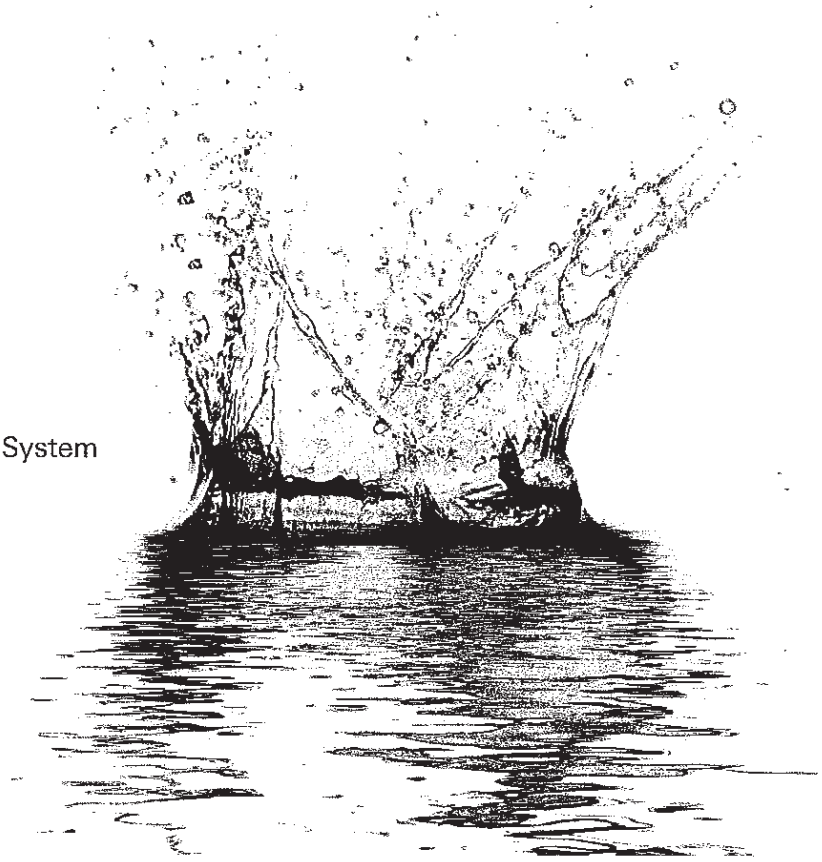
ANNUAL REPORT 2012

Atikokan Drinking Water System



NORTHERN WATERWORKS INC.

Prepared by Northern Waterworks Inc.
P.O. Box 1160, 104 Howey St.
Red Lake, Ontario, P0V 2M0

INTRODUCTION

The Atikokan Drinking Water System (DWS# 220000950) is obligated to meet the requirements of Ontario's *Safe Drinking Water Act* and the regulations therein, in addition to requirements associated with system approvals. Specifically, this system must meet extensive treatment and testing requirements in order to ensure that human health is protected.

This Annual Report has been prepared in accordance with both Schedule 22 and section 11 of Ontario Regulation 170/03. In this manner, the Summary Reports for Municipalities required by Schedule 22 and the Annual Reports required by section 11 have been consolidated into a single document. This Report is intended to brief the ownership of the Atikokan Drinking Water System (ADWS) on the system's performance over the past calendar year (January 1, 2012 to December 31, 2012).

A summary of this Drinking Water System (DWS) is difficult to produce without the use of technical 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*. 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. This document can be found at the following website address:

http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/std01_079707.pdf

Users of this Drinking Water System are also encouraged to contact a representative of Northern Waterworks Inc. for assistance in interpreting this Annual Report.

Report Availability

In accordance with section 11 of O. Reg. 170/03, this Annual Report must be made available for inspection by any member of the public, without charge, at the Town Office. Additionally, the Town of Atikokan is encouraged to make available this Annual Report on the community's website.

In accordance with Schedule 22 of O. Reg. 170/03, this Annual Report must be distributed to the members of the municipal council. Effective January 1, 2013, section 19 (Standard of care, municipal drinking water system) of Ontario's *Safe Drinking Water Act* places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system. Such municipal officials would be exercising diligence by becoming familiar with this Annual Report.

SYSTEM DESCRIPTION

Classified as a large municipal residential system, this drinking water system (DWS) provides a potable water supply to the community of Atikokan. This DWS is composed of the Atikokan Low Lift Pumping Station (LLPS), the Atikokan Water Treatment Plant (WTP), and the Atikokan distribution system. This DWS is owned by the Corporation of the Town of Atikokan, and the treatment subsystem is operated by Northern Waterworks Inc. Potential pathogenic organisms are removed from the source water by coagulation, flocculation, clarification, filtration, and primary disinfection processes.

The LLPS draws surface water from the Atikokan River, whereby low lift pumps transfer raw water from the source to the treatment units located in the Atikokan WTP. Upon such transfer, polyaluminum chloride (primary coagulant) is injected into the raw water upstream from the Actiflo treatment units. During the sand-ballasted flocculation stage, coagulated particles adhere to microsand and floc masses are formed within the treatment units. Additionally, a cationic polymer (coagulant aid) is added at this stage to enhance floc formation. Clarification allows for the settling of the floc, and process water is subsequently directed to the filter units. Any suspended particles that did not settle during the clarification stage will be removed by four dual-media filters (composed of anthracite and silica sand). Chlorine gas (disinfectant), hydrofluorosilicic acid (fluoridation), and sodium carbonate solution (pH/alkalinity adjustment) are subsequently added to the filter effluent water.

The chlorinated water is held in the treated water storage reservoirs to allow for the necessary time required to achieve primary disinfection. Treated water is then transferred to the distribution system by the use of high lift pumps located at the WTP. Secondary disinfection requirements in the distribution system are achieved by the maintenance of a residual as free chlorine.

System Expenses

It is within the scope of this Report to describe any major expenses incurred during the reporting period to install, repair or replace required equipment. Such major expenses for the Atikokan DWS include:

- → $ 5,966.40 related to the repair of cracks in the floor of the Atikokan WTP;
- → $ 2007.45 related to the repair of a pressure relief valve at the WTP;
- → $ 4,200 related to the purchase of replacement parts for the chlorinator system at the WTP;
- → $ 4769.67 related to the replacement and installation of a pneumatic actuating valve at the WTP; and,
- → $ 4855.85 related to repairs to the furnace and air conditioning system at the WTP.

WATER QUALITY

The descriptions below provide brief summaries of the parameters tested in the Atikokan DWS, and the reader is asked to consult **Appendix A** for a comprehensive summary of 2012 water quality.

In-House Analyses

The Atikokan DWS employs an extensive in-house testing program which includes analyses of water quality indicators beyond that required by Ontario's *Safe Drinking Water Act*. Such analyses are conducted on source, treated, and process water, and include testing for turbidity, colour, pH, temperature, alkalinity, aluminum, fluoride, and residual free chlorine. Approximately 4,400 routine independent in-house water quality tests were conducted with respect to this system in 2012.

Microbiological Analyses

Microbiological analyses are conducted on source, treated, and distribution system water. A total of 265 water samples were collected for bacteriological analysis by an accredited laboratory in 2012, as required by Schedule 10 of O. Reg. 170/03. These water samples were collected on a weekly basis, and included tests for E. coli, total coliforms, and heterotrophic plate counts. All treated and distribution water samples tested absent for E. coli and total coliform parameters.

Organic Parameters and Trihalomethanes

Organic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 and 24 of O. Reg. 170/03. These parameters include various acids, pesticides, herbicides, PCBs, volatile organics, and other organic chemicals. With respect to the Atikokan DWS, sampling for organic parameters was conducted on November 15, 2012. There was no exceedance for any organic parameter in 2012.

Trihalomethanes (THMs) are sampled on a quarterly basis from the farthest point in the Atikokan distribution system, in accordance with Schedule 13 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 ug/L). In 2012, the running annual average was 87.2 ug/L.

Glyphosate

Treated water is typically sampled and tested for glyphosate (a Schedule 24 organic parameter) on an annual basis. Such a routine annual sample collected on September 8, 2010, had a result of 150 ug/L, which exceeded half the standard prescribed for glyphosate (280 ug/L). As such, an increase in the frequency of sampling was required in accordance with Schedule 13, section 13-5. of O. Reg. 170/03. Specifically, treated water was required to be sampled on a quarterly basis and tested for glyphosate until such a time that the results from four consecutive three-month periods do not exceed half the standard.

WATER QUALITY (continued)

Prior to the latter half of 2011, such increased sampling was not being conducted in accordance with regulatory requirements. The failure to consistently sample for glyphosate was identified as an incident of non-compliance in a routine inspection conducted by the MOE. Specifically, samples were either inadequately prepared or had failed to be collected entirely. Subsequent results from quarterly sampling conducted in 2011 and 2012 indicated that glyphosate concentrations in treated water were less than half the standard prescribed in Schedule 2 of O. Reg. 169/03.

Recent Glyphosate Sampling Results

Sample Date	Glyphosate Sample Result[1] (ug/L)	ODWQS[2] (ug/L)	Half-Standard[3] (ug/L)	Compliant Half-Standard
August 22, 2011	<5.0	280	140	✓
December 5, 2011	<5.0			✓
March 5, 2012	<5.0			✓
May 22, 2012	<5.0			✓

1. All four sample results were below the lower detectable limit of 5.0 ug/L. Glyphosate concentrations below this limit are not detected by the employed analytical methods.
2. ODWQS = Ontario Drinking Water Quality Standard; a value above this threshold is considered to be an exceedance.
3. The half-standard value is shown as it relates to the requirement to conduct sampling at an increased frequency, as per Schedule 13, section 13-5. of O. Reg. 170/03.

As four consecutive quarterly samples were below the half-standard for glyphosate, provisions concerning increased sampling frequency cease to apply. Sampling for glyphosate will continue to occur on an annual basis, coincident with sampling for the majority of organic and inorganic parameters. The glyphosate result reported in **Appendix A** refers to annual sampling conducted on November 15, 2012.

Inorganic Parameters and Nitrate/Nitrite

Inorganic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 and 23 of O. Reg. 170/03. Inorganic sampling includes various parameters such as Antimony, Arsenic, Cadmium, Mercury, and Uranium. With respect to the Atikokan DWS, required annual sampling for inorganic parameters was conducted on November 15, 2012.

Treated water is also tested for nitrate and nitrite concentrations on a quarterly basis in accordance with Schedule 13 of O. Reg. 170/03. There was no exceedance for any inorganic parameter in 2012.

Community Lead Sampling

Community lead sampling was not conducted in 2012, as the Atikokan DWS had previously qualified for reduced sampling in accordance with Schedule 15.1 of O. Reg. 170/03. Community lead sampling under the reduced protocol will resume in 2013.

FLOWS

Discussion Concerning Flow Estimates

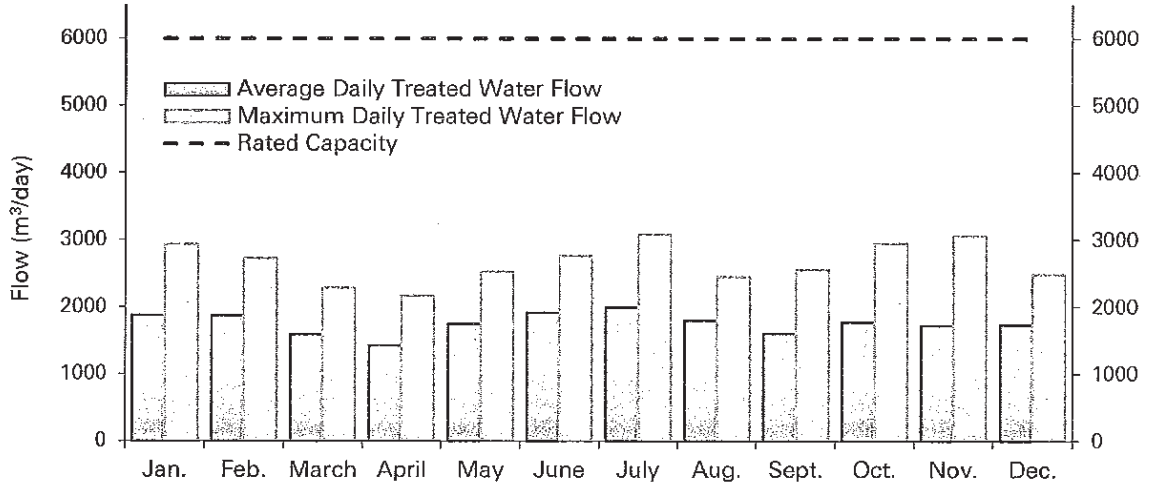
Examination of the treated water flow data for 2012 revealed values that were incongruent with source water and filter effluent flows. Due to the water consumed for plant processes, one would expect that over the course of an entire month treated water flows would be less than source water and filter effluent flows. In 2012, this was not the case for the months of January, February, March, November, & December. Operational staff was unable to determine the cause of the overestimations of treated water flow.

A correction factor which approximates the percentage of water used in backwash processes was applied to treated flows for the aforementioned months. Arguably, this correction provides a better indication of the amount of treated water supplied within the year. The corrected total annual treated water flow is 605,526 m^3, compared to the uncorrected total 642,622 m^3. Nevertheless, it is the uncorrected values which are used in calculations involving rated capacity, as this provides a more conservative estimate of capacity performance. Both corrected and uncorrected treated water flows are provided in **Appendix B**.

2012 Flows

Throughout the reporting period, the Atikokan DWS supplied 642,622 m^3 of treated water to consumers. On an average day in 2012, 1,756 m^3 of treated water was supplied to the community. This average daily flow rate in 2012 represented 29.3 % of the rated capacity of the Atikokan WTP (6,000 m^3/day). The maximum daily flow rate in 2012 was 3,082 m^3/day, which represented 51.4 % of the rated capacity of the Atikokan WTP. The reader is asked to consult **Appendix B** for a complete summary of 2012 flow data.

Daily Flows for the Atikokan DWS

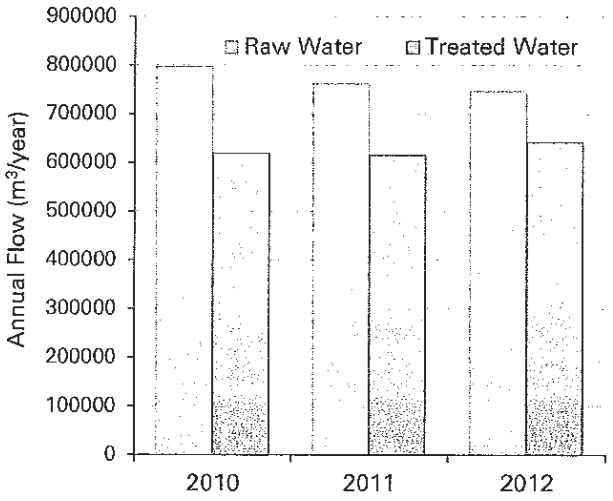


FLOWS (continued)

There was an increase in the amount of water supplied in 2012 when compared to the previous calendar year. In 2011, 615,934 m^3 of treated water was supplied to users of the Atikokan DWS, compared to 642,622 m^3 in 2012. This represents a 4.3% increase in the amount of treated water supplied to the community. The reader is asked to consult **Appendix B** for a summary of historical flow data.

Daily treated water flows experienced by the Atikokan DWS are excessive. Data indicate an average per capita consumption of 630 L/person/day, and the current flows encountered by the Atikokan DWS are those that may be expected for a community serving at least 5,300 people (including all non-residential users). NWI strongly recommends the imposition of water metering, in conjunction with a leak detection program.

Annual Flows for the Atikokan DWS



Chemical Consumptions

The table below summarizes all the water treatment chemicals used during the reporting period and their consumption data. All chemicals used in the treatment process are NSF 60 certified for use in potable water, as required by system approvals.

2012 Chemical Consumptions & Average Annual Dosages[1]

Polyaluminum chloride		Polymer		Sodium carbonate		Hydrofluorosilicic acid		Chlorine Gas	
Quantity Used (L)	Average Dosage (mg/L)	Quantity Used (kg)	Average Dosage (mg/L)	Quantity Used (kg)	Average Dosage (mg/L)	Quantity Used (L)	Average Dosage (mg/L)	Quantity Used (kg)	Average Dosage (mg/L)
47789	25.4	322.5	0.43	16606	24.0	1815.7	0.75	3051	4.41

1. Polyaluminum chloride and polymer average annual dosages are determined using source water volumes in the relevant calculations; sodium carbonate, hydrofluorosilicic acid, and chlorine gas average annual dosages are determined using combined filter effluent volumes in the relevant calculations.

COMPLIANCE

Ensuring Compliance

Northern Waterworks Inc. operates the Atikokan Water Treatment Plant for the Town of Atikokan, and must comply with legislative and regulatory requirements in addition to the terms and conditions of a number of site-specific system approvals. Staffing is maintained at levels to ensure that adequate numbers of trained and licensed personnel are available for proper operations, during emergency or upset conditions, for vacation/sick relief, or to deal with equipment breakdown. Emergency response procedures and operations manuals are established and located in the appropriate facilities, and are available to all staff members. Operations manuals include information necessary for the day-to-day operation and maintenance of the treatment and distribution systems, as well as information that may be required to be accessed quickly for various purposes. Emergency response procedures include information that may be required for proper operation of the system during emergency or upset conditions, and contains items such as emergency plans and contact lists.

The operational strategy of Northern Waterworks Inc. includes ensuring that permits and approvals are in place, ensuring efficient maintenance and operations, and ensuring that the quality of water supplied to its customers meets or exceeds the minimum requirements as set out in the *Safe Drinking Water Act*. It is also our responsibility to ensure that permissible flow rates are not exceeded. Flow measuring devices for measuring the amount of water taken and the amount of water supplied are calibrated annually. Accuracy in these measurements ensures that treatment chemicals are precisely applied and that flows do not exceed the capacity at which the system is designed to be effective. These flows are recorded to provide current and historical information for decision making purposes, in addition to being used by the Ministry of the Environment to review treatment operations.

Water quality analyzers are in place to continuously monitor water quality after critical treatment processes. Each filter is equipped with a filter effluent turbidity analyzer which monitors the amount of suspended particles in the water leaving the filter. A chlorine residual analyzer continuously monitors the free chlorine residual at a point where primary disinfection is complete. Each piece of equipment is equipped with an alarm indicating adverse water quality, and is maintained in accordance with manufacturer's recommendations. Additionally, a water sampling program is conducted to exceed the minimum requirements of O. Reg. 170/03 under the *Safe Drinking Water Act*. Raw water sampling is conducted to give operational staff the information required to effectively operate the treatment process, and samples are collected throughout the process to determine the effectiveness of treatment at each stage. Treated and distribution system sampling provide information regarding the quality of water delivered to consumers. All of these samples are analyzed by licensed staff or by an accredited laboratory.

Compliance with System Approvals

The Municipal Drinking Water Licence (MDWL) for the Atikokan DWS specifies conditions concerning environmental discharges. Currently, process wastewater is transferred directly to the Atikokan wastewater collection system. In the event that conditioned process wastewater must be discharged to the natural environment, sampling must occur in accordance with the MDWL. There were 2 such instances in 2012:

- January 25, the suspended solids concentration in discharged effluent was 8.1 mg/L; and,
- September 22, the suspended solids concentration in discharged effluent was 14.0 mg/L.

COMPLIANCE (continued)

Incidents of Non-Compliance

The most recent annual inspection conducted on February 21, 2012, by the Ontario Ministry of the Environment, revealed 18 incidents of regulatory non-compliance which occurred during previous reporting periods. Arguably, the nature and quantity of non-compliance items represented an unacceptable level of risk being introduced to the Atikokan Drinking Water System. The reader is asked to consult the *2011 Annual Report* for more information concerning these non-compliance items. There remain no known additional incidents of non-compliance in 2012.

Incidents of Adverse Water Quality

Under O. Reg 170/03, reporting procedures and corrective actions are required for any instance where a sample result shows that a parameter used to measure water quality exceeded a certain standard, or where other observations indicate that the safety of the water cannot be guaranteed. There were 3 such incidents for the Atikokan DWS in 2012, which are summarized in **Appendix C**

APPENDIX A: WATER QUALITY

Microbiological Parameters

Parameter (Sample Type)	Units	Number of Samples	Minimum	Maximum	ODWQS[1]	Compliant ODWQS
E. Coli (Raw)	MPN/100mL	52	0	32	---	---
E. Coli (Treated)	p/a/100mL	52	absent	absent	not detectable	✓
E. Coli (Distribution)	p/a/100mL	165	absent	absent	not detectable	✓
Total Coliforms (Raw)	MPN/100mL	52	30	>2420	---	---
Total Coliforms (Treated)	p/a/100mL	52	absent	absent	not detectable	✓
Total Coliforms (Distribution)	p/a/100mL	161	absent	absent	not detectable	✓
HPC (Treated)	CFU/mL	52	0	2	---	---
HPC (Distribution)	CFU/mL	132	0	600[2]	---	---

1. ODWQS = Ontario Drinking Water Quality Standard; a value above this threshold is considered to be an exceedance.
2. This HPC result in a distribution water sample is associated with AWQI 106501. This sample was collected at a location where secondary disinfection requirements were not achieved.

Chemical and Physical Parameters (In-House)

Parameter	Units	Number of Samples	Minimum	Maximum	Annual Average	Compliant ODWQS
Turbidity (Filter #1 Effluent)[1]	NTU	Continuous	0.044	0.980	0.084	✓
Turbidity (Filter #2 Effluent)[1]	NTU	Continuous	0.038	0.308	0.084	✓
Turbidity (Filter #3 Effluent)[1]	NTU	Continuous	0.039	0.290	0.076	✓
Turbidity (Filter #4 Effluent)[1]	NTU	Continuous	0.041	0.371	0.074	✓
Turbidity (Treated)[2]	NTU	Continuous	0.128	0.298	0.183	---
Residual Free Chlorine[3]	mg/L	Continuous	1.40	4.02[4]	2.33	---
Residual Fluoride[3]	mg/L	Continuous	0.49	1.32	0.75	✓
pH (Treated)[2]	pH units	Continuous	7.04	7.39	7.24	---
Total Alkalinity (Treated)[2]	mg/L $CaCO_3$	~250	24.8	34.5	28.9	---
Residual Aluminum (Treated)[2]	mg/L	~250	0.015	0.028	0.019	---

1. Minimum and maximum values for filter effluent turbidity are instantaneous values derived from continuous monitoring data during normal plant operation. The annual average is the average of instantaneous readings collected manually within the year.
2. Minimum and maximum values for these indicated parameters are given as minimum and maximum monthly averages, and annual averages are the averages of all in-house analyses conducted with the year.
3. Minimum and maximum values for residual free chlorine and residual fluoride are instantaneous values derived from continuous monitoring data during normal plant operation. The annual average is the average of all in-house analyses conducted within the year.
4. This maximum residual free chlorine result is associated with AWQI 107527.

Inorganic Parameters

Parameter (Treated Water)	Units	Result	ODWQS	Compliant ODWQS
Antimony	ug/L	<0.60	6	✓
Arsenic	ug/L	<1.0	25	✓
Barium	ug/L	<10	1000	✓
Boron	ug/L	<50	5000	✓
Cadmium	ug/L	<0.10	5	✓
Chromium	ug/L	<1.0	50	✓
Fluoride	mg/L	0.663	1.5	✓
Mercury	ug/L	<0.10	1	✓
Selenium	ug/L	<1.0	10	✓
Sodium	mg/L	10.2	20[1]	✓
Uranium	ug/L	<2.0	20	✓

1. This value for the parameter Sodium is not an Ontario Drinking Water Quality Standard as prescribed in O. Reg. 169/03, although an exceedance of this value is associated with mandatory reporting requirements and corrective actions.

Nitrate & Nitrite

Sample Date (2012)	Nitrate Result (mg/L)	Nitrite Result (mg/L)	Nitrate + Nitrite (mg/L)	Compliant ODWQS
January 16	<0.030	<0.020	<0.030	✓
March 5	0.056	<0.020	0.056	✓
May 22	<0.030	<0.020	<0.030	✓
August 7	<0.030	<0.020	<0.030	✓
November 15	0.046	<0.020	0.046	✓
ODWQS (mg/L)	10	1	10	

APPENDIX A: WATER QUALITY (continued)

Organic Parameters

Parameter (Treated Water)	Result (ug/L)	ODWQS (ug/L)	Compliant ODWQS	Parameter (Treated Water)	Result (ug/L)	ODWQS (ug/L)	Compliant ODWQS
Alachlor	<0.10	5	✓	Diquat	<1.0	70	✓
Aldicarb	<1.0	9	✓	Diuron	<1.0	150	✓
Aldrin + Dieldrin	<0.040	0.7	✓	Glyphosate	<5.0	280	✓
Atrazine + N-dealkylated metabolites	<0.20	5	✓	Heptachlor + Heptachlor Epoxide	<0.20	3	✓
Azinphos-methyl	<0.10	20	✓	Lindane (Total)	<0.10	4	✓
Bendiocarb	<0.20	40	✓	Malathion	<0.10	190	✓
Benzene	<0.50	5	✓	Methoxychlor	<0.10	900	✓
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	<0.5	5	✓	Parathion	<0.10	50	✓
Chlordane (Total)	<0.3	7	✓	Pentachlorophenol	<0.50	60	✓
Chlorpyrifos	<0.10	90	✓	Phorate	<0.10	2	✓
Cyanazine	<0.10	10	✓	Picloram	<0.20	190	✓
Diazinon	<0.10	20	✓	Polychlorinated Biphenyls (PCBs)	<0.035	3	✓
Dicamba	0.42	120	✓	Prometryne	<0.10	1	✓
1,2-Dichlorobenzene	<0.50	200	✓	Simazine	<0.10	10	✓
1,4-Dichlorobenzene	<0.50	5	✓	Temephos	<0.10	280	✓
DDT + metabolites	<0.40	30	✓	Terbufos	<0.20	1	✓
1,2-Dichloroethane	<0.50	5	✓	Tetrachloroethylene	<0.50	30	✓
1,1-Dichloroethylene	<0.50	14	✓	2,3,4,6-Tetrachlorophenol	<0.50	100	✓
Dichloromethane	<0.50	50	✓	Triallate	<0.10	230	✓
2,4 -Dichlorophenol	<0.30	900	✓	Trichloroethylene	<0.50	5	✓
2,4-Dichlorophenoxy acetic acid	<0.20	100	✓	2,4,6-Trichlorophenol	<0.50	5	✓
Diclofop-methyl	<0.20	9	✓	2,4,5-Trichlorophenoxy acetic acid	<0.20	280	✓
Dimethoate	<0.10	20	✓	Trifluralin	<0.10	45	✓
Dinoseb	<0.20	10	✓	Vinyl Chloride	<0.50	2	✓

Trihalomethanes

Sample Date (2012)	Total THMs Result (ug/L)	2012 Annual Average (ug/L)	2011 Annual Average (ug/L)	2010 Annual Average (ug/L)	2009 Annual Average (ug/L)	ODWQS (ug/L)	Compliant ODWQS
January 16[1]	62.1						
March 5	68.2						
May 22	78.5	87.2	82.7	68.2	56.2	100	✓
August 7	115						
November 15	87.1						

1. The sample collected on January 16 does not factor into the calculation for the running annual average THM concentration.

APPENDIX B: FLOW STATISTICS

2012 Flow Statistics (values expressed as m^3)

Month	Total Raw Water Flow	Total Treated Water Flow (Uncorrected)	Total Treated Water Flow (Corrected)[1]	Average Treated Water Daily Flow[2]	Maximum Treated Water Daily Flow[3]	Capacity Performance (Average Flows)[4]	Capacity Performance (Maximum Flows)
Jan.	62,618	58,162	50,557	1,876	2,936	31.3%	48.9%
Feb.	53,833	54,264	44,373	1,871	2,724	31.2%	45.4%
March	52,294	49,362	42,849	1,592	2,284	26.5%	38.1%
April	49,585	42,778	42,778	1,426	2,168	23.8%	36.1%
May	65,647	54,159	54,159	1,747	2,526	29.1%	42.1%
June	71,248	57,391	57,391	1,913	2,763	31.9%	46.0%
July	75,113	61,800	61,800	1,994	3,082	33.2%	51.4%
Aug.	68,423	55,850	55,850	1,802	2,452	30.0%	40.9%
Sept.	65,388	48,170	48,170	1,606	2,553	26.8%	42.6%
Oct.	69,324	55,113	55,113	1,778	2,950	29.6%	49.2%
Nov.	54,681	51,771	45,484	1,726	3,056	28.8%	50.9%
Dec.	59,089	53,804	47,003	1,736	2,486	28.9%	41.4%
Total	**747,243**	**642,622**	**605,526**	---	---	---	---
Avg.	**62,270**	**53,552**	**50,460**	**1,756**	---	---	---

1. Refer to the *Discussion Concerning Treated Water Flow Estimates* on Page 5 for information regarding corrected values. This correction applies only to total monthly treated water flows for the months of January, February, March, November, and December.
2. Average treated water daily flows are derived from uncorrected flow values.
3. Maximum treated water daily flows are derived from uncorrected flow values.
4. Capacity performance compares uncorrected average and maximum treated water daily flows to the rated capacity provided within the Municipal Drinking Water Licence for the Atikokan DWS. This limit (6000 m/day) refers to the daily amount of water transferred from the treatment subsystem to the distribution subsystem.

Flow Statistics by Year (values expressed as m^3)

Year	Total Raw Water Flow	Total Treated Water Flow	Plant Efficiency[2]	% Change in Total Raw Flow from Previous Year	% Change in Total Treated Flow from Previous Year
2010	797,588	619,846	77.7%	---	---
2011	762,600	615,934	80.8%	-4.4%	-0.6%
2012	747,243	642,622[1]	86.0%[3]	-2.0%	4.3%

1. This annual total treated water flow is the uncorrected value for the year 2012. Had the corrected value been used, there would have been an apparent reduction in the amount of treated water supplied to the community between 2011 and 2012.
2. Efficiency is calculated as follows: *[total treated water flow ÷ total raw water flow] x 100%*
3. The unusually high plant efficiency for the year 2012 provides another reason to question the uncorrected treated water flow values.

APPENDIX C: INCIDENTS OF ADVERSE WATER QUALITY

2012 Adverse Water Quality Incidents

AWQI#: 105922 Incident Date: May 10, 2012 Resolution Date: May 10, 2012

Incident Description	A complete SCADA failure occurred for between 5 to 6 hours, such that data from all continuous monitoring equipment was not being recorded. The plant was in production during this failure, and evidence suggested that there were no indications of adverse water quality. Importantly, the independence of the alarm and auto-dialer systems from the SCADA system meant that notifications of a set point exceedance would have still been received by operators. The plant PLCs are also independent of the SCADA system, and were capable of automatically controlling plant processes. This incident was reported to MOE SAC[1] and the NWHU.
Corrective Action(s)	Corrective actions concerning automation were performed by Automation Now. Automation Now prepared an incident report outlining all actions performed, which included proof that no adverse conditions were experienced by the facility during the SCADA failure. Corrective action also involved monitoring water quality throughout the DWS.

AWQI#: 106501 Incident Date: June 18, 2012 Resolution Date: June 22, 2012

Incident Description	An operational indicator of adverse water quality occurred such that the free chlorine residual in a distribution system sample was less than 0.05 mg/L. This incident was associated with a customer complaint concerning coloured water. This incident was reported to MOE SAC and the NWHU.
Corrective Action(s)	Immediate corrective action was performed according to Schedule 17 of O. Reg. 170/03. This included flushing mains for approximately half an hour and collecting additional samples and testing for residual free chlorine. The residual was restored and bacteriological samples were collected before and after system flushing. The Town of Atikokan proceeded to install a 'bleeder' on the dead end portion of the line which supplies the area.

AWQI#: 107527 Incident Date: July 26, 2012 Resolution Date: July 26, 2012

Incident Description	A chlorinator malfunction resulted in a high free chlorine residual in treated water. The free chlorine residual exceeded 4.0 mg/L for approximately 37 seconds, with recorded continuous monitoring data indicating that the residual had peaked at 4.02 mg/L. This is greater than guideline for the maximum free chlorine residual prescribed by the *Procedure for Disinfection of Drinking Water in Ontario*. Although a report was not required to be made to the Ministry[2], this incident was reported to MOE SAC and the NWHU.
Corrective Action(s)	Immediate corrective action involved switching chlorinators and restoring the free chlorine residual to within normal operating parameters. Applied dosages with the online chlorinator were monitored and the extent to which the issue had affected the distribution system was determined. Longer-term corrective action involved repairing the malfunctioned chlorinator between August 15 and 18, 2012.

1. MOE SAC – Ministry of the Environment Spills Action Centre
2. A report was not required to be made to the MOE under subsection 18(1) of the SDWA or section 16-4 of Schedule 16 of O. Reg. 170/03.