# **Annual Report** Red Lake 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 Annual 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 Red Lake 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:	Red Lake Drinking Water System
DWS Number:	210000265
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>Red Lake Water Treatment Plant</li><li>Red Lake water distribution system and standpipe</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 Skookum Bay (Red Lake) to underground reservoirs located at the Red Lake Water Treatment Plant. Pumps then transfer water from the reservoirs directly to the treatment units. Aluminum sulphate (coagulant) and sodium carbonate solution (pH/alkalinity adjustment) are injected and rapidly mixed into the raw water immediately upstream from the two package treatment units, which each include a four-chambered flocculation basin, clarifier and filter.

To promote floc formation water is gently mixed as it passes through the flocculation basins. Polymer (flocculant) is also added to the water at this stage of treatment to form larger and more stable floc aggregates. Water then enters the clarifier where its velocity is reduced to allow for the separation and settling of floc. Supernatant overflows into effluent launders and is directed to the filter unit. Settled floc is periodically 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 on a layer of support gravel. 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.

Primary disinfection is achieved as disinfectant mixes with the water in the reservoir. Treated water is then delivered from the reservoir to the community standpipe and water distribution system using pumps located at the treatment facility. The standpipe is used to regulate system pressure and to provide a reserve volume of water for emergency situations. Secondary disinfection requirements in the water distribution system 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			
Replace	Low lift pump wet ends	\$36,332			
Inventory	Transfer Switch	\$18,000			
Maintenance	New Hydrant Installation	\$11,000			
Maintenance/Repairs	SCADA PLC programming and upgrades	\$9,000			
New Equipment	Portable generator	\$4,200			
Replace/Upgrade	Digital chart recorder	\$3,290			
Upgrade/Repair	Concrete loading dock and ramp	\$2,400			
Maintenance	Flow meter calibration verifications	\$1,500			
Maintenance	Lighting	\$1,200			
Maintenance	Generator tri-annual load testing and servicing	\$1,066			
Inventory	Assorted tools	\$1,000			



# 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 260 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 2	0 to 387				
Treated Water	52	absent	absent	51	0 to 1		
Distribution	156	absent	154 absent *2 present	49	0 to 14		
Distribution (nonroutine)	6	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.

\* The presence of Total coliforms was detected in routine samples. These two (2) samples resulted in Adverse Water Quality Incidents. Refer to the compliance section of this report for more information.

### 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. In accordance with the system's *Municipal Drinking Water Licence*, additional parameters that must be monitored include treated water pH and alkalinity. 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.

Table 5: Results summary for operational parameters								
Parameter (Sample Type)	Number of Samples	Units	Min. Result	Max. Result	Annual Avg.	Adverse Result <sup>1</sup>		
Turbidity (Raw Water)	62	NTU	0.25	1.72	0.87	n/a		
Turbidity (Filter 1)	Continuous	NTU	0.040	>2.01	0.052	>1.0		
Turbidity (Filter 2)	Continuous	NTU	0.041	>2.01	0.066	>1.0		
Turbidity (Treated)	365	NTU	0.035	0.20	0.062	n/a		
pH (Treated)	365		6.66	8.80	7.76	n/a		
Alkalinity (Treated)	257	mg/L	31.5	65.0	51.9	n/a		
Aluminum Residual (Treated)	220	mg/L	0.018	0.100	0.048	n/a		
FCR <sup>2</sup> (Treated) <sup>3</sup>	Continuous	mg/L	0.46	2.64	1.96	n/a		
FCR <sup>2</sup> (Distribution) <sup>4</sup>	450+	mg/L	0.70	2.11	1.29	<0.05		

1. Adverse results for filtrate turbidity are prescribed within Schedule 16 of O. Reg. 170/03. There are additional factors not included in the table that are necessary to determine whether a result is adverse, such as the duration of the result.

- 2. FCR = free chlorine residual.
- 3. 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*.
- 4. Free chlorine residuals are tested at various locations in the distribution system, 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. One (1) AWQI pertaining to conventional filtration performance occurred during the reporting period, refer to the compliance section of this report for more information.

Table 6: Filtration performance summary						
Filter	Minimum Result	Maximum Result	Adverse Result			
Filter 1	99.9%	100%	<95%			
Filter 2	99.8%	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 (mg/L)	ODWQS (mg/L)	Result (mg/L)	ODWQS (mg/L)			
16-Feb-2022	0.088		< 0.010				
16-May-2022	0.091	10	< 0.010	1			
16-Aug-2022	0.027	ĨŬ	<0.010				
14-Nov-2022	0.074		< 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 running annual averages for THMs and HAAs were below the respective Ontario Drinking Water Quality Standards.

Table 8: Total THM results			Table 9: Total HAA results	
Sample Date	Result (µg/L)		Sample Date	Result (µg/L)
16-Feb-2022	65.5		16-Feb-2022	54.4
16-May-2022	78.7		16-May-2022	70
16-Aug-2022	105.0		16-Aug-2022	86.2
14-Nov-2022	79.1		14-Nov-2022	65.1
Regulatory Average (RAA)	82.1		Regulatory Average (RAA)	68.9
ODWQS (RAA)	100		ODWQS (RAA)	80

### 3.7 Lead Sampling

In 2011 and in accordance with Schedule 15.1 (Lead) of O. Reg. 170/03, a *Corrosion Control Plan* was required to be developed for the Red Lake Drinking Water System following unfavourable results associated with the community lead sampling program. Corrosion control measures were implemented at this time and involved maintaining treated water pH at a value of 7.8 +/- 0.2 units using a sodium carbonate chemical feed system. Corrosion control has been effective and has resulted in a 90% reduction in average lead levels and an 82% reduction in the 90th percentile lead concentration. The ODWQS exceedance rate has also been significantly reduced from 20.6% to 1.4% (i.e., 20.6% of plumbing samples collected prior to corrosion control exceeded the standard for lead in drinking-water), and there have been no lead exceedances in plumbing samples since 2011.

The system now adheres to the lead monitoring program outlined in its *Municipal Drinking Water Licence*, which requires the collection of distribution and plumbing samples on an annual basis. Table 10 summarizes the results of community lead sampling conducted in 2022. Distribution and plumbing samples were collected on September 6, 2022, and all results were below the Ontario Drinking Water Quality Standard for lead in drinking water.

Table 10: Lead sampling results summary								
Sample Type	No. of Sample Points	No. of Samples	Min. Result (µg/L)	Max. Result (µg/L)	ODWQS (µg/L)	No. of Sample Point Exceedances		
Distribution	2	2	1.7	5.6	10	0		
Plumbing <sup>1</sup>	12	24	<1.0	3.7 <sup>2</sup>	10	0		

- 1. In accordance with the sampling protocol outlined in Schedule 15.1 of O. Reg. 170/03, two samples are collected and analyzed for lead at each sample point for plumbing samples.
- 2. Only five (5) samples tested above the lower analytical detection limit for lead in drinking water.

#### 3.8 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 11. All results were below the associated Ontario Drinking Water Quality Standards.

Table 11: 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	0.021	1.5		
Mercury	16-Aug-2022	µg/L	<0.10	1		
Selenium	16-Aug-2022	µg/L	<1.0	50		
Sodium	15-Feb-2018	mg/L	24.3 <sup>1</sup>	20		
Uranium	16-Aug-2022	µg/L	<2.0	20		

1. 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 is associated with Adverse Water Quality Incident no. 138780, and a resample collected on February 26, 2018, yielded a sodium result of 23.2 mg/L.

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 16, 2022, and results are provided in Table 12. All results were below the associated Ontario Drinking Water Quality Standards.

Table 12: 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			

#### 3.9 Environmental Discharge Sampling

The *Municipal Drinking Water Licence* for the Red Lake 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 Red Lake and originates from the onsite treatment of the wastewater produced during plant operation (e.g., filter backwashing and clarifier solids removal). The *Licence* also requires that the effluent discharged to the natural environment has an annual average TSS concentration below 25 mg/L. Table 13 summarizes 2022 environmental discharge sampling results.

Table 13: Environmental discharge sampling results summary							
Number of Samples	Minimum TSS Result (mg/L)	Maximum TSS Result (mg/L)	TSS Annual Average (mg/L)				
12	5.9	59.0	24.0				



# 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 Red Lake Drinking Water System operated within its rated capacity and supplied a total of 401,942 m<sup>3</sup> of treated water. On an average day in 2022, 1,101 m<sup>3</sup> of treated water was supplied to the community, which represents 18% of the rated capacity of the Red Lake Water Treatment Plant (6,048 m<sup>3</sup>/day). The maximum daily flow in 2022 was 2,074 m<sup>3</sup>/day, which represents 34% 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	38,860	33,779	1,090	1,650	18%	27%		
Feb	40,464	35,617	1,272	1,705	21%	28%		
Mar	46,306	41,091	1,326	1,684	22%	28%		
Apr	39,022	34,530	1,151	1,944	19%	32%		
May	39,299	34,494	1,113	1,536	18%	25%		
Jun	39,905	34,622	1,154	2,074	19%	34%		
Jul	41,610	36,058	1,163	1,621	19%	27%		
Aug	36,637	32,440	1,046	1,378	17%	23%		
Sep	32,665	28,869	962	1,330	16%	22%		
Oct	32,813	29,172	941	1,271	16%	21%		
Nov	33,061	29,968	999	1,232	17%	20%		
Dec	35,030	31,302	1,010	1,542	17%	25%		
Total	455,672	401,942						
Average	37,973	33,495	1,101		18%			





#### 4.3 Recent Historical Flows

Table 15 summarizes recent historical flow monitoring results for the Red Lake Drinking Water System. There were slight increases in the volumes of source water withdrawn and 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 Red Lake Water Treatment Plant.

Table 15: 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	Maximum – Treated	Raw Water	Treated Water	
2008	633,689	543,403	1,485	3,567	-18.3%	-14.2%	
2009	548,288	472,192	1,294	3,157	-13.5%	-13.1%	
2010	477,015	369,761	1,013	2,465	-13.0%	-21.7%	
2011	429,785	295,498	810	2,112	-9.9%	-20.1%	
2012	355,397	297,396	813	1,654	-17.3%	+0.6%	
2013	350,834	304,087	833	1,567	-1.3%	+2.2%	
2014	389,092	331,219	907	1,645	+10.9%	+8.9%	
2015	413,969	357,230	979	1,886	+6.4%	+7.9%	
2016	396,239	345,746	945	2,231	-4.3%	-3.2%	
2017	381,516	334,669	917	1,700	-3.7%	-3.2%	
2018	439,388	379,157	1,039	2,290	+15.2%	+13.3%	
2019	410,962	358,997	984	1,917	-6.5%	-5.3%	
2020	451,078	402,134	1,099	2,036	+9.8%	+12.0%	
2021	439,893	394,204	1,080	1,943	-2.5%	-2.0%	
2022	455,672	401,942	1101	2074	+3.6%	+2.0%	

# 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 community of Red Lake;
- 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.

### 5.2 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. Three (3) adverse water quality incidents were reported in 2022 and are summarized below.

#### • AWQI No. 158708 (June 13, 2022) & AWQI No. 158919 (June 27, 2022)

Two (2) separate incidents of adverse water quality were reported to the ministry after routine microbiological samples, collected June 13, 2022, at the Super 8 Hotel, and another on June 27, 2022, at the Red Lake water tower, indicated the presence of Total Coliforms. Any presence of Total Coliforms constitutes an exceedance.

Corrective action was performed for each event in accordance with Schedule 18 of O. Reg. 170/03 and included resampling at the location that indicated the presence of Total Coliforms, as well as at a location upstream, and downstream of the initial sample point. Resampled results came back absent of microbiological parameters.

#### • AWQI No. 158177 (April 11, 2022)

Adverse results for filtrate turbidity are prescribed within Schedule 16 of O. Reg. 170/03. While filters are in production, and directing water to the next stage of treatment, filtrate turbidity must be continually monitored and must be less than 0.3 NTU in at least 95% of the measurements in each calendar month. In addition, filtrate turbidity cannot exceed 1.0 NTU for more than 15 minutes.

Polymer is a coagulant aid and is added upstream of the filter units. On April 11, 2022, it was discovered that the polymer line had come apart and had stopped dosing into the floc tank preceding filter 2. Filter #2 turbidity went over 1.0 NTU while water was being directed to the next stage of treatment. Turbidity exceeded 1.0 NTU between 6:10:21 PM and 6:11:25 PM, and again between 6:26:11 PM and 6:27:29 PM. The first reading taken 15 minutes after the reading at 6:11:25 PM exceeded 1.0 NTU, and the event was therefore reportable. The polymer line was repaired, and no further corrective action was required.

### 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 July 7, 2022. The final inspection rating was 92.94%, and two (2) incidents of regulatory noncompliance were identified. Information concerning the duration of failures and the measures taken to address those failures is provided below.

#### Noncompliance item no. 1

Operators were not examining continuous monitoring test results, or they were not examining the results within 72 hours of the test. O. Reg. 170/03, Schedule 6, section 6-5(1)3 requires that continuous filter effluent turbidity and treated water chlorine data be examined within 72 hours after the tests are conducted. Daily, operators document in the logbook that they reviewed the filter effluent turbidity and post clearwell chlorine trending for the previous day; however, on several occasions, anomalies in the trending were not documented; therefore, it cannot be confirmed if the continuous data was examined within 72 hours.

On March 31, 2022, a loss of SCADA trending occurred from 09:45 to 17:00. While there was backup trending available for the duration of the data loss, the logbooks did not reference that there was missing data, or that operators reviewed the back up data.

On June 16, 2022, a low chlorine alarm was triggered to do a loss of power in the Red Lake Drinking Water System. While the operator responded to the alarm, they did not document the response. When the data review was completed the next day, the operator did not include information of the low chlorine event or the cause of the alarm from the previous day. Therefore, it cannot be confirmed that monitoring data was reviewed adequately, as the intent of data review is to capture abnormalities and in trending.

As a corrective action the daily operational spreadsheets were amended to include fields that indicate if any data was missing from the SCADA trends. Further fields prompt operators to confirm the availability of backup trending for the missing data periods. Additionally, Northern Waterworks provided additional training to operators reviewing the requirements of trending and data review within 72 hours, as well as documenting abnormalities in the facility logbook.

#### Noncompliance item no. 2

All continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were not equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6.

On April 10, 2022, filter 2 turbidity exceeded the alarm set point of 0.6 NTU, however an alarm did not call out to an operator, but rather the high turbidity event was discovered the next day and was reported as an adverse water quality incident (see AWQI 158177 for more information). There was an 'alarm delay inhibit' feature that was not engaged, therefore failing to shut down the treatment process or call out an operator when the alarm setpoint was reached. Additionally, there was a 300 second delay on the alarm.

As a result of this event the alarm delay inhibit feature was engaged and the alarm delay was set to zero (0) seconds. This will shut down the filters and call an operator to respond immediately when turbidity reached 0.6 NTU. In addition, the facilities monthly maintenance procedures have been updated to include testing the functionality of alarms and verifying that there are no alarm delays for all regulatory alarm parameters.