

# 2016 Annual Report

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## Atikokan Drinking Water System

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Prepared by



for the Corporation  
of the Town of Atikokan

# Introduction

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 the Town Council on the operation of the system over the previous calendar year (January 1 to December 31, 2016).

Section 11 of O. Reg. 170/03 requires the development and adequate 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 Town 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.

## 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 following locations:

- (1) Atikokan Public Library
- (2) Town of Atikokan Website ([www.atikokan.ca](http://www.atikokan.ca))
- (3) NWI Website ([www.nwi.ca/publications](http://www.nwi.ca/publications))

In accordance with Schedule 22 of O. Reg. 170/03, this Annual Report must be given to the members of the Town Council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's *Safe Drinking Water Act* 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 O. Reg. 170/03.

System users and members of the Town Council are strongly encouraged to contact a representative of Northern Waterworks Incorporated (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](mailto:compliance@nwi.ca).

# ( System Overview )

The Atikokan Drinking Water System (DWS No. 220000950) must meet extensive treatment and testing requirements in order 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 approvals.

## System Description

The Atikokan Drinking Water System (DWS) is classified as a large municipal residential system, and it is composed of a raw water pumping station, the Atikokan Water Treatment Plant (WTP), and the Atikokan water distribution system. The system is owned by the Corporation of the Town of Atikokan and is operated and maintained by Northern Waterworks Incorporated. Potential pathogenic organisms are removed and inactivated by chemical coagulation, sand-ballasted flocculation, clarification, rapid sand filtration and free chlorine disinfection.

Pumps located at the raw water pumping station transfer source water from the Atikokan River and through a transmission line to the two proprietary Actiflo treatment units at the WTP, each of which includes a coagulation basin, injection basin, maturation basin and settling zone. Polyaluminum chloride (coagulant) is injected into the raw water immediately upstream from the coagulation basin. Water and coagulant are rapidly mixed in the coagulation basin and flow is directed to the injection basin, where microsand and polyacrylamide (polymer – a flocculant) are added to enhance the formation of robust flocs. Floc formation continues in the maturation basin before water is directed to the settling zone, where its velocity is reduced to allow for the separation and settling of floc. Supernatant then overflows into a launder and is directed to the filter units.

Any suspended particles that did not settle in the clarifier are removed by passing water through four dual media filters (each composed of anthracite and silica sand on a layer of support gravel). The filters are periodically cleaned by reversing the flow of water through the filter using pumps. Chlorine gas (disinfectant), sodium carbonate solution (pH adjustment), and hydrofluorosilicic acid (fluoridation) are added to the filtrate as it is directed from the filters to the treated water storage reservoir.

The reservoir at the Atikokan WTP uses a baffling system to allow the disinfectant to mix adequately with the water, and disinfected water is held in the reservoir for a sufficient amount of time to achieve primary disinfection. Treated water is then delivered from the reservoir to the distribution system by the use of pumps located at the WTP. Secondary disinfection requirements in the distribution system are achieved by the maintenance of a free chlorine residual.

## 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 (**Table 1**). All chemicals used in the treatment process are NSF/ANSI 60 certified for use in potable water, as required by system approvals.

**Table 1:** Water treatment chemicals used in 2016.

Treatment Chemical	Application
polyaluminum chlorine (SternPAC)	coagulant
silica dioxide (Actisand)	flocculant
polymer (Superfloc C-492)	flocculant
sodium carbonate (soda ash)	pH adjustment
hydrofluorosilicic acid	fluoridation
chlorine gas	disinfectant

## 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 2016 include:

- › The installation of a redundant low pressure high lift pump control system operating independently of the PLC at the Atikokan WTP;
- › the installation and PLC integration of a manually settable pressure switch on the distribution side of the high lift pumps at the Atikokan WTP;
- › the replacement of pump no. 1 at the raw water pumping station;
- › automation upgrades pertaining to raw water pump controls and duty routines;
- › automation upgrades to add parameters to the digital chart recorder and SCADA monitoring systems;
- › the replacement of an electric chain hoist in the high lift pumping room;
- › the purchase of two (2) spare level transmitters for the clear well;
- › the purchase of fifteen (15) spare solenoid valves (two different brands);
- › automation upgrades to integrate the filtrate chlorine residual analyzer and filtrate transfer pump with the PLC and SCADA systems;
- › the purchase of one (1) spare fluoride residual analyzer sensor, one (1) resistance thermometer, and one (1) reference electrode;
- › the purchase of various spare PLC parts deemed critical for the operation of the system;
- › the replacement and relocation of the two SCADA terminals and the installation of a second redundant network to allow both SCADA terminals to connect independently to the PLC;
- › an assessment of flow meter configuration and PLC scaling issues, complete with a report for future recommendations;
- › the purchase of various pipes and fittings for chemical feed systems;
- › the replacement of a laboratory pH meter;
- › the purchase and replacement of an inline turbidity analyzer an associated controller;

- > the purchase of a spare chlorine residual sensor;
- > the replacement of the vacuum switch for chlorinator no. 1;
- > repairs to high lift pump no. 1, including the replacement of the submersible pump end;
- > the purchase of eight (8) analog pressure gauges;
- > the purchase of a spare fluid end of a barrel pump for transferring fluorosilicic acid;
- > repairs to soda ash and fluoride room exhaust fan motors;
- > the replacement of the backwash pump air relief valves on both pumps and the check valve on pump no. 1;
- > the calibration of the decant tank level sensor;
- > the calibration verification of flow measuring devices; and,
- > various other upgrades and emergency repairs to automation systems at the Atikokan WTP.

# Water Quality

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 use technical water quality terms, some of which the reader may not be familiar with. It is recommended that the reader refer to the *Technical Support Document for Ontario Drinking Water Standards, Objectives, and Guidelines* available at the following website: <http://www.ontla.on.ca/library/repository/mon/14000/263450.pdf>. Within this document the reader will find information on provincial water quality standards, objectives and guidelines, rationale for monitoring, and a brief description of water quality parameters.

## 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, treated water fluoride residual, and the free chlorine residuals associated with primary and secondary disinfection. **Table 2** 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 2:** Results summary for operational parameters.

Parameter (Sample Type) <sup>1</sup>	Sample Method (Minimum Frequency)	Units	Min. Result	Max. Result	Annual Average	Adverse Result <sup>2</sup>
Turbidity (Raw Water)	Grab (4x weekly)	NTU	0.63	1.98	1.07	n/a
Turbidity (Filter 1)	Continuous	NTU	0.023	>2.0	0.070	>1.0
Turbidity (Filter 2)	Continuous	NTU	0.043	>2.0	0.078	>1.0
Turbidity (Filter 3)	Continuous	NTU	0.033	>2.0	0.057	>1.0
Turbidity (Filter 4)	Continuous	NTU	0.014	>2.0	0.059	>1.0
Turbidity (Treated)	Continuous	NTU	0.06	0.62	0.15	n/a
pH (Treated)	Grab (4x weekly)	---	6.57	7.70	7.02	n/a
FR (Treated)	Continuous	mg/L	0.43	0.83	0.62	1.5
FRC (Treated)	Continuous	mg/L	1.79	4.20	2.57	n/a
FRC (Distribution)	Grab (Daily)	mg/L	<0.05 <sup>3</sup>	1.84	1.18	<0.05

1. FR = fluoride residual; FRC = free residual chlorine.
2. Adverse results are prescribed within Schedule 16 of O. Reg. 170/03. There are additional factors not included in the table which are necessary to determine whether a result is adverse, such as the duration of the result and whether water is being directed to the next stage of the treatment process.
3. This result is associated with Adverse Water Quality Incident No. 129960. Refer to the *Compliance* section of this report for more information.

## Conventional Filtration Performance

In accordance with the *Procedure for Disinfection of Drinking Water in Ontario*, conventional filtration facilities must meet certain performance criteria in order to claim removal credits for *Cryptosporidium* oocysts, *Giardia* cysts and viruses. 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 3** 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.

**Table 3:** Filtration performance.

Filter	<0.30 NTU/95% Criterion	
	Monthly Min.	Monthly Max.
Filter 1	98.7% (March)	100%
Filter 2	98.2% (March)	100%
Filter 3	99.1% (March)	100%
Filter 4	99.1% (March)	100%

## Microbiological Parameters

Microbiological analyses are performed on source, treated, and distribution system water. 261 routine water samples were collected for microbiological analysis by an accredited laboratory in 2016, as required by Schedule 10 (Microbiological sampling and testing) of O. Reg. 170/03. These water 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 provided in **Table 4**. All results were below the associated Ontario Drinking Water Quality Standards.

**Table 4:** Microbiological sampling results.

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	<1 to 75	17 to >2420	---	---
Treated	52	absent	absent	52	0 to 2
Distribution	157	absent	absent/present <sup>2</sup>	52	0 to 4
Raw Water (Non-routine)	4	<1 to 15	248 to 727	---	---
Treated (Non-routine)	4	absent	absent	4	0
Distribution (Non-routine)	21	absent	absent	6	0 to 4

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 is considered an exceedance.
2. One (1) routine distribution sample collected on July 4, 2016, tested present for TC (AWQI No. 130087). Refer to the *Compliance* section of this report for more information.

## Nitrate and 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 5**. All results were below the Ontario Drinking Water Quality Standards.

## Trihalomethanes

Trihalomethanes (THMs) are required to be sampled on a quarterly basis from a distribution system location that is likely to have an elevated potential for THM formation, in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. Compliance with the provincial standard for trihalomethane concentrations is determined by calculating a running annual average (with a Maximum Acceptable Concentration of 0.100 mg/L or 100 µg/L). In 2016, the running annual average was 84.4 µg/L. Total THM results are summarized in **Table 6**.

## Lead Sampling

Based on favourable results of community lead sampling conducted in 2014 and 2015, the Atikokan DWS qualified for reduced lead sampling in accordance with Schedule 15.1 (Lead) of O.Reg. 170/03. Reduced sampling for lead will resume in the Winter 2017 sample period (i.e. December 15, 2017 to April 15, 2018).

## Environmental Discharge Sampling

The Municipal Drinking Water Licence for the Atikokan DWS requires additional sampling associated with environmental discharges. During normal operation, process wastewater is transferred directly to the wastewater collection system. In the event that conditioned process wastewater is discharged to the natural environment, composite samples must be collected and analyzed for total suspended solids (TSS). The results of environmental discharge sampling conducted in 2016 are provided in **Table 7**.

**Table 5:** Nitrate and nitrite results.

Sample Date	Nitrate Result (mg/L)	Nitrite Result (mg/L)	Nitrate + Nitrite (mg/L)
16-Feb-2016	0.058	<0.010	0.058
24-May-2016	0.022	<0.010	<0.040
23-Aug-2016	<0.020	<0.010	<0.040
15-Nov-2016	0.021	<0.010	<0.040
ODWQS	10	1	10

**Table 6:** Total THM results.

Sample Date	Result (µg/L)
16-Feb-2016	41.8
16-May-2016	70.4
23-Aug-2016	147
15-Nov-2016	78.4
Average	84.4
ODWQS (RAA)	100

**Table 7:** Environmental discharge results.

Sample Date	TSS Result (mg/L)
16-Mar-2016	43.2
26-Apr-2016	41.7
6-Jun-2016	10.9
22-Aug-2016	85
10-Oct-2016	32.9



## Inorganic & Organic Parameters

Inorganic and organic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 (Chemical sampling and testing), 23 (Inorganic parameters) and 24 (Organic parameters) of O. Reg. 170/03. Sodium is sampled every five (5) years in treated water in accordance with Schedules 13 and 23 of O. Reg. 170/03. Although grab samples may be analyzed, regulatory testing for fluoride is achieved through the use of continuous monitoring equipment, in accordance with Schedule 6 of O. Reg. 170/03. The most recent inorganic parameter sampling results are provided in **Table 8**. All results were below the associated Ontario Drinking Water Quality Standards.

**Table 8:** Inorganic sampling results.

Parameter	Sample Date	Units	Result	ODWQS
Antimony	15-Nov-2016	µg/L	<0.60	6
Arsenic	15-Nov-2016	µg/L	<1.0	25
Barium	15-Nov-2016	µg/L	<10	1000
Boron	15-Nov-2016	µg/L	<50	5000
Cadmium	15-Nov-2016	µg/L	<0.10	5
Chromium	15-Nov-2016	µg/L	<1.0	50
Fluoride	15-Nov-2012	mg/L	0.663	1.5
Mercury	15-Nov-2016	µg/L	<0.10	1
Selenium	15-Nov-2016	µg/L	<1.0	10
Sodium	15-Nov-2012	mg/L	10.2	20 <sup>1</sup>
Uranium	15-Nov-2016	µg/L	<2.0	20

1. This value for the parameter sodium is not a water quality standard as prescribed in O. Reg. 169/03, although an exceedance of this value is associated with reporting requirements and corrective actions.

Organic parameters include various acids, pesticides, herbicides, PCBs, volatile organics, and other organic chemicals. Organic parameter sampling results are provided in **Table 9**. Sampling for all organic parameters was conducted on November 15, 2016. All results were below the associated Ontario Drinking Water Quality Standards.

**Table 9:** 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 + N-dealkylated metabolites	<0.20	5	Glyphosate	<5.0	280
Azinphos-methyl	<0.10	20	Malathion	<0.10	190
Benzene	<0.50	1	2-Methyl-4-Chlorophenoxy-acetic acid (MCPA)	<0.20	100
Benzo(a)pyrene	<0.010	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	<0.50	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	Polychlorinated Biphenyls (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	30
Dichloromethane	<5.0	50	2,3,4,6-Tetrachlorophenol	<0.50	100
2,4 -Dichlorophenol	<0.30	900	Triallate	<0.10	230
2,4-Dichlorophenoxy acetic acid	<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

# Flow Monitoring

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.

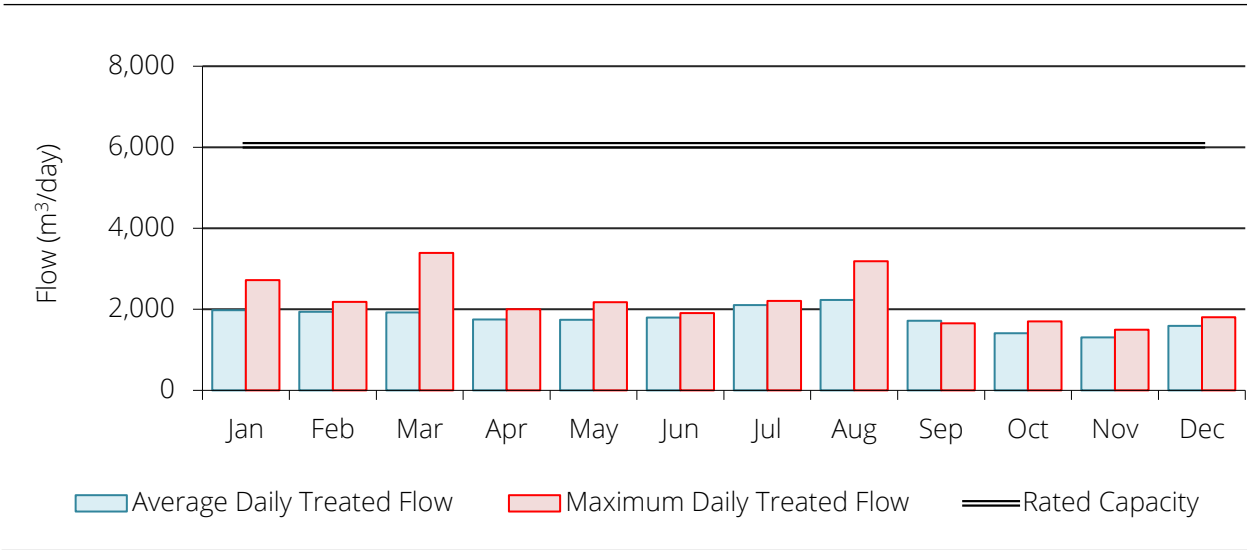
Throughout the reporting period, the Atikokan DWS operated within its rated capacity and supplied a total of 656,030 m<sup>3</sup> of treated water. On an average day in 2016, 1,792 m<sup>3</sup> of treated water was supplied to the community of Atikokan. The average daily flow in 2016 represents 30% of the rated capacity of the Atikokan WTP (6,048 m<sup>3</sup>/day). The maximum daily flow in 2016 was 3,389 m<sup>3</sup>/day, which represents 56% of the rated capacity of the Atikokan WTP. 2016 flow monitoring results are summarized in **Table 10** and **Figure 1**.

**Table 10:** 2016 total volumes, daily flows, and capacity assessments.

Month	Total Volumes (m <sup>3</sup> )		Daily Flows (m <sup>3</sup> /day)		Capacity Assessments <sup>1</sup>	
	Raw Water	Treated Water	Average - Treated Water	Maximum - Treated Water	Average - Treated Water	Maximum - Treated Water
Jan	68,820	61,277	1,977	2,722	33%	45%
Feb	66,120	56,183	1,937	2,185	32%	36%
Mar	77,420	59,535	1,920	3,389	32%	56%
Apr	68,360	52,495	1,750	2,001	29%	33%
May	70,450	54,066	1,744	2,173	29%	36%
Jun	64,360	53,943	1,798	1,910	30%	32%
Jul	66,270	65,325	2,107	2,209	35%	37%
Aug	73,320	69,222	2,233	3,185	37%	53%
Sep	54,730	51,515	1,717	1,656	28%	27%
Oct	54,190	43,792	1,413	1,702	23%	28%
Nov	48,300	39,218	1,307	1,498	22%	25%
Dec	59,010	49,458	1,595	1,803	26%	30%
Total	771,350	656,030	---	---	---	---
Avg.	64,279	54,669	1,792	---	30%	---

1. Capacity assessments compare average and maximum daily treated water flows to the rated capacity of the treatment facility (6,048 m<sup>3</sup>/day), as provided within the Municipal Drinking Water Licence for the Atikokan DWS.

**Figure 1:** 2016 average and maximum daily treated water flows.



**Table 11** summarizes annual flow monitoring results for the Atikokan DWS. There were significant reductions in the amounts of source water withdrawn and treated water supplied in 2016 when compared to 2015. Total annual volumes of treated water supplied in the near future may be expected to be between 600,000 m<sup>3</sup> and 825,000 m<sup>3</sup>, which represents approximately 27% to 37% of the rated capacity of the Atikokan WTP.

**Table 11:** Recent historical flow monitoring results.

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
2011	762,600	615,934	1,687	3,889	-4.4%	-0.6%
2012	747,243	642,622	1,756	3,082	-2.0%	+4.3%
2013	798,360	639,019	1,751	5,530	+6.8%	-0.6%
2014	943,794	789,592	2,163	3,770	+18.2%	+23.6%
2015	1,029,030	825,522	2,262	4,124	+9.0%	+4.6%
2016	771,350	656,030	1,792	3,389	-25.0%	-20.5%

# Compliance

Northern Waterworks Incorporated and the Town of Atikokan employ an operational strategy that is committed to achieving the following goals:

- 1) Providing a safe and reliable supply of drinking water to the community of Atikokan;
- 2) Meeting or exceeding all applicable legislative and regulatory requirements;
- 3) Maintaining and continually improving the operation and maintenance of the system; and,
- 4) Maintaining and operating the Atikokan Drinking Water System in a responsible manner in accordance with documented quality management system policies and procedures.

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

## Regulatory Noncompliance

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. **Table 12** provides a summary of recent historical inspection results conducted by Ontario’s Ministry of the Environment and Climate Change (MOECC). Both the amount and magnitude of incidents of regulatory non-compliance have been decreasing over the previous four inspection cycles.

**Table 12:** Inspection results.

Inspection Date	# of Regulatory Noncompliance Incidents
Feb-2016	6
Feb-2015	8
Jan-2014	10
Mar-2013	11
Nov-2011	18
Feb-2011	15
Mar-2010	23
Mar-2009	12
Jan-2008	11

Six (6) incidents of regulatory noncompliance were identified during the most recent inspection by Ontario’s MOECC initiated on February 24, 2016. Information concerning the duration of failures and the measures taken to address those failures is provided for each item of non-compliance. The details of the noncompliance items and the actions required may utilize some or all of the original wording contained within the inspection report. Updates concerning the status of actions required have been provided where appropriate.

- **There was not sufficient monitoring of flow as required by the Permit and Licence or Approval issued under Part V or the SDWA.**

The Municipal Drinking Water Licence requires that continuous flow measurement and recording shall be undertaken for the flow rate and daily volume of water that flows into the treatment subsystem. In the fall of 2015, problems developed with the distribution flow meter. On November 21, 2015, a leak developed from the flow meter gasket which resulted in a low pressure event. The flange was tightened stopping the leak. However, later that day the distribution flow meter stopped working.

The flow meter was replaced on December 23, 2015, using the spare meter that was available at the water treatment plant. Readings from the instrument were off initially by approximately 5 L/sec from the flow meter to the SCADA system. On January 19, 2016, treated (finished) water flow monitoring was restored at the Atikokan Water Treatment Plant. Treated water flow measurements of flow rate and daily volume are not available for the period of November 21, 2015, to January 19, 2016. The treated water flow monitoring issue has since been resolved. No further actions are required.

- **Records did not indicate that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a Permit, Licence or Approval issued under Part V of the SDWA at all times that water was being supplied to consumers.**

Since the previous inspection in February 2015 there have been two incidents that resulted in the treatment process not meeting the requirements of Schedule 1 of Ontario Regulation 170/03, Drinking Water Systems Regulation.

On October 30, 2015, gas chlorine was not added to the partially treated water as it entered the clearwell. No alarms were associated with the failure of the chlorination system. The problem was detected when low residuals were measured by the analyzer monitoring the free chlorine residual in the water leaving the clearwell and entering the distribution system. The operator reviewed the operation of the chlorination system and found that the header valve on chlorine cylinder #1 was not open enough to allow for the flow of the chlorine gas. The operator assessed that CT had been met and that residuals had not dropped to the point requiring additional sampling in the distribution system. The Town of Atikokan has since installed and commissioned a chlorine residual analyzer that will monitor the amount of chlorine prior to the clearwell. This analyzer should assist operators in preventing times when the treatment process operates without the chlorination system delivering chlorine gas. No further actions are required.

A mechanical failure of a PVC fitting on the SternPAC system resulted in the loss of coagulant on April 20, 2015. The leak occurred after the flow sensor and was not detected by the operator until the treatment process was upset without the addition of the coagulant. The incident was reported, AWQI 123292, and the equipment was repaired. The loss of coagulant was resolved at the time of the incident. No further actions are required.

- **Records did not confirm that the water treatment equipment which provides chlorination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free.**

Due to the condition of the distribution system, low chlorine residuals in sections of the distribution system, particularly unlined cast iron mains, have been a chronic problem. The old mains combined with low usage or dead end areas result in low free chlorine residuals. Despite the actions that have been taken to date, free chlorine residuals less than 0.05 mg/L have been detected in the distribution system.

A sample collected on August 17, 2015, at a Grenville Ave. residence was found to contain 0.04 mg/L of free chlorine. Reporting and corrective actions were followed as required by the Drinking Water Systems Regulation. On September 29, 2015, a bleeder was installed in this area of town to promote the maintenance of higher chlorine residuals.

The Town of Atikokan and Northern Waterworks Inc. have been working to address low chlorine residuals with both short term and long term solutions. Reports of coloured or dirty water must continue to be investigated in a timely manner. The Town of Atikokan recognizes the need to replace sections of watermains. This would help to resolve low chlorine residuals in the distribution system. It is hoped that funds become available for this work.

- **The process wastewater discharge did not comply with the requirements established in the Permit and Licence or Approval issued under Part V of the SDWA.**

Some of the samples collected for TSS analysis were composite samples as required by the Municipal Drinking Water Licence. However, some of the samples were single grab samples. For example, the sample collected on June 15, 2015, was a single grab collected at 2:40.

The operating authority reviewed the decant tank sampling requirements with staff following the identification of this non-compliance. A reminder to operators has been added to the "White Board" in the control room. Following a review of the draft inspection report NWI identified that a SOP for sampling of the decant tank overflows is available. Additional training as a means of ensuring compliance was provided to operators.

A review of trending shows that from June 15th at 3:21 am to June 18th at 7:25 am the Decant tank level was over 100% on numerous occasions. As discussed in the previous inspection report, there is a history of problems with the high level alarm for the contact tank. Although the alarm works, there are problems with the accuracy of the flow transmitter. Information provided indicates that the level transmitter needs to be calibrated or replaced. The decant tank level indicator was calibrated in July 2016 and no further actions are required.

- **The operator-in-charge did not ensure that records were maintained of all adjustments made to the processes within his or her responsibility.**

The previous inspection had found that inadequate information was being recorded when sections of the distribution system are being maintained or repaired. When work was being conducted, changes to valve positions were not being recorded. This had resulted in valves being left in the wrong position once the work had been completed.

In response to an "action required" following the last inspection the Town of Atikokan created a standard operating procedure, a form to be used to record valve operations and then requires operators to record this information in the log book at the Public Works garage. The current inspection finds that although the form was created for recording valve positions, the form was only used for a brief period of time and then ceased to be done.

By June 3, 2016, the Public Works Foreman for the Town of Atikokan was to provide to the undersigned inspector a copy of the SOP related to the recording of valves and a copy of the records for the months of April and May 2016. The SOP and a copy of the records were delivered to the inspector on June 2, 2016. No further actions are required.

- **In instances where written notice of issue resolution was required by regulation, the notice was not provided as per O. Reg. 170/03 16-9.**

A Notice of Issue Resolution was not received for the low chlorine residual that was measured on August 17, 2015. The OIC reports that there was some confusion as to when the notice should be submitted. Residuals at the location recovered to acceptable levels following flushing but only for a short while before dropping again. A bleeder line was installed at the end of Vincienne Ave. on September 29, 2015.

Although the operators plan to further monitor the chlorine residuals and the effectiveness of the bleeder line in this area, the undersigned inspector finds that this AWQI should have been closed once the chlorine residuals in the area had been restored and the bleeder line installed. A copy of the Notice of Issue Resolution was submitted on April 1, 2016. No further action is required.



## 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.

**Table 13:** AWQI summary.

Year	# of AWQIs
2016	13
2015	24
2014	30
2013	17

**Table 13** provides a summary of recent historical adverse water quality incidents for the Atikokan DWS. The number of AWQIs in 2017 is expected to be less than in 2016 following the discontinuation of AWQI reporting for the majority of water main break repair events. There were thirteen (13) adverse water quality incidents during the report period for the Atikokan DWS, as summarized below:

- **AWQI No. 128543 (March 1, 2016)**

A localized loss of pressure occurred due to unplanned distribution system repairs affecting 182 to 195 Pine Crescent. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action included completing repairs, restoring pressure, and restoring disinfection. The Notice of Issue Resolution was provided on March 7, 2016.

- **AWQI No. 129780 (June 15, 2016)**

A localized loss of pressure occurred due to the replacement of a faulty curb stop affecting 226 White Street and the Arena. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action included completing the replacement, restoring pressure, and restoring disinfection. The Notice of Issue Resolution was provided on July 4, 2016.

- **AWQI No. 129960 (June 27, 2016)**

An adverse result occurred such that the free chlorine residual in a distribution sample collected from a location on Grenville Avenue was less than 0.05 mg/L. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action was performed in accordance with Schedule 17 of O. Reg. 170/03, and included flushing mains, restoring the disinfectant residual at the affected location, and continuing to monitor secondary disinfection in the area. The Notice of Issue Resolution was provided on June 28, 2016.

- **AWQI No. 129957 (June 29, 2016)**

A localized loss of pressure occurred due to the planned installation of a new fire suppression service to the Arena affecting 213 to 225 Clarke Street. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action included completing the planned installation, restoring pressure, and restoring disinfection. The Notice of Issue Resolution was provided on July 8, 2016

- **AWQI No. 130087 (July 6, 2016)**

NWI received notice from the licensed laboratory that a routine distribution water sample collected from a location on Grenville Avenue on July 4, 2016, tested present for the parameter of total coliforms. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action was performed in accordance with Schedule 17 of O. Reg. 170/03, and included system flushing, collecting resamples, and monitoring secondary disinfection in the affected area. All resamples tested absent for E. coli and total coliform parameters. The Notice of Issue Resolution was provided on July 12, 2016.

- **AWQI No. 130486 (July 27, 2016)**

An operational indicator of adverse water quality occurred following a reduction of distribution system pressure originating at the Atikokan WTP. An unknown cause resulted in a reduction in distribution system pressure for approximately 47 seconds. There was no evidence that system pressure was not maintained in the distribution system. The issue was reported to the MOECC Spills Action Centre and to the Northwestern Health Unit. Corrective action included restoring system pressure. The Notice of Issue Resolution was provided on July 27, 2016.

- **AWQI No. 130572 (August 2, 2016)**

A localized loss of pressure occurred due to unplanned distribution system repairs affecting 1 to 26 Rawn Road. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action included completing repairs, restoring pressure, and restoring disinfection. The Notice of Issue Resolution was provided on August 9, 2016.

- **AWQI No. 1411-AD3765 (August 21, 2016)**

An operational indicator of adverse water quality occurred following a loss of free chlorine residual continuous monitoring capability at the Atikokan WTP. Specifically, a treatment process upset interfered with the operation of the free chlorine residual inline analyzer. The issue was reported to the MOECC Spills Action Centre and to the Northwestern Health Unit.

Corrective action included restoring treatment processes, manually measuring and recording the free chlorine residual at regular intervals, and restoring the operation of continuous monitoring equipment. The Notice of Issue Resolution was provided on August 23, 2016.

- **AWQI No. 130968 (August 29, 2016)**

A localized loss of pressure occurred due to unplanned distribution system repairs affecting 10 to 149 Abbott Road and 200 to 202 Wright Street. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action included completing repairs, restoring pressure, and restoring disinfection. The Notice of Issue Resolution was provided on September 6, 2016.

- **AWQI No. 131010 (August 31, 2016)**

A localized loss of pressure occurred due to unplanned distribution system repairs affecting 27 to 35 Birch Road. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action included completing repairs, restoring pressure, and restoring disinfection. The Notice of Issue Resolution was provided on September 12, 2016.

- **AWQI No. 131586 (October 19, 2016)**

An operational indicator of adverse water quality occurred following a reduction of distribution system pressure originating at the Atikokan WTP. Specifically, an equipment malfunction resulted in a reduction in distribution system pressure for approximately 41 seconds. The issue was reported to the MOECC Spills Action Centre and to the Northwestern Health Unit. Corrective action included restoring distribution system pressure, resolving equipment failures, flushing watermains throughout the community, issuing a Boil Water Advisory, and collecting microbiological samples. The Notice of Issue Resolution was provided on October 25, 2016.

- **AWQI No. 131756 (November 3, 2016)**

An operational indicator of adverse water quality occurred following a reduction of distribution system pressure originating at the Atikokan WTP. Specifically, an equipment failure resulted in a reduction in distribution system pressure. The issue was reported to the MOECC Spills Action Centre and to the Northwestern Health Unit. Corrective action included restoring distribution system pressure, resolving equipment failures, flushing watermains throughout the community, issuing a Boil Water Advisory, and collecting microbiological samples. The Notice of Issue Resolution was provided on November 14, 2016.

- **AWQI No. 131997 (December 6, 2016)**

A localized loss of pressure occurred due to the replacement of a main/corporation stop affecting 12 to 26 Grenville Avenue. The issue was reported to the MOECC Spills Action Centre and the Northwestern Health Unit. Corrective action included completing the replacement, restoring pressure, and restoring disinfection. The Notice of Issue Resolution was provided on December 12, 2016.