NORTHERN WATERWORKS INC.

104 Howey Street, P.O. Box 1160
Red Lake, ON P0V 2M0
Tel: 807.727.2424
Fax: 807.727.1146
Email: info@nwi.ca
www.nwi.ca

March 28, 2018

Attention: Mr. Dave Manol, Water Program Supervisor
Ministry of the Environment and Climate Change
Thunder Bay Regional Office
435 James Street South, Suite 331
Thunder Bay, ON P7E 6S7

Re: 2017 Annual Report – Sioux Lookout Water Pollution Control Plant

Dear Mr. Manol,

Please find attached the 2017 Annual Report for the Sioux Lookout Water Pollution Control Plant. This report has been completed in accordance with Condition 17 of Certificate of Approval No. 3-0250-92-006, issued to the Municipality of Sioux Lookout on June 17, 1992.

This report was prepared by Northern Waterworks Incorporated (NWI) on behalf of the Municipality of Sioux Lookout and it covers the period from January 1, 2017 to December 31, 2017. The report is intended (1) to provide a performance record for future references, (2) to ensure that the Ministry of the Environment and Climate Change is made aware of problems as they arise, and (3) to provide a compliance record for the terms and conditions outlined in the ECA.

If there are any questions or comments concerning the report, please do not hesitate to contact me at 807-728-1824 or by email at compliance@nwi.ca.

Sincerely,

Nicholas Kyle
Compliance Coordinator
Northern Waterworks Incorporated

Cc: Ann Mitchell, Chief Administrative Officer (Municipality of Sioux Lookout)
Andrew Jewell, Public Works Manager (Municipality of Sioux Lookout)
Norm Hissa, Water Inspector (MOECC – Kenora Area Office)
Jason LeBlanc, Chief Administrative Officer (NWI)
Gilles Vachon, Northwest Regional Manager (NWI)
Dan Perron, Operations Manager – Sioux Lookout (NWI)

2017 Annual Report

Sioux Lookout Water Pollution Control Plant

Prepared for: The Corporation of the Municipality of Sioux Lookout

Prepared by: Northern Waterworks Incorporated

Date: March 28, 2018

Table of Contents

1 Introduction 3

2 System Description 4

3 Water Quality . . . . . .4 - 7

3.1 Monitoring Programs . . . . . 4 - 5

3.2 Monitoring Results . . . . . 6 - 7

4 Flow Monitoring . . . . . 7 - 8

5 Solids Management . . . . . .8 - 9

6 Maintenance and Modifications . . . . . 9 - 11

6.1 Planned Maintenance and Modifications . . . . . 9 - 10

6.2 Monitoring Equipment Calibration and Maintenance 10

6.3 Summary of Proposed Alterations, Extensions, or Replacements 11

6.4 Modifications to Improve Performance and Reliability 11

7 Operating Problems . . . . . 11 – 13

7.1 Effluent Limit and Objective Exceedances 12

7.2 Equipment, Infrastructure and Process Failures 12

7.3 By-passes, Overflows, Spills and Abnormal Discharge Events 13

8 Conclusion . . . . . .13 - 14

1 Introduction

The Sioux Lookout Water Pollution Control Plant (WPCP) is regulated by the terms and conditions within Certificate of Approval Number 3-0250-92-006 (the Certificate). This Annual Report has been prepared in accordance with Condition 17 of the Certificate, and it shall summarize the system's performance over the previous calendar year (January 1 to December 31, 2017).

This Report is intended (1) to provide a performance record for future references, (2) to ensure that the Ministry of the Environment and Climate Change (MOECC) is made aware of problems as they arise, and (3) to provide a compliance record for the terms and conditions outlined in the Certificate. This report must contain, but shall not be limited to, the following information:

(a) A summary of all monitoring and compliance reports submitted in the reporting period, including an overview of the success and adequacy of the sewage treatment program (section 8);

(b) A comprehensive interpretation of all monitoring data and analytical data collected relative to the works during the reporting period and a comparison to the effluent quality and quantity criteria (sections 3.2 & 4);

(c) A summary of any effluent quality assurance or control measures undertaken during the reporting period (section 3.1);

(d) A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works (section 6.1);

(e) A description of any operating problems encountered and corrective actions taken during the reporting period (section 7);

(f) A summary of any proposed alteration, extension or replacement in the process or operation of the Works to be completed over the next reporting period which may require approval under the *Ontario Water Resources Act* (section 6.3);

(g) A tabulation of the volume of sludge generated in the reporting period and an outline of anticipated volumes to be generated over the next reporting period (section 5);

(h) An outline of the sludge handling methods and disposal areas to be utilized over the next reporting period (section 5);

(i) An evaluation of the calibration and maintenance procedures conducted on all monitoring equipment (section 6.2); and,

(j) An evaluation for the need for modifications to the Works to improve performance and reliability and to minimize upsets and bypasses (section 6.4).

2 System Description

The Sioux Lookout sewage works consist of sanitary sewers, sewage pumping stations and associated force-mains, and an extended aeration water pollution control plant. Sanitary sewers collect wastewater and direct it to multiple pumping stations located throughout the community, which in turn deliver the wastewater to the Robert Street Sewage Pumping Station. This pumping station includes an underground wet well and two variable speed submersible pumps for transferring wastewater via force-main to the Sioux Lookout WPCP for treatment.

Designed for the treatment and disposal of sewage, the Sioux Lookout WPCP has a hydraulic rated capacity of 2,840 m^3/day (average daily flow) with a peak flow rated capacity of 9,230 m^3/day. The facility includes a mechanical and stationary bar screen for the removal of large particles, a grit removal system, two circular treatment units each containing an aeration tank, clarifier, and aerobic digester, a chlorine contact chamber, and an outfall sewer discharging final effluent to Pelican Lake. The facility also includes a sludge dewatering system and a control building housing a laboratory, a gas chlorination system, an emergency diesel generator set, air supply equipment, control and metering systems, and piping, heating and ventilation systems. The Sioux Lookout WPCP is owned by the Corporation of the Municipality of Sioux Lookout and was operated by Northern Waterworks Incorporated (NWI) for the entire reporting period.

3 Water Quality

3.1 Monitoring Programs

Samples are collected by licenced operators and submitted to an accredited laboratory for analysis on a biweekly basis (once every two weeks) for influent (raw sewage) and effluent parameters. Minimum requirements concerning the sampling and testing of raw sewage and final effluent parameters are provided in Condition 15 (Monitoring and Recording) of the Certificate. Additionally, the sampling program has been designed to comply with the federal *Wastewater Systems Effluent Regulations* (WSER). Table 1 summarizes the sampling program employed at the Sioux Lookout WPCP.

Licenced operators also conduct in-house testing to determine the operational performance of the various stages of the treatment process and for quality assurance purposes as it concerns final effluent parameters. Table 2 summarizes those parameters that were routinely tested for operational control or quality assurance purposes during the reporting period. This table is intended to provide a summary of effluent quality assurance measures undertaken in the reporting period as required by Condition 17(c) of the Certificate. Typical control measures that may be implemented in response to test results include adjusting the rate of return activated sludge flow, altering the volume of solids removed from the treatment process (i.e. waste activated sludge), modifying chlorine dosages to optimize disinfection, modifying the operation of air supply equipment, and conducting plant cleaning and maintenance.

Table 1: Sampling program summary

Parameter	Sample Type[1]
Influent Monitoring (Once every two weeks)	
BOD5	Composite
Total Suspended Solids	Composite
Total Phosphorus	Composite
Total Kjeldahl Nitrogen	Composite
Effluent Monitoring (Once every two weeks)	
BOD5	Composite
CBOD5[2]	Composite
Total Suspended Solids	Composite
Total Phosphorus	Composite
Total Kjeldahl Nitrogen	Composite
Total Ammonia Nitrogen	Composite
Nitrate	Composite
Nitrite	Composite
pH	Composite
Field Temperature	Grab
Field Total Residual Chlorine[3]	Grab
E. coli	Grab
Sludge Monitoring (Annual)	
Solids, Phosphorus, Metals	Grab

1. A composite sample is a sample that is collected over a period of at least 24 consecutive hours. The sample consists of at least 24 discrete samples taken approximately one hour apart, with the volume of each sample being proportional to the sewage flow at the time the discrete sample is taken. A grab sample refers to an individual sample of sufficient size collected at a randomly selected time.
2. The final effluent parameter CBOD5 is not a component of the mandatory sampling program required by the Certificate. However, effluent CBOD5 must be tested on a monthly basis in accordance with the federal *Wastewater Systems Effluent Regulations*.
3. Regulatory testing for effluent total residual chlorine (TRC) is achieved through the in-house testing program. TRC is typically tested on a daily basis and is also tested coincident with E. coli sample collection.

Table 2: Testing program summary[1]

Parameter
Influent Monitoring
Dissolved Oxygen
Temperature
Effluent Monitoring
Dissolved Oxygen
Temperature
Free Residual Chlorine
Total Residual Chlorine
Total Suspended Solids (per CTU[2])
Process Monitoring[3]
Aeration 30 Minute Sludge Settling
Aeration Dissolved Oxygen
Aeration pH
Aeration Total Suspended Solids
Return Activated Sludge TSS[2]
Clarifier Sludge Depth
Clarifier Dissolved Oxygen
Clarifier Temperature

1. The testing program refers to all in-house tests conducted for purposes related to operational control and quality assurance. All samples collected for the in-house testing program are grab samples.
2. CTU = combined treatment unit; TSS = total suspended solids.
3. All process monitoring tests are conducted on each of the aeration tanks and secondary clarifiers associated with the two combined treatment units.

3.2 Monitoring Results

In accordance with Condition 17(b) of the Certificate, this report must provide a comprehensive interpretation of all monitoring and analytical data collected relative to the facility during the reporting period, complete with a comparison to the effluent quality criteria. Table 3 summarizes effluent monitoring results and compares them to the relevant objectives and compliance limits for regulated parameters and certain unregulated parameters.

Table 3: Effluent monitoring results summary and comparison with performance criteria[1]

Month	BOD5		TSS		TRC	E. coli[4]	TAN	Total P	CBOD5
	MAC[2] (mg/L)	MAL[3] (kg/d)	MAC (mg/L)	MAL (kg/d)	MAC (mg/L)	MGMD (MPN/ 100 mL)	MAC (mg/L)	MAC (mg/L)	MAC (mg/L)
Objective	**10**	**28.4**	**10**	**28.4**	**0.50**	**150**	**n/a**		
Limit	**25**	**71.0**	**25**	**71.0**	**1.20**	**200**	**n/a**		
Jan	4.1	7.2	8.4	14.8	0.43	14	0.29	0.29	3.5
Feb	5.3	9.6	7.6	13.9	0.48	10	1.18	0.23	4.1
Mar	6.1	12.0	14.5	28.5	0.45	9	0.63	0.44	5.1
Apr	4.7	10.1	12.4	26.8	0.45	5	0.58	0.32	3.3
May	4.6	10.3	7.3	16.3	0.36	22	0.22	0.22	2.3
Jun	1.0	2.1	2.7	5.7	0.37	7	0.07	0.14	1.0
Jul	1.6	3.2	6.3	12.4	0.42	2	0.08	0.18	1.0
Aug	1.0	1.9	6.7	12.3	0.49	1	0.24	0.24	1.0
Sep	1.6	2.9	6.2	11.4	0.50	1	0.72	0.23	1.7
Oct	1.5	2.9	3.8	7.3	0.48	4	0.42	0.19	1.0
Nov	5.0	8.8	16.8	29.6	0.37	2	0.37	0.40	3.4
Dec	5.0	8.2	7.6	12.6	0.44	334	0.68	0.31	4.5

1. BOD5 = five-day total biochemical oxygen demand; TSS = total suspended solids; TRC = total residual chlorine; TAN = total ammonia nitrogen; Total P = total phosphorus; CBOD5 = five-day carbonaceous biochemical oxygen demand; MAC = monthly average concentration; MAL = monthly average loading; MGMD = monthly geometric mean density.
2. Monthly average concentration is defined as the arithmetic mean of the daily concentrations of a contaminant in the effluent sampled or measured, or both, during a calendar month. For determinations related to monthly average concentrations, individual sample results that are below a lower detection limit are assigned a value of half the detection limit.
3. Monthly average loading is defined as the value obtained by multiplying the monthly average concentration of a contaminant by the monthly average daily flow over the same calendar month.
4. For determinations related to monthly geometric mean densities, individual sample results that are below or above a detection or reportable limit are assigned a value equivalent to that limit.

Effluent limits are summarized in Condition 12 (Non-Compliance) of the Certificate, and any exceedance constitutes non-compliance. Limits are expressed as monthly average concentrations and monthly average loadings for the parameters BOD5 and total suspended solids, as a monthly average concentration for the parameter total residual chlorine, and as a monthly geometric mean density for the parameter E. coli.

Effluent objectives are summarized in Condition 11 of the Certificate, and the facility must be designed, constructed, and operated to achieve the effluent objectives. Objectives are set at more stringent values than compliance limits, and they are expressed as monthly average concentrations and monthly average loadings for the parameters BOD5 and total suspended solids, as a monthly average concentration for the parameter total residual chlorine, and as a monthly geometric mean density for the parameter E. coli.

Effluent results were below the compliance limits for the entire reporting period except for an exceedance for the parameter E. coli in the month of December. Effluent results were also below the objectives for the entire reporting period except for the effluent parameter total suspended solids. The monthly average concentration for effluent total suspended solids exceeded the objective in the months of March, April and November; the monthly average loading for effluent total suspended solids exceeded the objective in the months of March and November. Refer to section 7.1 for more information concerning effluent limit and objective exceedances.

4 Flow Monitoring

Condition 13(a) of the Certificate states that the sewage works are approved to treat sewage at an average flow of 2,840 m^3/day, with a peak flow rate of 9,230 m^3/day. Condition 13(b) states that the introduction of sewage flows in excess of the peak flow rate is not approved under the Certificate. Additionally, Condition 13(c) states that the introduction of sewage flows in excess of the average daily flow for any consecutive period of time greater than one year is not approved.

Table 4 summarizes influent flow monitoring results. Throughout the reporting period, 764,700 m^3 of influent was introduced to the facility. On an average day 2,095 m^3 of influent was introduced, which represents 74% of the average daily rated capacity. The maximum amount of influent introduced to the facility on a given day in 2017 was 3,200 m^3, which represents 35% of the peak flow rate of the facility.

Table 4: Influent wastewater flows and solids management summary

Month	Influent Flows					Solids Management
	Total Volume (m^3)	Daily Flows (m^3/day)		Capacity Assessments[1]		Dewatered Sludge Volume Generated (m^3)
		Average	Maximum	Average	Maximum	
Jan	60,100	1,939	2,100	68%	23%	135
Feb	56,900	2,032	3,200	72%	35%	78
Mar	69,700	2,248	2,700	79%	29%	78
Apr	69,800	2,327	2,700	82%	29%	88
May	74,900	2,416	2,800	85%	30%	196
Jun	68,200	2,273	2,700	80%	29%	142
Jul	66,800	2,155	2,400	76%	26%	125
Aug	64,100	2,068	2,300	73%	25%	122
Sep	60,600	2,020	2,500	71%	27%	78
Oct	63,500	2,048	2,300	72%	25%	49
Nov	57,600	1,920	2,300	68%	25%	80
Dec	52,500	1,694	1,900	60%	21%	66
Total	764,700	---	---	---	---	1,236
Avg	63,725	2,095	---	74%	---	103

1. Capacity assessments compare average and maximum daily influent wastewater flows to the hydraulic rated capacity (2,840 m^3/day) and peak flow rated capacity (9,230 m^3/day) of the treatment facility, respectively.

5 Solids Management

In accordance with Condition 17(h) of the Certificate, this report must provide an outline of the sludge handling methods and disposal areas that will be utilized over the next reporting period. The volume of solids in the treatment process is controlled by directing activated sludge (i.e. waste activated sludge) to the respective aerobic digesters at the Sioux Lookout WPCP. Sludge is then transferred to a dewatering system for further processing, such that the solids are concentrated and much of the water present is removed and returned to the influent works. Dewatered sludge is then hauled by trailer to the Hidden Lake Landfill, where it is mixed with sand and used as cover for the site. Dewatered sludge is classified as non-hazardous solid industrial waste and is hauled by NWI in the province of Ontario under the Waste Management System Certificate of Approval No. 5667-5NCKYM. Any sewage, scum, grit or solids from preliminary treatment processes removed from the facility are hauled by NWI as septage under Certificate of Approval No. 0558-5MSHN6. Sludge management methods and disposal areas to be utilized over the next reporting period are not expected to change.

In accordance with Condition 17(g) of the Certificate, this report must provide a tabulation of the volume of sludge generated in the reporting period, in addition to providing an outline of anticipated volumes to be generated over the next reporting period. A tabulation of the amount of sludge generated in the reporting period is provided in Table 4. Approximately 1,236 m^3 of dewatered solids were removed from the facility in 2017, which was the result of dewatering 7,642 m^3 of waste activated sludge. The amount of dewatered sludge generated and removed from the facility in 2017 is anticipated to be between 1,000 m^3 and 1,500 m^3.

6 Maintenance and Modifications

6.1 Planned Maintenance & Modifications

In accordance with Condition 17(d) of the ECA, this report must include a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works. The Sioux Lookout WPCP employs a planned maintenance program that ensures that the sewage works and related equipment that are installed or used to achieve compliance are properly operated and maintained. Licenced Operators perform routine maintenance on all equipment including pumps, air supply equipment, chemical feed systems, monitoring equipment, alarm systems, safety equipment, and other treatment components. Both routine and non-routine (emergency) maintenance activities are conducted in accordance with manufacturers' instructions.

Additional significant planned inspection, maintenance, rehabilitation, and renewal activities that occurred during the reporting period are summarized below.

- On March 28, representatives from Konecranes replaced the trolley for the beam gantry crane hoist at the Robert Street Pumping Station. The trolley was upgraded to a 2-ton capacity unit.

- On April 20, representatives from GAL Power Systems conducted repairs to the emergency generator exhaust system at the WPCP.

- On April 29, representatives from Eaton Electrical updated the transfer switch associated with the emergency generator at the WPCP to a digital system. Old analog components were removed.

- On September 15, the grit room and channels were cleaned with the assistance of the municipal vacuum truck.

- All backflow prevention devices were tested and inspected by a representative from Venshore Mechanical on September 27. Two devices were identified as requiring replacement.

- Calibration verification for influent and effluent flow measuring devices was conducted by a representative from Syngery Controls Corporation on September 28. Both flow measuring devices passed calibration verification.

- Various maintenance activities and modifications were performed on the sludge dewatering system throughout 2017, including belt replacement, bearing replacements, the replacement of the floc drive and motor, and electrical repairs.

6.2 Monitoring Equipment Calibration and Maintenance

Condition 13(d) of the Certificate requires the installation, maintenance, and operation of a sufficient number of flow measurement devices. These devices must be calibrated at regular intervals not exceeding one year to ensure their accuracy within ± 5% of the full scale reading. Flow meters are required to measure a) the quantity of sewage being conveyed to and through the sewage treatment plant and b) the quantity of untreated sewage being bypassed to the disinfection facility.

Flow monitoring equipment indicated in the Certificate includes one (1) 229 mm throat dimension Parshall flume at the influent works and one (1) V-notch weir for measuring plant effluent flow. Additional monitoring equipment includes a handheld colorimeter for measuring chlorine residuals and a portable meter used for determining pH, temperature and dissolved oxygen concentrations. A summary of planned calibration and maintenance activities conducted on monitoring equipment is provided in Table 5.

Table 5: Summary of monitoring equipment calibration and maintenance activities

Equipment	Calibration & Maintenance Activities
Flow Measuring Devices (Influent & Effluent)	Daily inspection; annual calibration verification; calibration as required.
Handheld Colorimeter (Free and Total Chlorine)	Daily (weekdays) inspection; monthly quality assurance; calibration as required.
Portable Multi-Parameter Meter (Dissolved Oxygen, pH, Temperature)	Weekly (minimum) inspection; calibration and maintenance as required.

In accordance with Condition 17(i) of the Certificate, this report must include an evaluation of the calibration and maintenance procedures conducted on all monitoring equipment. Current planned calibration and maintenance procedures are considered to be adequate for all monitoring equipment.

6.3 Summary of Proposed Alterations, Extensions, or Replacements

In accordance with Condition 17(f) of the Certificate, this report must provide a summary of any proposed alteration, extension, or replacement in the process or operation of the works to be completed over the next reporting period which may require approval under the *Ontario Water Resources Act*.

There are no anticipated alterations, extensions, or replacements in the process or operation of the works to be completed over the next reporting period which may require approval under the *Ontario Water Resources Act*.

6.4 Modifications to Improve Performance and Reliability

In accordance with Condition 17(j) of the Certificate, this report must provide an evaluation for the need for modifications to the sewage works to improve performance and reliability and to minimize upsets and bypasses. For the purposes of this report, modifications intended to improve performance may include major and minor capital and operational projects planned for future reporting periods. Modifications to improve the performance and reliability of the sewage treatment program include:

- Effluent total residual chlorine (TRC) at the facility is greater than the prospective federal effluent TRC water quality standard of less than 0.02 mg/L. This standard will come into force on January 1, 2021, and the Sioux Lookout WPCP will be required to either switch to an alternative disinfectant or to install a dechlorination chemical feed system. This work will also result in the issuance of an updated Approval for the facility prior to the installation of required equipment.

- While an effluent limit for pH is not currently included in the Certificate of Approval for the Sioux Lookout WPCP, any updated Approval would likely include a pH effluent limit range of between 6.0 and 9.5. The facility would not be able to consistently achieve this effluent limit, and consideration may be given to the installation of a pH adjustment chemical feed system. Such a system would also help to control effluent total ammonia nitrogen, which is likely to be included as a regulated effluent parameter in an updated Approval.

7 Operating Problems

In accordance with Condition 17(e) of the Certificate, this report must provide a description of any operating problems encountered and corrective actions taken during the reporting period. For the purposes of this report, operating problems may be indicated by 1) effluent limit and objective exceedances, 2) equipment, infrastructure and process failures, and 3) by-passes, overflows, spills, and abnormal discharge events.

7.1 Effluent Limit and Objective Exceedances

7.1.1 E. coli

In December the monthly geometric mean density for effluent E. coli was 334 MPN/100 mL, which is greater than the effluent limit and objective of 200 MPN/100mL and 150 MPN/100 mL, respectively. The exceedance was attributed to a single result equal to 1990 MPN/100mL from a sample collected on December 28. The grab sample was incorrectly collected from the head of the chlorine contact chamber, immediately after effluent enters the chamber. At this location there is an insufficient amount of detention time to achieve disinfection, and the water quality is not representative of water that is discharged to the environment. The sampling error was identified and corrected.

7.1.2 Total Suspended Solids

The monthly average concentration for effluent total suspended solids exceeded the objective in the months of March, April and November; the monthly average loading for effluent total suspended solids exceeded the objective in the months of March and November. The objective exceedances were not promptly identified, and no specific best efforts were applied to manage total suspended solids concentrations beyond normal operational adjustments. Importantly, there were no compliance limit exceedances during the reporting period for effluent total suspended solids.

7.2 Equipment, Infrastructure and Process Failures

Operating problems associated with significant equipment, infrastructure and process failures that occurred during the reporting period include the following:

- On March 15, the clarifier drive associated with treatment unit no. 2 failed. The drive motor and helical gearbox were replaced, and the drive was placed back into service.
- On April 24, the emergency generator at the Robert Street Pumping Station failed to start. The associated batteries were replaced by municipal mechanics and operation was restored.
- On May 17, the emergency generator at the WPCP failed to start after the coupling on the cooling system failed and caused a high temperature fault condition. Municipal mechanics fixed the coupling and operation was restored.
- On May 23, it was identified that the blower no. 1 motor at the WPCP was starting to fail. The motor was disconnected and rebuilt.
- On May 23, there was a failure of the programmable logic controller at the Robert Street Pumping Station. A new PLC was installed on June 21 and 22 by the automation service provider.

7.3 Bypasses, Overflows, Spills and Abnormal Discharge Events

A by-pass refers to the diversion of sewage around one or more unit processes within the treatment facility, whereby diverted sewage flows are returned to the treatment facility upstream of the final effluent sampling location and are discharged to the environment through the plant outfall. By-passes are prohibited except in certain situations and may be planned (i.e. for maintenance or research purposes) or unplanned (i.e. emergency situations or high flow conditions).

A plant overflow means a discharge to the environment from the sewage treatment facility at a location other than the plant outfall or into the plant outfall downstream of the final effluent sampling location. Overflows are prohibited except in certain situations, and special reporting, sampling, and recording requirements apply in the event of an overflow.

Spills are releases of pollutants into the natural environment from or out of a structure, vehicle or other container that is abnormal in quality or quantity in light of all the circumstances of the discharge. Abnormal discharge events include any other abnormal events not otherwise classified as a bypass, overflow, or spill.

There were no bypasses, overflows or spills during the reporting period for the Sioux Lookout WPCP.

8 Conclusion

In accordance with Condition 17(a) of the Certificate, this report must provide a summary of all monitoring and compliance reports submitted in the reporting period, including an overview of the success and adequacy of the sewage treatment program. All owners of mechanical sewage treatment plants are encouraged to submit Municipal Utility Monitoring Program forms to the Ministry of the Environment and Climate Change (MOECC). These forms summarize monitoring data and are completed for every calendar month. All such forms were completed and submitted to the MOECC for the entire reporting period.

Analytical and flow monitoring data suggest a successful and adequate sewage treatment program. Except for a single compliance limit exceedance, the Sioux Lookout WPCP was capable of consistently meeting all compliance limits for the final effluent parameters biochemical oxygen demand, total suspended solids, total residual chlorine, and E. coli. Additionally, all flows to the sewage works during the reporting period were below the maximum hydraulic capacity of the facility, and the annual average daily flow was below the rated capacity.

Facility performance with respect to the total number of effluent limit and objective exceedances across all parameters is summarized in Table 6. The goals of the sewage treatment program for 2018 are (1) to eliminate all compliance limit exceedances and (2) to maintain or improve system performance with respect to effluent objective exceedances.

Table 6: Compliance history – total number of effluent limit and objective exceedances[1]

Year	No. of Limit Exceedances				No. of Objective Exceedances				Total
	BOD5	TSS	TRC	EC	BOD5	TSS	TRC	EC	
2013	0	0	0	0	0	4	12	0	16
2014	0	0	0	1	0	12	10	0	23
2015	0	0	0	1	0	4	3	0	8
2016	0	0	0	1	0	1	0	0	2
2017	0	0	0	1	0	5	0	0	6

1. BOD5 = total biochemical oxygen demand; TSS = total suspended solids; TRC = total residual chlorine; EC = Escherichia coli.