capabilities required under O. Reg. 170/03 or a DWWP and/or MDWL issued under Part V of the SDWA at all times that water was being supplied to consumers was not met in one instance. The Procedure for Disinfection of Drinking Water in Ontario states that in order to be considered conventional filtration and to meet the log removal credits, the filtration process must "use a chemical coagulant at all times when the treatment plant is in operation". If a chemical coagulant is not used for a period of time while the filters are in production and that

water is directed to the next stage of treatment (e.g. to the clear well for chlorination), it is deemed to be improper disinfection.

The drinking water inspector verified that primary disinfection was met, apart from the following loss of chemical coagulant event. On June 27, 2022, at approximately 21:00, an operator was called to the Cochenour water treatment plant in response to a coagulant alarm. The operator troubleshooted the issues and restored chemical coagulation. Throughout the response it was determined that over a period of approximately 13 minutes the water treatment plant was in production, directing water to the next stage of treatment, without dosing chemical coagulant. Approximately 29 m<sup>3</sup> of raw water was produced during this time, which was ultimately directed to the clear well. While coagulant was not dosed to the water coming into the flocculation tank during this period, a concentration of coagulant would still exist in the tank, meaning the overall concentration of coagulation would be decreased, rather than entirely absent. There were no turbidity issues following this event.

Northern Waterworks shall continue to ensure that a chemical coagulant is added upstream of the treatment trains at all times while water is being directed to the next stage of treatment. In addition, Northern Waterworks provided training to their operators on October 24, 2022, on their internal Chemical Feed System Failure procedure, as well as the Adverse Test Results and Observations contingency plans. Issues pertaining to the lack of reporting of this event are outlined under non-compliance 4 of this report.

#### • Noncompliance item no. 2

Operators responded to an alarm call out at the Balmertown RPS and upon arrival noticed another alarm that had been active for 8 hours but had not called out an operator. In accordance with O. Reg. 170/03, all continuous monitoring equipment utilized for sampling and testing must be equipped with alarms or shut-off mechanisms that satisfy the standards in Schedule 6. The Cochenour water treatment plant and the Balmertown RPS are both set to alarm and call an operator in the event of a chlorine residual falling below 0.80mg/L or above 4.00mg/L.

On May 11, 2022, an operator was called to the Balmertown RPS for fluctuating pressure in the distribution system. Upon arrival the operator noticed that a low chlorine alarm had been triggered approximately 8 hours ago but failed to call out an operator. The auto-dialler was found to be locked out, and that an operator had failed to test the auto-dialler system during operational rounds that day. Typically, operators perform the daily task of testing the alarms at each facility, but it is not consistently documented.

As a corrective action, Northern Waterworks has ensured that the routine operational procedure has been updated to indicate that testing the auto-dialler system and alarm

function is a mandatory daily task. Additionally, the daily operational spreadsheet has been updated to include a field for operators to record that these checks have been completed.

## • Noncompliance item no. 3

Operators that responded to the loss of chemical coagulation alarm (see noncompliance item no.1) failed to follow written procedures pertaining to that emergency event. The Municipal Drinking Water Licence, Schedule B, Condition 16.4 states: "All of the of the procedures included or referenced within the operations and maintenance manual must be implemented.". The Chemical Feed System Failure emergency response procedure that was developed by Northern Waterworks states in Step 1B that "The following events associated with chemical feed system failures would be immediately reportable as an AWQI: a) A failure to use a chemical coagulant (alum or SternPAC) at all times when the plant is in operation (reportable under Schedule 16-4., "Duty to report other observations")".

On June 27<sup>th</sup>, 2022, when the operator responded to the Cochenour water treatment facility for the loss of coagulant alarm, they failed to immediately report the event as an Adverse Water Quality Incident, as per the procedure. While the operator resolved the issue and restored coagulation, they did not satisfy the requirement in the MDWL to implement all procedures.

Operators were familiarized and trained on the implementation of the Emergency Response Procedure: Chemical Feed System Failure. Confirmation of the training, with a list of operators in attendance, was forwarded to the water inspector.

## • Noncompliance item no. 4

When operators failed to report the loss of coagulant, the required notifications of Adverse Water Quality Incidents were not immediately reported per O. Reg. 170/03, Schedule 16, sections 16-4 and 16-6. There is a duty to report observations immediately to the ministry, medical officer of health and the owner of the system when water that has been directed to users of the system has not been disinfected in accordance with the Ministry's procedure for Disinfection of Drinking Water in Ontario. The Procedure for Disinfection of Drinking Water in Ontario states that in order to be considered conventional filtration and to meet the log removal credits, the filtration process must "use a chemical coagulant at all times when the treatment plant is in operation".

On June 27<sup>th</sup>, 2022, when the operator responded to the Cochenour water treatment facility for the loss of coagulant alarm, they failed to immediately report the event as an Adverse Water Quality Incident to the ministry, the medical officer of health or to the system owner.

The failure to report the observation of improper disinfection has been forwarded to the MECP's Environmental Investigation and Enforcement Branch for follow up. Northern Waterworks shall ensure that for all future observations of improper disinfection an immediate report shall be made in accordance with O. Reg. 170/03. Additionally, Northern Waterworks has applied to the ministry for relief from reporting the loss of coagulation of a short duration to accommodate for maintenance, minor process upsets and troubleshooting emergency events.



#### 5.2 Adverse Water Quality Incidents

In accordance with section 11 (Annual Reports) of O. Reg. 170/03, this Report must summarize any reports made to the Ministry under subsection 18(1) (Duty to report adverse test results) of *the Act* or section 16-4 (Duty to report other observations) of Schedule 16 of O. Reg. 170/03. Additionally, this Report must describe any corrective actions taken under Schedule 17 of O. Reg. 170/03 during the period covered by the report. The seven (7) adverse water quality incidents that occurred during the reporting period are summarized below.

#### AWQI No. 158159 (April 8, 2022)

As per Ontario's *Watermain Disinfection Procedure*, an emergency water distribution system repair on McMarmac Road was classified as a Category 2 repair and resulted in a localized loss of pressure.

Corrective actions included completing the repair, restoring pressure, issuing a localized and precautionary Boil Water Advisory, and collecting drinking-water samples for microbiological testing. The samples tested absent for E. coli and total coliform parameters and the Boil Water Advisory was subsequently rescinded April 21, 2022.

#### AWQI No. 158259 (April 26, 2022)

On April 26, 2022, a watermain break was evident. A precautionary Adverse Water Quality Incident was reported, and a Boil Water Advisory was issued, prior to discovering that the break occurred on a private service in the trailer park. The owner was advised to repair the break and following repairs Northern Waterworks flushed the main line and collected microbiological samples. When the sample tested absent for microbiological parameters the BWA was rescinded May 3, 2022.

#### AWQI No. 158880 (June 27, 2022)

A sustained loss of pressure in the distribution system occurred due to an interruption in the power supply. The power failure caused faults to the high lift pumps and as a result the Balmertown Reservoir Pumping Station (RPS), as well as the Cochenour McKenzie Island distribution system lost pressure. The municipality issued a Boil Water Advisory to the effected system users.

In response to this event, Northern Waterworks collected two sets of microbiological samples (one in each distribution system), and the Boil Water Advisory was rescinded upon the receipt of sample results absent of E. coli and total coliform parameters.

#### AWQI No. 159115 (July 12, 2022)

A sustained loss of pressure in the distribution system occurred due to an interruption in the power supply. The power failure caused faults to the high lift pumps and as a result the Balmertown Reservoir Pumping Station (RPS), as well as the Cochenour McKenzie Island distribution system lost pressure. The municipality issued a Boil Water Advisory to the effected system users.

In response to this event, Northern Waterworks collected two sets of microbiological samples (one in each distribution system), and the Boil Water Advisory was rescinded upon the receipt of sample results absent of E. coli and total coliform parameters.

#### AWQI No. 159692 (August 24, 2022)

Northern Waterworks received notification from the lab that a sample had resulted in a high sodium level. While sodium is not considered a toxic element and is not associated with a Standard as prescribed in O. Reg. 169/03, an exceedance of 20 mg/L requires reporting and corrective actions.

The Northwestern Health Unit has put into place a high sodium advisory for the Balmertown, Cochenour, McKenzie Island community. Additionally, Northern Waterworks resampled and tested for sodium on September 15, 2022, with a result of 20.0mg/L, which does not exceed the limit.

#### AWQI No. 160906 (December 6, 2022)

Operators were notified of a coagulant low flow alarm, and immediately reported to the ministry, the medical officer of health, and the system owners. The electrical connection was corroded and gave a false signal, which triggered an alarm, and the treatment units were shut down. Therefore, water was not produced, or directed to the next stage of treatment and no adverse result was observed. Operators repaired the electrical and restarted water production. No other corrective actions were prescribed by the health unit.

#### AWQI No. 161078 (January 1, 2023)

Haloacetic acids (HAAs) are sampled on a quarterly basis from a location that is likely to have an elevated potential for their formation, in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. HAAs form when the chlorine used to disinfect the water reacts with naturally occurring organic material in the water. Compliance with the provincial standards for haloacetic acid concentrations is determined by calculating a running annual average (RAA). The 2022 RAA for HAAs exceeded the Ontario Drinking Water Quality Standards. In the fourth (4) quarter of the year, HAAs were resampled, which brought the running annual average down, but the result still exceeded the standard of 80  $\mu$ g/L. Northern Waterworks has started sampling for Haloacetic acids monthly, as opposed to quarterly, to monitor the situation, in addition to maintaining a residual of chlorine in the distribution system that maintains disinfection but does not promote HAA formation.