

# 2013

ANNUAL REPORT



## Sioux Lookout Urban DRINKING WATER SYSTEM

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# Introduction

The Sioux Lookout Urban Drinking Water System (DWS# 210001405) is obligated to meet the requirements of Ontario's *Safe Drinking Water Act* (the *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 and users of the Sioux Lookout Urban Drinking Water System on the system's performance over the past calendar year (January 1, 2013 to December 31, 2013).

A summary of this drinking water system 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](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 Incorporated (NWI) for assistance in interpreting this Annual Report. Questions and comments may be directed to [compliance@nwi.ca](mailto:compliance@nwi.ca).

## Report Availability

In accordance with section 11 of O. Reg. 170/03 this Annual 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 on the municipal website. Additionally, Annual Reports for all systems and facilities operated by NWI are published online at [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 municipal 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. 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 Sioux Lookout. This DWS is composed of the Doc Moberly Low Lift Pumping Station (LLPS), the Urban Sioux Lookout Water Treatment Plant (WTP), and the Sioux Lookout distribution system (including an elevated storage tank and the Fifth Avenue Booster Pumping Station). The Sioux Lookout Urban DWS is owned by the Corporation of the Municipality of Sioux Lookout and is operated by Northern Waterworks Incorporated (NWI). Potential pathogenic organisms are removed and inactivated by coagulation, flocculation, membrane filtration, and primary disinfection processes.

The LLPS draws surface water from Pelican Lake, whereby low lift pumps transfer water from the source to the flocculation tanks located at the WTP. Aluminum sulphate (primary coagulant) and sodium hydroxide (pH/alkalinity adjustment) are injected into the raw water upon transfer, and gentle mixing subsequently promotes the formation of floc masses in order to facilitate membrane filtration. Water is directed from the flocculation tanks to process reservoirs, in which there are submerged membrane filters. Permeate is drawn through the membrane filters via an applied vacuum and is directed to the treated water storage reservoirs. Sodium hypochlorite (disinfectant), fluorosilicic acid (fluoridation), and sodium hydroxide (pH/alkalinity adjustment) are added to filter effluent upon such transfer to the reservoirs.

The chlorinated water is held in the storage reservoirs to allow for the necessary time required to achieve primary disinfection. Treated water is then transferred from the reservoirs to the elevated storage tank and 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 Sioux Lookout Urban DWS include:

- » \$160,273.37 related to the membrane filter replacement and upgrade project (partial payment);
- » \$68,085.89 related to the backwash treatment project, including automation upgrades at the WTP;
- » \$4,189.79 related to the purchase of chemical feed pumps (primary disinfection);
- » \$5,650.23 related to the replacement of Zenon air compressors and air driers;
- » \$10,955.80 related to the replacement of a SCADA computer terminal;
- » \$4,706.88 related to the replacement of an alum pump;
- » \$1,721.56 related to the replacement of pressure transmitters;
- » \$1,721.56 related to the replacement of vacuum transmitters;
- » \$5,020.99 related to the replacement of actuators and valves;
- » \$1,367.30 related to the installation of a chain hoist; and,
- » \$1,856.92 related to the purchase of a spare floc motor.

# Water Quality

In accordance with section 11 (Annual Reports) of O.Reg. 170/03, this Annual Report must summarize the results of tests required by regulations, approvals, and orders. The results of such water quality analyses are provided within the following sections.

## Operational Parameters

The Sioux Lookout Urban DWS employs an extensive in-house testing program which includes analyses of water quality indicators beyond that required by the *Act*. Such analyses are conducted on source and treated water, and include testing for turbidity, colour, pH, temperature, alkalinity, aluminum, fluoride, and residual free chlorine. Approximately 4,000 routine in-house water quality tests were conducted in 2013.

In accordance with Schedule 6 of O. Reg. 170/03, filter effluent turbidity and the free-chlorine residual required to achieve primary disinfection are continuously monitored at the Urban Sioux Lookout WTP. Results of such continuous monitoring and in-house analyses are provided in **Table 1**.

**TABLE 1: OPERATIONAL PARAMETERS<sup>1,2</sup>**

Parameter	Units	Min.	Max.	Avg.
Turbidity (Filter 1)	NTU	0.034	0.068	0.042
Turbidity (Filter 2)	NTU	0.030	0.043	0.034
FCR (Treated) <sup>3</sup>	mg/L	1.78	2.19	1.97
FR (Treated) <sup>4</sup>	mg/L	0.55	0.70	0.63
Turbidity (Treated)	NTU	0.039	0.095	0.057
pH (Treated)	pH	7.1	7.7	7.4

1. Minimum, maximum, and average values for filter turbidity, free chlorine residual, and fluoride residual are derived from daily instantaneous readings of continuous monitoring equipment. As minimum and maximum values are expressed as monthly averages, excursions greater than the maximum value and less than the minimum value do occur within a given year.
2. Minimum, maximum, and average values for the parameters turbidity (treated) and pH are derived from the results of in-house analyses (i.e. bench tests). Minimum and maximum values are expressed as the minimum and maximum monthly averages of these results.
3. FCR = Free Chlorine Residual.
4. FR = Fluoride Residual.

## Membrane Filtration Performance

In accordance with the *Procedure for Disinfection of Drinking Water in Ontario*, membrane filters must meet certain performance criteria in order to claim a 2.0+ log *Cryptosporidium* oocyst removal credit. In addition to continuously monitoring filtrate turbidity, the integrity of the membranes must be monitored and filtered water turbidity must be less than or equal to 0.1 NTU in 99% of the measurements each month. **Table 2** summarizes filter effluent turbidity compliance against the <0.1 NTU/99% performance criterion. Values in the table correspond to the proportion of time (expressed as a percentage) that filtered water turbidity was less than or equal to 0.1 NTU.

**TABLE 2: MEMBRANE FILTER PERFORMANCE<sup>1</sup>**

Membrane Filter	Min.	Max.	Criterion
Filter 1	99.24	100	<0.10 NTU in 99% of the measurements each month
Filter 2	99.74	100	
Combined	99.48	100	

1. For the <0.1 NTU/99% performance criterion, minimum and maximum values represent the minimum and maximum turbidity compliance achieved in a given month in 2013.

## Microbiological Parameters

Microbiological analyses are performed on source, treated, and distribution system water. A total of 319 routine water samples were collected for bacteriological analysis by an accredited laboratory in 2013, 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.

With respect to non-routine sampling, 26 distribution samples were collected and analyzed for *E. coli* and total coliforms. These samples are often associated with planned or unplanned maintenance conducted within the distribution system. All routine and non-routine samples tested absent for *E. coli* and total coliform parameters. Results from both routine and non-routine microbiological analyses are provided in **Table 3**.

## Water Quality continued

**TABLE 3: MICROBIOLOGICAL SAMPLING RESULTS**

Parameter (Sample Type)	Units	Number of Samples	Minimum	Maximum	ODWQS <sup>1</sup>
E. Coli (Raw)	MPN/100mL	53	<1	5	---
E. Coli (Treated)	p/a/100mL	53	absent	absent	not detectable
E. Coli (Distribution)	p/a/100mL	239	absent	absent	not detectable
Total Coliforms (Raw)	MPN/100mL	53	<1	340	---
Total Coliforms (Treated)	p/a/100mL	53	absent	absent	not detectable
Total Coliforms (Distribution)	p/a/100mL	239	absent	absent	not detectable
HPC (Treated)	CFU/mL	53	0	3	---
HPC (Distribution)	CFU/mL	66	0	19	---

1. ODWQS = Ontario Drinking Water Quality Standard; a value above this threshold is considered to be an exceedance.

### Nitrate/Nitrite

Treated water is tested for nitrate and nitrite concentrations on a quarterly basis in accordance with Schedule 13 of O. Reg. 170/03. Nitrate and nitrite results are provided in **Table 4**. All results were below the associated Ontario Drinking Water Quality Standards.

**TABLE 4: NITRATE AND NITRITE SAMPLING RESULTS**

Sample Date (2013)	Nitrate Result (mg/L)	Nitrite Result (mg/L)	Nitrate + Nitrite (mg/L)
February 12	0.046	<0.020	0.046
May 14	0.093	<0.020	0.093
August 13	0.060	<0.020	0.060
November 12	0.084	<0.020	0.084
ODWQS (mg/L)	10	1	10

### Lead Sampling

The Sioux Lookout Urban DWS previously qualified for reduced lead sampling and ultimately became exempt from sampling at plumbing locations, in accordance with Schedule 15.1 of O.Reg. 170/03. Six (6) distribution system samples must now be collected every year and analyzed for pH and alkalinity. Additionally, these six distribution system samples must be analyzed for lead in every third 12-month period after the plumbing sample exemption was activated. **Table 5** summarizes the results of community lead sampling and related required tests. Lead analyses were not required in 2013.

**TABLE 5: DISTRIBUTION LEAD SAMPLING RESULTS<sup>1</sup>**

Sample Date <sup>2</sup>	pH	Alkalinity (mg/L as CaCO <sub>3</sub> )	Lead Result (ug/L)
December 19, 2012 <sup>3</sup>	7.8	30	
March 11, 2013	7.4	25	
April 3, 2013	7.3	25	not required <sup>4</sup>
August 28, 2013	7.1	20	
September 26, 2013	7.0	20	
October 10, 2013	7.3	20	

- All distribution system samples were collected from hydrants located throughout the community of Sioux Lookout.
- Each sample date corresponds to the collection of one (1) sample.
- Lead sampling periods are defined as the periods between December 15 and April 15 and between June 15 and October 15. The sample collected on December 19, 2012, pertains to the sample period that ended on April 15, 2013.
- Lead will be tested in distribution samples during the period corresponding to December 15, 2014 to April 15, 2015, and again during the period corresponding to June 15, 2015 to October 15, 2015.

### Inorganic Parameters

With the exception of the parameters sodium and fluoride, 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 Sioux Lookout Urban DWS, required annual sampling for inorganic parameters was conducted on February 12, 2013. **Table 6** provides sampling results for inorganic parameters. All results were below the associated Ontario Drinking Water Quality Standards.



## Water Quality continued

**TABLE 6: INORGANIC SAMPLING RESULTS**

Parameter (Treated Water)	Units	Result	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 <sup>1</sup>	mg/L	0.562	1.5
Mercury - Total	ug/L	<0.10	1
Selenium	ug/L	<1.0	10
Sodium <sup>2</sup>	mg/L	8.81	20 <sup>3</sup>
Uranium	ug/L	<2.0	20

1. In accordance with Schedule 6-4. (Form of sampling) of O. Reg. 170/03, sampling and testing for fluoride is achieved through the use of continuous monitoring equipment. The sample result for fluoride pertains to a grab sample that was collected and sent to an accredited lab for analysis on April 17, 2012.
2. Treated water must be tested for sodium concentrations once every 5 years. The most recent sodium result pertains to a sample collected on January 12, 2010.
3. 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.

### Trihalomethanes

Trihalomethanes (THMs) are sampled on a quarterly basis from the farthest point in the Sioux Lookout 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 2013, the running annual average was 103.3 ug/L. Total THM (TTHM) results are summarized in **Table 7**.

**TABLE 7: TOTAL TRIHALOMETHANE SAMPLING RESULTS<sup>1</sup>**

Sample Date (2013)	TTHMs Result (ug/L)	2013 Annual Average (ug/L)	2012 Annual Average (ug/L)	2011 Annual Average (ug/L)	2010 Annual Average (ug/L)	ODWQS (ug/L)
February 12	85.1	103.3	86.7	59.9	59.2	100 <sup>2</sup>
May 14	94					
September 11	120					
November 12	114					

1. Eight (8) distribution samples were collected and analyzed for total THM concentrations in 2013. Only those sample results that are used in the RAA calculation have been provided. Specifically, the highest sample result within a quarter is used to determine the RAA. Resamples taken for corrective action purposes do not contribute to the quarterly data used to determine routine compliance.
2. The Ontario Drinking Water Quality Standard for total trihalomethanes (TTHMs) is calculated as a running annual average.

Elevated TTHM concentrations in 2012 and 2013 have been attributed to elevated treated water pH and a change in sample locations from the Sioux Lookout WPCP to the airport. While elevated pH favours THM formation it is also preferable as a corrosion control measure in the distribution system, particularly as it concerns controlling lead release in household plumbing. Efforts to reduce total THM concentrations in 2014 will include optimizing the coagulant dosage for increased removal of disinfection by-product (DBP) precursors. Specifically, enhanced coagulation for DBP precursor removal involves increasing the coagulant dosage to a point that does not interfere with membrane filtration processes. Dosage optimization is being accompanied with increased monitoring, particularly as it concerns the analysis of total THMs in treated water samples. An evaluation of the effectiveness of enhanced coagulation will be conducted in 2014.

### Organic Parameters

Organic parameters including pesticides, herbicides, and volatile organics are sampled on an annual basis in treated water in accordance with Schedules 13 and 24 of O. Reg. 170/03. With respect to the Sioux Lookout Urban DWS, sampling for organic parameters was conducted on February 12, 2013. Organic parameter sampling results are provided in **Table 8**. All results were below the associated Ontario Drinking Water Quality Standards

## Water Quality continued

**TABLE 8: ORGANIC SAMPLING RESULTS**

Parameter (Treated Water)	Result (ug/L)	ODWQS (ug/L)	Parameter (Treated Water)	Result (ug/L)	ODWQS (ug/L)
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	<0.50	5	Parathion	<0.10	50
Chlordane (Total)	<0.30	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	<0.20	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

# Flows

## 2013 Flows

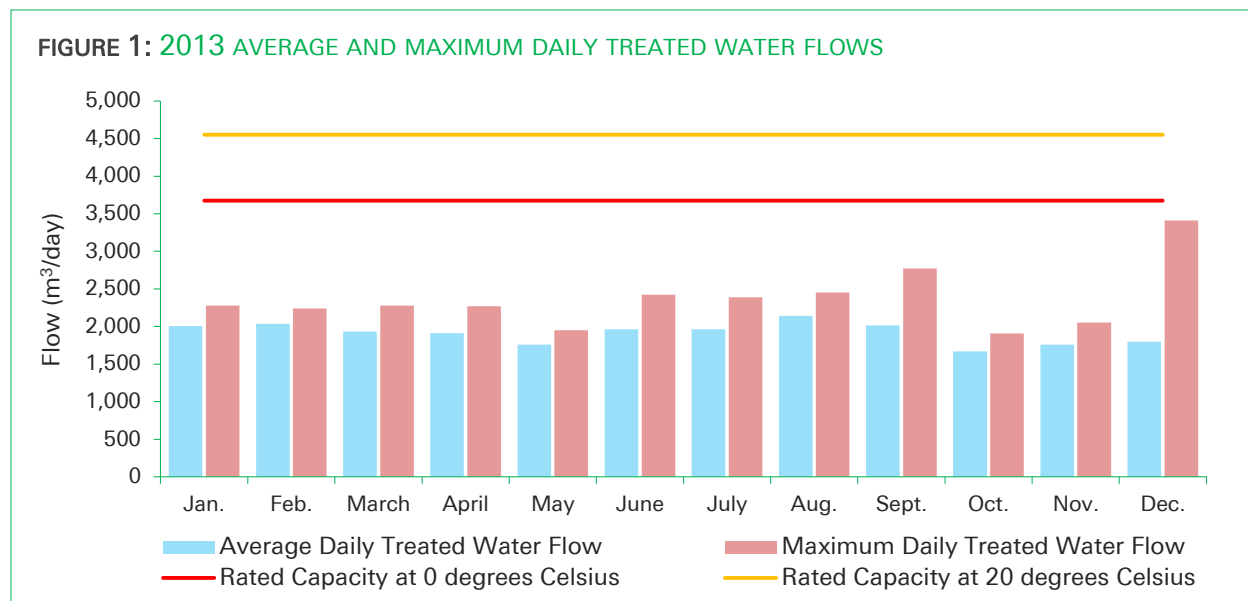
Throughout the reporting period, the Sioux Lookout Urban DWS supplied 697,954 m<sup>3</sup> of treated water to the community. On an average day in 2013, 1,912 m<sup>3</sup> of treated water was supplied to the community. This average daily flow represents 52.0 % of the rated capacity (3,675 m<sup>3</sup>/day) of the Urban Sioux Lookout WTP at a water temperature of 0 °C, or 42.0 % of the rated capacity (4,550 m<sup>3</sup>/day) at a water temperature of 20 °C. The maximum daily flow in 2013 was 3,411 m<sup>3</sup>/day, which represents 92.8 % of the rated capacity of the Urban Sioux Lookout WTP at a water temperature of 0 °C, or 75.0 % of the rated capacity at a water temperature of 20 °C. This maximum daily flow was associated with a major distribution system break that occurred in December.

The reader is asked to consult **Appendix A** for a complete summary of 2013 flow data. A comparison of average and maximum daily treated water flows with rated capacity is provided in **Figure 1**.

## Flow Comparisons

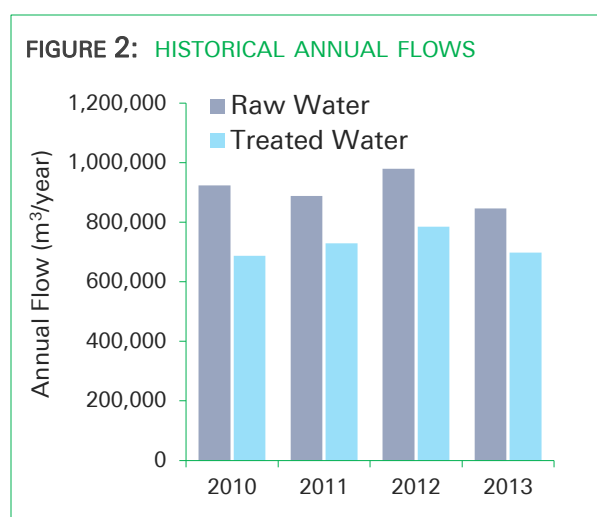
There was an appreciable decrease in the amount of treated water supplied in 2013 when compared to the previous calendar year. In 2012, 785,487 m<sup>3</sup> of treated water was supplied to users of the Sioux Lookout Urban DWS, compared to 697,954 m<sup>3</sup> in 2013. This represents an 11.1% decrease in the amount of treated water supplied. A portion of the decrease may be attributed to the results of a leak detection program that was implemented in the third quarter of 2013. Multiple distribution system leaks identified by the program were subsequently repaired, and daily treated water flows encountered in the final quarter were significantly lower than the flows encountered in the first three quarters of 2013.

The reader is asked to consult **Appendix A** for a summary of historical flow data. Historical raw and treated water flows are provided in **Figure 2** on the following page.





## Flows continued



### Chemical Consumptions

In accordance with section 11 (Annual Reports) of O. Reg. 170/03, **Table 9** includes a list of water treatment chemicals used by the system during the reporting period. All chemicals used in the treatment process are NSF/ANSI 60 certified for use in potable water, as required by system approvals. The reduction in treated water flows in 2013 was associated with corresponding reductions in source water flows and treatment chemical consumptions.

**TABLE 9: CHEMICAL CONSUMPTIONS AND AVERAGE DOSAGES<sup>1</sup>**

Treatment Chemical	2012		2013	
	Quantity Used (L)	Average Dosage (mg/L)	Quantity Used (L)	Average Dosage (mg/L)
aluminum sulphate (coagulant)	88,723	58.4	69,342	52.8
sodium hydroxide (pH/alkalinity adjustment)	27,002	8.8	21,126	8.0
sodium hypochlorite (disinfectant)	23,770	3.63	20,680	3.56
fluorosilicic acid (fluoridation)	2,013	0.79	1,601	0.71

1. Slight discrepancies in the reported annual average dosages between this and previous Annual Reports can be attributed to modifications to dosage calculations. Quantities used have remained unchanged.

## Ensuring Compliance

Northern Waterworks Incorporated operates the Sioux Lookout Urban Drinking Water System for the Municipality of Sioux Lookout, and must comply with legislative and regulatory requirements in addition to the terms and conditions of site-specific approvals. Staffing is maintained at levels to ensure that adequate numbers of trained and licensed personnel are available for normal 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 contain items such as emergency plans and contact lists.

The operational strategy of NWI 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 *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 correctly 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.

A water testing program is conducted to exceed the minimum requirements of O. Reg. 170/03 under the *Safe Drinking Water Act*. Raw water testing is conducted to give operational staff the information required to effectively operate the treatment process, and samples are analyzed throughout the process to determine the effectiveness of treatment at each stage. Treated and distribution system testing provides information regarding the quality of water delivered to consumers. All samples are analyzed by licensed staff or by an accredited laboratory (where required).

### Incidents of Non-Compliance

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Annual 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 non-compliance). Additionally, this Annual Report must specify the duration of the failure and the measures that were taken to correct the failure. There were no known incidents of non-compliance in 2013 for the Sioux Lookout Urban DWS.

### Incidents of Adverse Water Quality

In accordance with section 11 (Annual Reports) of O. Reg. 170/03, this Annual 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 Annual Report must describe any corrective actions taken under Schedule 17 of O. Reg. 170/03 during the period covered by the report. **Table 10** summarizes the seven (7) incidents of adverse water quality in 2013. Six (6) of these incidents are related to elevated total THM concentrations.

**TABLE 10: 2013 ADVERSE WATER QUALITY INCIDENTS**

#### **AWQI# 111099 (May 21, 2013)**

NWI received notice from the licensed laboratory that a routine quarterly distribution water sample collected on May 14, 2013 and tested for total trihalomethanes resulted in a total THM running annual average (RAA) of 104 ug/L. The issue was reported to the MOE Spills Action Centre (SAC) and the Northwestern Health Unit (NWHU).

Corrective action was performed in accordance with Schedule 17 of O. Reg. 170/03, and included collecting a resample on June 4, 2013. As part of ongoing corrective action related to this adverse water quality incident, additional non-routine total THM samples continued to be collected throughout 2013. Importantly, total THM resamples taken specifically for corrective action purposes do not require the RAA to be calculated on them and do not need to be reported as an exceedance. Other routine quarterly samples failed to bring the RAA below the Ontario Drinking Water Quality Standard (100 ug/L), and all subsequent THM-related AWQIs are associated with this initial incident.

#### **AWQI# 111610 (June 11, 2013); 113454 (August 16, 2013); 113784 (August 30, 2013); 114098 (September 17, 2013); 115079 (November 18, 2013)**

NWI received multiple notices from the licensed laboratory that the total THM running annual average was greater than the Ontario Drinking Water Quality Standard of 100 ug/L. Notices were received for all distribution system samples (both routine and non-routine) that were collected and tested for total THMs following the initial AWQI issued in May (AWQI 111099).

Corrective action to address elevated total THM concentrations is ongoing, and includes coagulant dosage optimization at the Urban Sioux Lookout WTP (in consultation with the MOE and the NWHU).

#### **AWQI# 114922 (November 6, 2013)**

An adverse result occurred such that the free-chlorine residual in a distribution sample obtained from a hydrant was less than 0.05 mg/L. The issue was reported to the MOE SAC and the NWHU.

Immediate corrective action was performed in accordance with Schedule 17 of O. Reg. 170/03. This included flushing mains and collecting additional samples to test for residual free chlorine. The residual was restored and monitored at the relevant location.

## Appendix A: Flow Data

**TABLE A1: 2013 FLOWS<sup>1</sup>**

Month	Total Monthly Raw Water Flow (m <sup>3</sup> /month)	Total Monthly Treated Water Flow (m <sup>3</sup> /month)	Average Daily Treated Water Flow (m <sup>3</sup> /day)	Maximum Daily Treated Water Flow (m <sup>3</sup> /day)	Capacity Performance (Average Flows, 0 °C)	Capacity Performance (Average Flows, 20 °C)	Capacity Performance (Maximum Flows, 0 °C)	Capacity Performance (Maximum Flows, 20 °C)
Jan.	75,800	62,210	2,007	2,278	54.6%	44.1%	62.0%	50.1%
Feb.	69,341	57,031	2,037	2,239	55.4%	44.8%	60.9%	49.2%
March	73,221	59,945	1,934	2,277	52.6%	42.5%	62.0%	50.0%
April	70,252	57,358	1,912	2,269	52.0%	42.0%	61.7%	49.9%
May	65,749	54,480	1,757	1,952	47.8%	38.6%	53.1%	42.9%
June	71,245	58,885	1,963	2,424	53.4%	43.1%	66.0%	53.3%
July	73,479	60,869	1,964	2,391	53.4%	43.2%	65.1%	52.5%
Aug.	80,457	66,370	2,141	2,454	58.3%	47.1%	66.8%	53.9%
Sept.	73,439	60,467	2,016	2,774	54.8%	44.3%	75.5%	61.0%
Oct.	63,107	51,836	1,672	1,910	45.5%	36.8%	52.0%	42.0%
Nov.	63,270	52,824	1,761	2,051	47.9%	38.7%	55.8%	45.1%
Dec.	67,206	55,679	1,796	3,411	48.9%	39.5%	92.8%	75.0%
<b>Total</b>	<b>846,566</b>	<b>697,954</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
<b>Avg.</b>	<b>70,547</b>	<b>58,163</b>	<b>1,912</b>	<b>3,411</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>

1. The production capacity of the membrane filtration units depends upon water temperature, and capacity values are stated for 0 and 20 °C within the Municipal Drinking Water Licence for the Sioux Lookout Urban DWS. Production capacity is prorated accordingly for water temperatures between these two limits.

**TABLE A2: HISTORICAL FLOWS<sup>1</sup>**

Year	Total Annual Raw Water Flow (m <sup>3</sup> /year)	Total Annual Treated Water Flow (m <sup>3</sup> /year)	Plant Efficiency	% Change in Total Raw Flow from Previous Year	% Change in Total Treated Flow from Previous Year
2006	---	702,510	---	---	---
2007	---	757,770	---	---	7.9%
2008	---	735,920	---	---	-2.9%
2009	---	636,700	---	---	-13.5%
2010	923,850	687,640	74.4%	---	8.0%
2011	888,430	729,341	82.1%	-3.8%	6.1%
2012	979,670	785,457	80.2%	10.3%	7.7%
2013	846,566	697,954	82.4%	-13.6%	-11.1%

1. Data concerning annual total raw water volumes were unavailable during the preparation of this report for the years spanning 2006 – 2009.