Long Sault Wastewater Treatment System
2019 Annual Performance Report

Certificate of Approval No. 3-0918-93-979 (June 1997)
Works No. 120000131

Completed by
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1.0 Introduction

This Annual Performance Report is submitted to satisfy the requirements of the Certificate of Approval issued to the Long Sault WWTP. (Amended C of A No. 3-0918-93-979, June 1997).

This report corresponds with the period from January to December.

This Annual Report provides:

- an overview of the wastewater treatment plant performance;
- a summary and interpretation of all monitoring data and analytical results collected, including quality and quantity;
- a summary of the system operation, including calibration, information on operating problems encountered in the reporting period, and modifications to the works to correct the problems;
- a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated over the next reporting period, and an outline of the sludge handling methods and disposal areas to be utilized over the next reporting period;

2.0 Wastewater Treatment Performance

The current treatment system for Long Sault consists of a sequential batch reactor (SBR) process.

Overall, the wastewater treatment facility in Long Sault has operated efficiently and has proven to provide consistent removal efficiencies for the design parameters. Appendix A contains the monthly quantity and quality values.

Please note that the data contained in Appendix A represents all the acquired data throughout the year, including laboratory results and "in-house" testing at the plant.

2.1 Raw Wastewater Characteristics

The average process wastewater flow rate was 1,602 m^3/d (59% of the average daily design flow of 2,700m^3/d). The plant is rated at 11,500m^3/d (peak daily flow). The maximum daily flow did not exceed the plant's rated peak capacity. Appendix A contains the monthly quantity and quality values for the influent and effluent.

2.2 Treatment Performance

Table 2.2 outlines the treatment efficiencies of the treatment process within the facility.

Table 2.2: System Treatment Performance

Constituent	Raw Influent mg/L	Final effluent mg/L	Final eff. C of A mg/L	Average Loading kg/d	Loading C of A kg/d	Average Removal Efficiency (%)
CBOD (mg/L)	89	1.61	25	2.56	67.5	98
SS (mg/L)	201	3.73	25	5.76	67.5	98
TP (mg/L)	5.37	0.52	1	0.80	2.7	85
NH3+NH4	13.79	0.79	15	0.86	40.5	94
E. Coli (cnts/100ml)		2 (geometric mean)	200			

3.0 Effluent Monitoring

The results are based on weekly samples, which are taken from the influent channel ahead of the pretreatment equipment (raw sample) as well as in the effluent channel prior to the effluent discharge pumps.

Total sewage flows (m^3), average sewage flow (m^3/d) and peak daily flows (m^3/d) are tabulated each month.

Disinfection results (sampled weekly) are recorded in the annual monitoring and performance report which is attached (Appendix A).

Composite raw samples are collected and analyzed weekly for Suspended Solids, Total Phosphorous, Dissolved Reactive Phosphorous, Total Kjeldahl Nitrogen, Ammonia + Ammonium Nitrogen, Nitrite + Nitrate Nitrogen, Alkalinity, pH, and $CBOD_5$.

Composite final effluent samples are collected and analyzed weekly for Suspended Solids, Total Phosphorous, Dissolved Reactive Phosphorous, Total Kjeldahl Nitrogen, Ammonia + Ammonium Nitrogen, Nitrite + Nitrate Nitrogen, Alkalinity, pH, and $CBOD_5$.

Grab samples of Total Coliform, Fecal Coliform/E. Coli, Fecal Streptococcus are also collected weekly.

In addition to the routine sampling program above, on site testing is performed on the final effluent for temperature and pH 5 times per week.

Please refer to Appendix A for the monthly quantity and quality results.

Effluent Quality

In accordance with the C of A:

In Compliance

- Non-compliance with respect to concentrations of $CBOD_5$ in the effluent is deemed to have occurred when the annual average concentration exceeds 25 mg/L during any twelve consecutive calendar months.

In Compliance

- Non-compliance with respect to concentrations of Suspended Solids in the effluent is deemed to have occurred when the annual average concentration exceeds 25 mg/L during any twelve consecutive calendar months.

In Compliance

- Non-compliance with respect to concentrations of Ammonia + Ammonium in the effluent is deemed to have occurred when the daily concentration exceeds 15 mg/L during any calendar day.

In compliance

- Non-compliance with respect to concentrations of Total Phosphorus in the effluent is deemed to have occurred when the monthly average concentration exceeds 1 mg/L during any calendar month.

In compliance

- Non-compliance with respect to total loading of $CBOD_5$ in the effluent is deemed to have occurred when the annual average loading exceeds 67.5 kg/d during any twelve consecutive calendar months.

In Compliance

- Non-compliance with respect to total loading of Suspended Solids in the effluent is deemed to have occurred when the annual average loading exceeds 67.5 kg/d during any twelve consecutive calendar months.

In compliance

- Non-compliance with respect to total loading of Total Phosphorus in the effluent is deemed to have occurred when the annual average loading exceeds 2.7 kg/d during any twelve consecutive calendar months.

In compliance

- Non-compliance with respect to loading of Ammonia + Ammonium Nitrogen in the effluent is deemed to have occurred when daily concentration during any calendar day, multiplied by the average daily flow over the seasonal period the sample was taken exceeds 40.5 kg/d.

In Compliance

- Non-compliance with respect to E.coli in the effluent is deemed to have occurred when the monthly geomean exceeds 200 CFU (colony forming units).

Please refer to Appendix A for a detailed look at the analytical results.

4.0 Plant Operations

A preventative maintenance program is in effect at the Long Sault WWTP. Preventative maintenance is scheduled on a weekly basis and records are maintained of completed activities.

In 2001, CANEAU had a computerized maintenance program installed to ensure that preventative maintenance is preformed on all equipment in accordance with the manufacturer's specifications.

The last compliance inspection conducted by the MOECC was February 16, 2017.

The flow meter was calibrated on November 26, 2019 by Capital Controls.

4.1 Operational Problems

A logbook of operational activities and problems is maintained at the treatment facility.

4.2 Maintenance

The following is a list of repairs, calibrations and upgrades that took place at the Long Sault WWTP in the reporting period:

- January 16 – St. Lawrence Insulation on site to repair biofilter inlet insulation tear.
- January 16 – Marleau Mechanical on site to replace damaged solenoid valve on control system for biofilter.
- January 21 – Marleau Mechanical on site to repair last solenoid valve on biofilter system.
- January 21 – Marleau Mechanical on site to inspect motor on spiral aerator.
- January 21 – Township on site to complete VPN work.
- January 25 – Surgeson electric on site to remove motor on spiral aerator.
- January 31 – Marleau Mechanical on site to work on boiler system.
- February 20 – Surgeson Electric on site to troubleshoot motor issue – discovered the problem was in the PLC – called Capital Controls – they arrived on site to repair PLC issue.
- February 20 – Marleau Mechanical on site to install repaired spiral aerator motor.
- February 21 – Marleau HVAC on site to replace broken shutoff and ordered new faucet to replace existing one that's leaking.
- February 22 – Surgeson Electric on site to troubleshoot solenoids and timers.

- March 15 – McEwen on site to fill diesel tank.
- March 22 – David Brown on site emptying thickened WAS tank to troubleshoot pump problem.
- March 24 – David Brown on site pumping down thickened tank.
- March 24 – Surgeson Electric on site to repair ATAD power pump cord.
- March 27 – GenRep on site to perform semi-annual inspections – both batteries are in need of replacement – generator won't start in current state.
- March 29 – Capital Controls on site to install new level sensor on thickening tank.
- April 10 – Cintas on site to replenish first aid kit/eye wash station.
- April 12 – Township IT on site to work on VPN for computer.
- April 26 – Marleau Mechanical on site to service boiler and HVAC system.
- May 15 – CDTec on site to work on gas monitoring system.
- May 24 – Marleau Mechanical on site to repair leak on hot water recirculation copper line.
- June 6 – Third High Farms on site to haul 40m3 from long term storage.
- June 12 – Township IT on site to change password on computers.
- June 17 – Township IT on site to install anti-virus software.
- June 18 – Marleau Mechanical on site to inspect air handling unit VFD – fan overheating – unit needs replacing.
- June 18 – Township IT on site troubleshooting computer fault.
- June 24 – Marleau Mechanical on site installing new VFD on air handling unit.
- June 25 – Third High Farms on site to haul 40m3 sludge from long term storage.
- July 2 – Third High Farms on site to haul 40m3 from long term storage.
- July 10 – Surgeson on site to troubleshoot foam cutter panel relating to July 9 call-in.
- July 15 – Surgeson on site troubleshooting ATAD Feed Pump #1, repaired faulty connection.
- August 14 – Third High Farms on site to haul from long term storage.
- August 15 – Third High Farms on site to haul from long term storage.
- August 16 – Third High Farms on site to haul from long term storage.
- September 18 – Marleau Mechanical on site to disconnect existing effluent pump and connect new effluent pump.
- September 18 – Macgregor on site to remove existing effluent pump and deliver new effluent pump.
- September 23 – Capital Controls on site to troubleshoot SCADA issue. CC removed one hard drive and will replace it.
- September 24 – Capital Controls on site to fix SCADA issue. New hard drive installed and both SCADA and Win911 systems repaired.
- October 9 – Gen Rep on site for annual generator maintenance and testing.
- October 10 – Marleau Mechanical on site to troubleshoot exhaust fans and to repair broken water line.
- October 15 – Surgeson on site to install new overload on foam cutter #1.
- October 25 – Surgeson on site to troubleshoot bar screen #1 rake issues.
- October 25 – Third High Farms on site to haul from long term storage.
- October 31 – Marleau on site to install new motor for blower boom exhaust.
- November 5 – Marleau and Surgeson on site to work on generator exhaust system.
- November 8 – EVB Engineering on site at Post Rd pumping station to inspect electrical in wet well.
- November 13 – Marleau HVAC on site to troubleshoot heating system.
- November 14 – Received delivery of 25 cubic yards of biofilter agent for capital project.
- November 19 – Third High Farms on site to haul from long term storage.
- November 19 – St. Lawrence Insulation on site inspecting duct work.
- November 21 – Third High Farms on site to haul from long term storage.
- November 21 – Enbridge Gas on site at Post Rd pumping station to investigate natural gas supply to generator.

- November 25 - Third High Farms on site to haul from long term storage.
- November 26 – Capital Controls on site to calibrate flow meters and level sensors at plant and pumping stations.
- November 27 – Ambio Filtration on site to start capital project of biofilter media replacement.
- November 28 – Marleau on site to fix hot water tank.
- November 28 – Ambio Filtration on site to remove biofilter media.
- November 29 – Ambio Filtration on site to load new biofilter media.
- December 2 – Eastern Welding on site to repair biofilter tank.
- December 2 – Marleau Mechanical on site at Post Rd pumping station, checking natural gas line for ugrades.
- December 4 – Marleau Mechanical on site at Post Rd pumping station to upgrade gas line for generator.
- December 5 – Gen Rep on site at Post Rd pumping station to verify gas pressure for generator.
- December 11 – Marleau Mechanical on site to disconnect effluent pump #2 and connect refurbished effluent pump.
- December 11 – MacGregor Crane on site to pull effluent pump #2 and install refurbished effluent pump.
- December 16 – Bell on site. Bell line had been disconnected down the road from Milles Roches pumping station.
- December 18 – Marleau Mechanical on site to install new thickened sludge mixer pump.

4.3 Completed Modifications

- There were no completed modifications in 2019.

4.4 Planned Modifications

- There are no planned modifications for 2020.

5.0 Biosolids Management

WSP Canada Inc. was retained to coordinate the transfer and disposal via land application of sewage biosolids from the Long Sault Sewage Treatment Plant (STP) over the course of 2019.

The beneficial use of the sewage biosolids for the purpose of improving the growth of agricultural crops was demonstrated through laboratory analysis in accordance with O. Reg. 267/03. Material application rates were determined based on field conditions and agronomic and/or crop removal balances incorporating assessment of nutrients, metals and solids loading.

The stored biosolids were transferred by Third High Farms Limited (Iroquois, ON) via tankers and hauled to Land Application Sites with active NASM Plans in accordance with ECA 0936-574KQF. Field markers delineating the required separation distances to sensitive features were positioned by Third High Farms at all land-application sites as per the setbacks shown on the appropriate NASM Plan field sketches. The material was land applied by direct injection and/or immediately incorporated to reduce odour and minimize runoff potential.

The total volume of biosolids transferred from the Long Sault STP in 2019 was **1,220 m^3**. The receiving field locations and volumes applied are detailed in Table 1 below along with nutrient loadings.

*Table 1**: NASM Land Application Summary, Long Sault Sewage Treatment Plan***

DATE	NASM PLAN OWNER / ID	FIELD / AREA	MATERIAL SOURCE	TOTAL VOLUME (M^3)	NITROGEN LOADING (KG/HA)	PHOSPHOROUS LOADING (KG/HA) †	POTASSIUM LOADING (KG/HA) ††
August 15, 2019	Habers – 23973	Habers GH, Lot 16, 17 Con. 6	Long Sault	720	63	56	0
August 16, 2019	Habers – 23973	Habers F, Lot 16, 17 Con. 6	Long Sault	340	27	24	0
November 15, 2019	Rombough – 23325	Neville Home B – Lots 21, 22, 23, 25, 26 Con 5, Lot 18 Con 6	Long Sault	160	77	60	0

† Phosphorus as P2O5
†† Potassium as K2O

Based on recent historical (2014 - 2019) annual volumes of biosolids transferred from the facility, the volume of biosolids generated by the Long Sault STP in 2020 is anticipated to be approximately 1,000 m3. It is anticipated there will be a greater quantity to land apply in 2020.

Metals of concern resulting from the land application of sewage biosolids include As, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, Se, Zn. Cumulative metal loadings for these fields range from 0% to 18% of the maximum metal loading limit for five (5) years.

Table 2 below provides a summary of the agricultural fields approved to receive Long Sault STP sewage biosolids (these fields are also approved to receive Ingleside STP material) and, based on nutrient loadings resulting from current and past applications, the remaining capacity of the field to receive material. Please note this is an estimate as nutrient and metals loadings will vary based on material quality data and application rates established at the time of application.

*Table 2**: Inventory of Fields Approved Under a NASM Plan to Receive Ingleside and Long Sault Biosolids.***

FIELD	NASN PLAN OWNER/ID	AREA AVAILABLE FOR NASM (HA)	COMMENT
Rombough North	Rombough – 23325	9	Unavailable – Maximum five-year Phosphorous loading reached.
Rombough South	Rombough - 23325	27	Unavailable – Maximum five-year Phosphorous loading reached.
Hollister Rd.	Rombough - 23325	16	**Available** - Field has not received material under this NASM plan.
Neville Rd.- Home	Rombough - 23325	13	**Available** – Can receive Long Sault material

FIELD	NASN PLAN OWNER/ID	AREA AVAILABLE FOR NASM (HA)	COMMENT
Neville Rd. - South East	Rombough - 23325	3	**Available** - Field has not received material under this NASM plan.
Neville Rd. - South West	Rombough - 23325	2	**Available** - Field has not received material under this NASM plan.
Habers Field B + C	Habers - 23973	7.1	Unavailable – Maximum five-year Phosphorous loading reached.
Habers Field D + E	Habers - 23973	11.5	Unavailable – Maximum five-year Phosphorous loading reached.
Habers Field F	Habers - 23973	9.8	Could receive approximately 500 m3 of Long Sault material at a low application rate
Habers Field G + H	Habers - 23973	9	Unavailable – Maximum five-year Phosphorous loading reached.
Gallinger Edwards Rd	Gallinger - 24012	21	**Available** - Field has not received material under this NASM plan.
Gallinger Home Field	Gallinger - 24012	28	**Available** - Field has not received material under this NASM plan.

Fields have been identified for spring 2020 land application of Long Sault material and will be confirmed closer to land application dates based on field availability and weather conditions.

Appendix A
Wastewater Data & Rolling Averages