American Water Canada Corp.
200 Eastport Blvd
Hamilton, ON L8H 7S4

P 905.521.1988
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February 17, 2017

Town of Moosonee
P.O. Box 727
5 First Avenue
Moosonee, ON
P0L 1Y0

Attention: Shannon McGillivray, Chief Administrative Officer

RE: Moosonee Drinking Water System
2016 Annual Report

Dear Shannon,

Please find attached the 2016 Annual Operations Report for the Moosonee drinking water system, in accordance with Section 11(1) of O. Reg. 170/03. This report covers the period from January 1 to December 31 and meets the requirement of being prepared by February 28 of this year.

Please ensure that a copy of this report is given, without charge, to every person who requests a copy. In addition, please make certain that effective steps are taken to advise residents that copies of the report are available, and of how a copy can be obtained.

Finally, as per Schedule 22 of O. Reg. 170/03, please ensure that a copy of the report is given to the members of municipal council no later than March 31, 2017.

If you have any questions regarding the report, we would be pleased to address them and you should contact the undersigned accordingly.

Sincerely,

AMERICAN WATER CANADA CORP.

Greg Prangley
Project Manager, Ontario Regional Projects

c. T. Keefe, AW Canada- Moosonee operations

2016 ANNUAL REPORT FOR WATER SYSTEMS

Part 1 – ANNUAL REPORT (as required by O. Reg. 170/03, Section 11)

Drinking-Water System Number:	260007114
Drinking-Water System Name:	Moosonee Drinking Water System
Drinking-Water System Owner:	Corporation of the Town of Moosonee
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1-December 31, 2016

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Complete if your Category is Large Municipal Residential or Small Municipal Residential	Complete for all other Categories
Does your Drinking-Water System serve more than 10,000 people? ☐ Yes ☑ No	Number of Designated Facilities served: n/a
Is your annual report available to the public at no charge on a web site on the Internet? ☐ Yes ☑ No	Did you provide a copy of your annual report to all Designated Facilities you serve? ☐ Yes ☐ No
Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection. Municipal Office 5 First Avenue Moosonee, ON Tel: (705)336-2993	Number of Designated Facilities served: n/a
	Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? ☐ Yes ☐ No

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:	
Drinking Water System Name	Drinking Water System Number
n/a	

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?
n/a

Indicate how you notified system users that your annual report is available, and is free of charge.		
☐ Public access/notice via the web	☑ Public access/notice via Government Office	☑ Public access/notice via a newspaper
☑ Public access/notice via Public Request	☐ Public access/notice via a Public Library	☑ Public access/notice via other method local bulletin boards and the community television channel_

Describe your Drinking Water System
Surface water supply from the Moose River. Water treatment plant rated at 3000 m³/day consisting of a dual train package unit with in-line flash mixing, two-stage flocculation, upflow solids contact clarifier with automatic sludge withdrawal, and dual media filters with air scour/water backwash. There are

separate chemical feed systems for primary coagulant, coagulant aid, disinfection and pH adjustment. Sludge is gravity settled in the clarifier then thickened and dewatered in a sludge bagging system for disposal at the local landfill. There is a 2140 m^3 reservoir for treated water storage.

List all water treatment chemicals used over this reporting period

Coagulant - polyaluminum chloride
Coagulant aid - polymer
Disinfection – sodium hypochlorite
pH adjustment – caustic soda

Please provide a brief description and a breakdown of monetary expenses incurred

Low-lift pump end (Grundfos) and motor (Franklin Sand Fighter) $5000
Flow meter calibrations (Lakeside Controls) $5000
10 Fire Extinguishers (Cain Safety) $2000
Kodiak Industrial Pressure Washer $1000
Lab Supplies and analyzer reagent kits (Hach Canada) $3200
Advanced pump end (PACl daytank feed) $900
Vulcan Wall Charger (main liftstation gen set battery charger + installation) $1200

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

Incident Date	Parameter	Result	Corrective Action	Corrective Action Date
April 14, 2016	Zero Pressure in distribution system	Water hammer during fire practice resulting in several main breaks. Due to difficulties locating breaks clearwell drained; service to town shut down	Report to Spills Action Centre and Health Unit. Pressure restored. PBWA issued. PBWA lifted once two consecutive microbiological sample results from lab.	April 21, 2016
September 2, 2016	TC=8	19 homes were already on a PBWA due to mainbreak. 100mm water main very difficult to flush due to having no hydrant.	Report to Spills Action Centre and Health Unit. Flushed 17,000 L of water through 400mm main line to assist in flushing the 100mm main. Sample recollected, plus upstream and downstream of location.	Samples collected - September 4/5, 2016 PBWA lifted September 7, 2016
September 3, 2016	TC=2	2nd consecutive sample of above incident. Was suspected to come back adverse as well.	In conjunction with above incident. Report to Spills Action Centre and Health Unit. Flushed 17,000 L of water through 400mm main line to assist in flushing the 100mm main. Sample recollected, plus upstream and downstream of location	Samples collected - September 4/5, 2016 PBWA lifted September 7, 2016

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period

	Number of Samples	Range of E.Coli Results (min #) - (max #)	Range of Total Coliform Results (min #) - (max #)	Number of HPC Samples	Range of HPC Results (min #) - (max #)
Raw	52	0-96	0-590	n/a	n/a
Treated	52	0	0	52	<10-20
Distribution	145	0	0	55	<10-10

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Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report			
	Number of Grab Samples	Range of Results (min #) – (max #)	Units
Filter #1 effluent turbidity	8760	0.00-2.0*	NTU
Filter #2 effluent turbidity	8760	0.00-2.00*	NTU
Chlorine (POE)	8760	0.00-5.00**	mg/L
Chlorine (distribution)	476	0.21-1.67	mg/L
Fluoride (If the DWS provides fluoridation)	n/a	n/a	

* There were no incidents of water exceeding the regulatory limit (1.0NTU) entering the distribution system. All occurrences of greater than 1.0NTU were due to backwashing and calibrations. This flow goes to waste

** The instance when POE Cl2 dropped to 0.00 and any other instance where it is dropped below normal operating dosage is due to calibration and maintenance of CL-17 analyzer. During these instances residuals are taken every 5 minutes and recorded in the logbook.

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument				
Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
None				

Summary of Inorganic parameters tested during this reporting period or the most recent sample results				
Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	11/01/2016	<0.5	µg/L	No
Arsenic	11/01/2016	<1	µg/L	No
Barium	11/01/2016	5.2	µg/L	No
Boron	11/01/2016	7.1	µg/L	No
Cadmium	11/01/2016	<0.1	µg/L	No
Chromium	11/01/2016	<1	µg/L	No
Lead-see results below				
Mercury	11/01/2016	<0.1	µg/L	No
Selenium	11/01/2016	<1	µg/L	No
Sodium	10/20/2015	25.8	mg/L	Yes
Uranium	11/01/2016	<1	µg/L	No
Fluoride	10/22/2013	<0.1	mg/L	No
Nitrite	01/26/2016	<0.03	mg/L	No
Nitrate	01/26/2016	0.13	mg/L	No
Nitrite	04/19/2016	<0.03	mg/L	No
Nitrate	04/19/2016	4.02	mg/L	No
Nitrite	08/02/2016	<0.03	mg/L	No
Nitrate	08/02/2016	<0.1	mg/L	No
Nitrite	11/01/2016	<0.03	mg/L	No
Nitrate	11/01/2016	<0.1	mg/L	No

Summary of Lead Results during this reporting period (Winter: Dec. 15/14-April 15/15; Summer: June 15-Oct. 15/15				
Sampling Period	Range of Results (µg/L) from Residential Samples (# of Samples taken)	Non-residential locations	Distribution System	Any Adverse Water Quality Incidents?
Winter	No samples required	n/a	0.14-*0.2 (2)	No
Summer	No samples required	n/a	<0.1-7.27 (2)	No

Note: * Sample was collected outside of the regulated sampling date, on April 28, 2016.

Summary of Organic parameters tested during this reporting period or the most recent sample results				
Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	11/01/2016	ND	µg/L	NO
Atrazine + N-dealkylated metobolites	11/01/2016	ND	µg/L	NO
Azinphos-methyl	11/01/2016	ND	µg/L	NO
Benzene	11/01/2016	ND	µg/L	NO
Benzo(a)pyrene	11/01/2016	ND	µg/L	NO
Bromoxynil	11/01/2016	ND	µg/L	NO
Carbaryl	11/01/2016	ND	µg/L	NO
Carbofuran	11/01/2016	ND	µg/L	NO
Carbon Tetrachloride	11/01/2016	ND	µg/L	NO
Chlorpyrifos	11/01/2016	ND	µg/L	NO
Diazinon	11/01/2016	ND	µg/L	NO
Dicamba	11/01/2016	ND	µg/L	NO
1,2-Dichlorobenzene	11/01/2016	ND	µg/L	NO
1,4-Dichlorobenzene	11/01/2016	ND	µg/L	NO
1,2-Dichloroethane	11/01/2016	ND	µg/L	NO
1,1-Dichloroethylene (vinylidene chloride)	11/01/2016	ND	µg/L	NO
Dichloromethane	11/01/2016	ND	µg/L	NO
2-4 Dichlorophenol	11/01/2016	ND	µg/L	NO
2,4-Dichlorophenoxy acetic acid (2,4-D)	11/01/2016	ND	µg/L	NO
Diclofop-methyl	11/01/2016	ND	µg/L	NO
Dimethoate	11/01/2016	ND	µg/L	NO
Diquat	11/01/2016	ND	µg/L	NO
Diuron	11/01/2016	ND	µg/L	NO
Glyphosate	11/01/2016	ND	µg/L	NO
Malathion	11/01/2016	ND	µg/L	NO
MCPA	11/01/2016	ND	µg/L	NO
Metolachlor	11/01/2016	ND	µg/L	NO
Metribuzin	11/01/2016	ND	µg/L	NO
Monochlorobenzene	11/01/2016	ND	µg/L	NO
Paraquat	11/01/2016	ND	µg/L	NO
Pentachlorophenol	11/01/2016	ND	µg/L	NO
Phorate	11/01/2016	ND	µg/L	NO

Summary of Organic parameters tested during this reporting period or the most recent sample results				
Picloram	11/01/2016	ND	µg/L	NO
Polychlorinated Biphenyls(PCB)	11/01/2016	ND	µg/L	NO
Prometryn	11/01/2016	ND	µg/L	NO
Simazine	11/01/2016	ND	µg/L	NO
THM (NOTE: show latest annual average)	Q1-Q4 2016	66.3	µg/L	NO
Terbufos	11/01/2016	ND	µg/L	NO
Tetrachloroethylene	11/01/2016	ND	µg/L	NO
2,3,4,6-Tetrachlorophenol	11/01/2016	ND	µg/L	NO
Triallate	11/01/2016	ND	µg/L	NO
Trichloroethylene	11/01/2016	ND	µg/L	NO
2,4,6-Trichlorophenol	11/01/2016	ND	µg/L	NO
Trifluralin	11/01/2016	ND	µg/L	NO
Vinyl Chloride	11/01/2016	ND	µg/L	NO

ND=Non-detect (below measurable limit)

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.				
Parameter	Sample Date	Result Value	Unit of Measure	ODWS Criteria
Total THMs (annual avg.)	2016 (Q1-Q4)	66.3	µg/L	100
Sodium	10/20/2015	25.8	mg/L	20

Part 2 – SUMMARY REPORT (as required by O. Reg. 170/03, Schedule 22)

Non-Compliance with Legislations, Regulations, Approvals & Orders
During this period, the Facility was operated in full compliance with the Act, the regulations and the Facility's approval, save and except for the following:

No non-compliances in 2016

SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES AS PER 2016 MOE INSPECTION
This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following issues and consider measures to address them.

The following issues were also noted during the inspection:
The "General Operating Procedures" for the Moosonee WTP, prepared by LeBrun Northern Contracting Ltd. (dated February 2001) provide summaries on the basic functioning of all components of the water treatment system. However, at some point since 2001, revisions and edits have been noted in the margins of the manual. Based on the comments, the age of the manual and that the manual references a different

operating authority, it is unclear whether all of the details of the operating procedures provided in the manual are still applicable to the manner in which the drinking water system is currently operated.
Recommendation:
It is recommended that the owner and operating authority for the system:

1. Update the operations and maintenance manual to reflect current operating practices so that new operators can confidently rely on information presented in the manual to guide decision making in the operation of the drinking water system
2. Remove factually incorrect and otherwise confusing information from the operations manual and,
3. Include any newly developed standard operating procedures

System Capability Assessment			
Comparison of Flow Rates (m^3/d):			
Month	Average Flow	Maximum Flow	Max Instantaneous flow (L/s)
January	807	856	25.2
February	816	1350	44.0
March	733	783	34.8
April	843	1883	89.8
May	786	835	38.3
June	730	1028	160
July	747	1025	65.1
August	763	954	26.6
September	757	914	50.1
October	757	925	72.0
November	721	842	57.7
December	723	1093	54.9
AVERAGE	765	n/a	n/a
MAXIMUM	843	1064	160
SYSTEM CAPACITY	2998	2998	-
% CAPACITY	28.1%	35.5%	n/a