2018 ANNUAL REPORT

Pickle Lake Wastewater Pollution Control Plant

Introduction

The **Pickle Lake Wastewater Pollution Control Plant System** (C of A # 3-1360-90-006) is obligated to meet the requirements of Ontario's *Environmental Protection Act, (R.R.O. 1990 Regulations 358 Sewage Systems),* The law. All discharges of **wastewater** to the natural environment are regulated under the **Ontario Water Resources Act**. There are also regulations under the **Environmental Protection Act** covering 9 specific industrial sectors:

The MISA (Municipal and Industrial Strategy for Abatement) program was initiated with a series of sector specific monitoring regulations which referred to a common General Regulation (Effluent Monitoring Regulation, General:

Ontario Regulation 695/88 as amended to 533/89). The General Regulation contained, among other things, the common requirements, guidelines, principles and protocols related to the sampling, preservation, storage and analysis of wastewater samples, the minimum numbers and types of field and laboratory quality control samples to be included and a general guideline for data recording and reporting.

The General Regulation was replaced with the above listed nine sector-specific regulations during the period 1993–1995. Minor amendments were made to these nine regulations in 2007.

This Protocol may also be incorporated by reference into instruments issued under legislation administered by the Ministry, including in Environmental Compliance Approvals (ECA), other forms of approvals (e.g. Certificate of Approval), and/or Orders.

1.2 Scope:

This Protocol contains much of the same information originally presented in the General Regulation. It includes direction on techniques for planned sampling of industrial/municipal wastewater, preservation of samples and their storage requirements, maximum storage times allowed prior to analysis, the most appropriate and where applicable alternate preparation and instrumental analysis protocols and the type and frequencies of field and laboratory QC samples.

This document represents a synthesis of best available information from organizations including the Ontario Ministry of Environment and Climate Change (e.g. Brownfields), Environment Canada (e.g. CCME protocols), Standard Methods for the Examination of Water and Wastewater (Current edition, American Public Health Association), and the U.S. Environmental Protection Agency (Federal Register CFR40 part 136).

It also incorporates the recommendations and conclusions reached through collaborative efforts of government, industrial and private laboratory personnel.

The techniques described here may be applicable to unplanned sampling events, but the sampling of unplanned events is beyond the scope of this document. This document also defines the principles and protocols which must be followed by all laboratories handling samples collected under the Effluent Monitoring and Effluent Limits regulations.

In some cases, it intentionally stops short of stipulating any detailed procedures, methods or control techniques. While this approach can leave room for interpretation and uncertainty resulting in slight differences in sampling or analytical procedures, it also leaves room for improvement, analyst discretion and modernization of techniques which can improve the quality of environmental analytical data being generated. Effluent Sampling/Analytical Protocol Chapter 1:

Introduction Version 2.0 Page 3 January 1, 2016 Throughout the document, “Ministry” and “Ministry officials” refers to the Ontario Ministry of the Environment and Climate Change (MOECC) and its employees, unless indicated otherwise.

Report Availability

This Curtesy Annual Report shall be given, to the Township of Pickle Lake. This Annual Report shall be made available upon request at the following locations:

(1) Town Office, 2 Anne Street, Pickle Lake
(2) Township of Pickle Lake Website (www.picklelake.org)

System Overview

Certificate of Approval System Description (1-1561-75-02):

Whereas Union Meniere Explorations & Mining Corporation Limited, Montreal Quebec has applied in accordance with section 42 of the Water Resources Act for the Approval:

The Pickle Lake Township Sewage Treatment Plant to be located on crown land in the Township of Ponsford, in the district of Kenora, northwest of Pickle Lake Townsite between Pickle Lake and the settlement of Central Patricia consisting of a fabricated extended aeration sewage treatment plant having the average daily capacity of 0.2 MGD or 909 M3 Day with an inlet chamber, bar screen, comminutor, grit removal facility, aeration tank, air diffusion equipment, settling tank, sludge holding tank, chlorine contact chamber, on site drying beds, and all necessary, valves, piping, internal power, control wiring, etc., including standby power, alarms and standby chlorination facilities, together with out-fall sewer and open ditch to the Kawinogans River approximately 4,500 feet upstream of Central Patricia, all in accordance with preliminary plans and specifications prepared by Kilborn Engineering Limited, consulting Engineers, at a total estimated cost including Engineering and contingencies, of One Million Four Hundred and Twenty Thousand Dollars, ($1,420,000.00).

Therefore, this is to certify that after the inquiry the said proposed works have been approved under section 42 of the Ontario Water Resources Act.

This is a true copy of the original Certificate Mailed on May 17th 1976, Dated at Toronto 13th day of May 1976, by Mr. T. Murphy Environmental Assessment Board.

Whereas the Township of Pickle Lake has applied in accordance with Section 24 of the Ontario Water Resources Act for approval of: Sanitary Sewers, Force mains, Sewage Pumping Stations and Appurtenances to be constructed in the Township of Pickle Lake as follows:

Sanitary Sewers:

General Process Description

1. The Main Lift Station is at the end of Koval Street off the lake shore, it has a two-pump system which takes all the flows from the gravity flow Collection System in Pickle Lake Township, and then pumps it up to the Wastewater Pollution Control Plant for Pickle Lake Township.

2. There is a wet well outside the building with a bar screen and walk way installed, with two air vents and a ladder for entry.

3. There are two pumps installed in a dry well which is located inside the Main Lift Station Building, there is also a sump pump installed in the dry well to keep it dry in case of leaks.

4. The two pumps pump up a force main to the Wastewater Pollution Control Plant down at the end of the road.

5. The wet well is considered a confined space entry location and when entering the confined space entry procedures must be followed at all times.

6. The dry well can be considered safe for entry however if there are leaks it is then considered a confined space entry system, treat as confined space to be safe and always have a spotter on top when working inside the dry well.

7. The Dry well holds two pumps and the must be checked monthly when the maintenance is being done.

8. The pump control panel is mounted on the wall up and outside the dry well inside the Lift Station Building.

9. The Lift Station building holds all the electrical equipment for the two pumps below in the dry well and also has Heaters, Lights and an alarm system.

10. Outside the building is the main disconnect from the Hydro power supply

11. The diesel generator building outside holds the diesel generator and switch gear required for it operation.

Process Description Wet Well Chamber:

The following subsections provide descriptions of the main components of the Main Lift Station System:

1. This is a cement structure buried below ground surface, which the flows enter from the Gravity collection system from the Pickle Lake collection system area.
2. The Inlet Invert comes from the manhole above on the side of Koval Street.
3. There is a Bar Screen below the Invert which catches rags and large debris during the 24/7 operation period.
4. There are two vent stacks located on top of the wet well for ventilation when required.
5. There is a walkway in the wet well that was installed so easy cleaning of the bar screens.
6. There are floats installed to control the operation of the pumps and also supply low and high-level alarms.

Certificate of Approval System Description (3-1360-90-006):

The final certificate of approval, Number 3-1360-90-006 has been issued to the Township of Pickle Lake subject to the following outlined conditions. The reason for the imposition of the condition is as follows:

To ensure that all proposed sanitary water connections, including future connections are serviced correctly by the downstream sanitary sewer collection system, and is within the treatment capacity of the downstream sanitary sewage works, both in terms of effluent requirements and hydraulically.
The township may be written notice within 15 days by the Environmental Appeal Board after receipt of this notice, requiring a hearing from the board. Section 63 of the Ontario Water Resources Act 1980 C. 361 provides that the notice requiring the hearing shall state the portions of each term or condition in the approval in respect of which the hearing is required.

This notice should be served upon:

The Secretary, Environmental Appeal Board, 112 St. Clair Ave. West, 5th Floor, Toronto, Ontario M4V 1N3	&	The Director, Section 24, OWR Act, Ministry of the Environment, 250 Davisville Avenue, Toronto, Ontario M4S 1H2

Whereas the Township of Pickle Lake has applied in accordance with Section 24 of the Ontario Water Resources Act for approval of: Sanitary Sewers, Force mains, Sewage Pumping Stations and Appurtenances to be constructed in the Township of Pickle Lake as follows:

Sanitary Sewers:

Street	from	To
Hwy. 646	Easement to existing Manhole No. 44	Approx. 136 m North of easement to manhole 44
7 m easement L PA 4462	Hwy. No. 646	Approx. 163 m West of Hwy. No. 646

Force main:

Easement	Sewage Pumping Station	Approx. 400 m West of Sewage Pumping Station

Sewage Pumping Station Consists of:

1. 2.1 m Diameter wet well.
2. Two (2), one duty and one standby Submersible pumps rated at 21.45 L/s against 17.37 m Total Dynamic Head.
3. Connection to an existing 187 KVA Diesel Generator.
4. Float switches, interconnection piping and valves, emergency by-pass chamber.
5. A 3.6 x 3.6 m Lift Station enclosure.
6. This is the Lakeview Crescent Lift Station.

Therefore:

This is to certify after due enquiry the said proposed works have been approved under section 24 of the Ontario Water Resources Act.

This is including stub sanitary sewers and sanitary service drains from the main sewer to the street line, all in accordance with the following documents, namely, final plans and specifications prepared by Hileri Consultants Ltd., contingencies, of Two Hundred and Fifty Five Thousand Dollars, ($255,000.00), and all additional stub sanitary sewers and sanitary service drains from the main sewer street line not included in the above Final plans and specifications as may be approved by the Operating Authority in the future in accordance with the conditions of the Certificate of Approval.

Condition:

The Operating Authority shall not approve any additional stub sanitary sewers and sanitary services drains from the main sewer not included in the documents referred to above unless it has reviewed the hydraulic capacity of the downstream sanitary sewer collection system and the sanitary sewage treatment works serving them and has concluded that the additional stub sanitary sewers and sanitary services drains together with all existing and previously approved stub sanitary sewers and sanitary services drains will not overload either the downstream sanitary sewer collection system or the sanitary sewage treatment works and has recorded its review and conclusion in writing.

This record shall be maintained by the operating authority and shall be summarized in a yearly report to be sent to the District Officer of the Ministry's District Office by February 15th of the following calendar year in which the records were collected.

Dated at Toronto This 26th day of September, 1990.

System Overview (continued)

System Expenses

In accordance with best Practise annual costs are estimated for sewage system in **Table 1**. Other expenses have also been provided within the table, including those expenses related to equipment inspections and acquiring spare equipment or parts. Also included are building repairs and maintenance supplies.

Table 1: 2018 System Expenses

Items	New	Repair	Replace	Inspection	Spare	Expense
Sewage Sampling				12		$3,845.55
Clarifier Repairs						$0.00
Sewage plant Equipment	1			2		$2,043.01
Back Hoe Rental						$0.00
Sewage Buildings Repair supplies		1				$769.97
Totals Repair Costs						$6,658.53

Sewage Quality Influent and Effluent:

In accordance with the Certificate of Approval an (Annual Report), 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 Pickle Lake Sewage treatment plant employs an in-house sample taken and the free chlorine residual required to achieve primary disinfection at the Final Effluent. Additionally, Sewage Influent are analyzed on a Monthly basis in Table 2:

Table 2 Parameters 2018:

INFLUENT:

Month	BOD_5 (mg/L)	SS (mg/L)	Total P (mg/L)	TKN (mg/L)
Jan	49.9	58.6	1.80	15.3
Feb	49.0	30.7	1.84	15.7
Mar	48.0	51.2	2.04	17.2
Apr	53.6	62.6	2.18	16.6
May	40.6	51.6	1.74	13.9
Jun	27.4	34.4	1.14	12.8
Jul	15.6	9.8	1.38	12.1
Aug	40.2	40.7	2.13	20.1
Sep	30.0	20.9	1.76	14.3
Oct	32.4	6.1	1.80	17.7
Nov	26.0	26.8	1.19	12.4
Dec	56.0	71.2	2.21	18.3
AVERAGE:	**39.0**	**38.7**	**1.77**	**15.5**

$CBOD_5$ = Carbonaceous Biochemical Oxygen Demand; SS = Suspended Solids; Total P = Total Phosphorus; TKN = Total Kjeldahl Nitrogen; TAN = Total Ammonia Nitrogen.

EFFLUENT:

Month	CBOD $_5$ (mg/L)	SS (mg/L)	Total P (mg/L)	TKN (mg/L)	TAN (mg/L)	Unionized Ammonia (mg/L)	pH	E-Coli
Jan	<2.0	3.3	0.907	2.92	0.214	0.00379	7.82	50
Feb	<2.0	6.3	0.847	1.96	0.108	0.00155	7.73	30
Mar	<2.0	3.5	1.38	2.31	0.180	0.00284	7.77	<10
Apr	<2.0	4.4	0.976	3.08	0.322	0.00668	7.89	<10
May	2.2	4.7	0.683	2.93	0.117	0.00212	7.83	7
Jun	<2.0	2.7	0.727	12.8	0.95	0.0179	7.85	<10
Jul	<2.0	<2.0	1.50	2.68	1.34	0.0277	7.89	0
Aug	<2.0	2.8	1.77	2.10	0.852	0.0231	8.01	3
Sep	<2.0	<2.0.	1.68	1.95	0.930	0.0216	7.94	2
Oct	<2.0	2.9	1.25	2.81	0.909	0.0180	7.87	44
Nov	<2.0	3.2	1.32	2.19	0.378	0.0103	8.01	100
Dec	3.0	8.0	1.36	2.17	0.381	0.00905	7.95	1790
AVG:	**<2.0**	**3.8**	**1.20**	**3.33**	**0.557**	**0.0121**	**7.88**	**171.3**

$CBOD_5$ = Carbonaceous Biochemical Oxygen Demand; SS = Suspended Solids; Total P = Total Phosphorus; TKN = Total Kjeldahl Nitrogen; TAN = Total Ammonia Nitrogen.

Microbiological Parameters

Microbiological analyses are performed on Sewage Effluent. For EC = E. Coli. Are shown in Table 3:

TABLE 3: Sewage Final Effluent EC Results in 2018:

Sample	Number of Samples	EC2 Results (MPN/100ml)
Final Effluent	12	2056

Heavy Metals Digester Sludge Results:

All Heavy Metal Digester Sludge which are taken once a year, the parameter sampling results are provided in **Table 4**;

TABLE 4: Heavy Metals Digester Sludge Sample Results:

Heavy Metals	Units	Digester Sludge Results
Aluminum	mg/L	0.710
Antimony	mg/L	0.00143
Arsenic	mg/L	0.0425
Barium	mg/L	0.0829
Beryllium	mg/L	<0.00050
Bismuth	mg/L	0.00827
Boron	mg/L	0.117
Cadmium	mg/L	0.00123
Calcium	mg/L	237
Cesium	mg/L	0.000192
Chromium	mg/L	0.00582
Cobalt	mg/L	0.00222
Copper	mg/L	0.976
Iron	mg/L	1.64
Lead	mg/L	0.00362
Lithium	mg/L	<0.0050
Magnesium	mg/L	26.7
Manganese	mg/L	2.08
Mercury	mg/L	0.000022
Molybdenum	mg/L	0.00172
Nickel	mg/L	0.0233
Phosphorous	mg/L	34.5
Potassium	mg/L	26.8
Rubidium	mg/L	0.0298
Selenium	mg/L	0.00165
Silicon	mg/L	9.02
Silver	mg/L	0.000271
Sodium	mg/L	49.5
Strontium	mg/L	0.227
Tellurium	mg/L	<0.0010
Thallium	mg/L	0.000088
Thorium	mg/L	<0.00050
Tin	mg/L	<0.00050
Titanium	mg/L	<0.0051
Tungsten	mg/L	<0.00050
Uranium	mg/L	0.000464
Vanadium	mg/L	<0.0025
Zinc	mg/L	0.547
Zirconium	mg/L	<0.00030

Sewage Treatment Plant Flows

2018 Sewage Treatment Plant Flows:

Throughout the reporting period of 2018, the Pickle Lake Sewage Plant released 109,533 m3 of effluent. On an average day in 2018, 300 m^3 of final effluent was sent to the receiving waters in Kawinogans River. The average daily flow in 2018 represents 33% of the combined rated capacity of the Pickle Sewage Treatment Plant of Maximum flow (909 m^3/day).

Table 5 provides a flow summary and capacity assessment for the WPCP 2018.

TABLE 5: 2018 Flow Summary:

Monthly Effluent Flow & Chlorine Usage					
Date	**Effluent Flows**		**Chlorine**		
			Gallons	**Litres**	
	Gallons	**m^3**	**Used**	**Used**	
Jan	3,238,620	14,721	75.90	345.03	
Feb	2,757,480	12,534	81.05	368.46	
Mar	3,022,140	13,737	140.74	639.81	
Apr	3,231,580	14,689	80.37	365.39	
May	3,869,140	17,587	79.19	360.00	
Jun	3,412,860	15,513	76.66	348.50	
Jul	2,605,680	11,844	76.71	348.75	
Aug	2,519,880	11,454	79.19	360.00	
Sep	2,889,480	13,134	74.24	337.50	
Oct	3,600,960	16,368	76.71	348.75	
Nov	3,337,620	15,171	76.71	348.75	
Dec	3,346,640	15,212	74.51	338.75	
Totals	37,832,080	171,964	991.98	4,509	
Monthly Avg	3,152,673	14,330	82.67	375	
Daily Avg	103,649	471	2.72	12.4	
Total Yearly Flow:		37,832,080	Gallons	171,964	m^3
Average Monthly Flow:		3,152,673	Gallons	14,330	m^3
Average Daily Flow:		103,649	Gallons	471	m^3
Total Chlorine Used:		991.98	Gallons	4,509	Litres

Flow Comparisons at Sewage Treatment Plant:

There should be a record of yearly flows to represent if they are increasing or decreasing over the years, the table below will should annual results of flows at the Sewage Treatment Plant in Pickle Lake.

Table 6 provides a flow summary and capacity assessment for each relevant location.

TABLE 6: Flow Summary:

Date	Effluent Flow	
	Gallons	**m^3**
2018	37,832,080	171,964
2017	27,099,886	109,533
2016	28,200,040	114,454
2015	30,674,080	127,030
2014	29,606,060	123,887

Chemical Consumptions

All chemicals used in the treatment process are NSF/ANSI 60 certified for use in potable water, as required by system approvals in table 7.

TABLE 7: Sewage Treatment Plant Chlorine Used Yearly:

Date	Gallons Used	Litres Used
2018	**992**	**4509**
2017	**989**	**4498**
2016	**672**	**3052**
2015	**351**	**1597**
2014	**411**	**1867**

Compliance

The Township of Pickle Lake employs an operational strategy that is committed to achieving the following goals:

1) Meeting or exceeding all applicable legislative and regulatory requirements;
2) Maintaining and continually improving the operation and maintenance of the system; and,
3) Maintaining and operating the Pickle Lake Sewage Treatment Plant System in a responsible manner in accordance with documented quality management system policies and procedures.

The following sections will summarize incidents of By-passes and noncompliance that occurred during the reporting period. The Township of Pickle Lake is committed to employing timely and effective corrective actions to prevent recurrence of all identified incidents of By-passes and noncompliance.

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.

NON-COMPLIANCE WITH REGULATORY REQUIREMENTS AND ACTIONS REQUIRED:

This section provides a summary of all non-compliance with regulatory requirements identified during the inspection period, as well as actions required to address these issues. Further details pertaining to these items can be found in the body of the inspection report.

PICKLE LAKE SEWAGE TREATMENT PLANT EVENTS 2018:

1. March 9, 2018 the Town Office sewer lines froze – fixed the same day
2. OPP contacted due to break in at Lakeview Lift Station on March 29, 2018. Nothing stolen, damage to door and locks.
3. Shut-off float faulty at Lakeview Lift Station on October 1, 2018, float replaced.
4. On October 5, 2018, there was a high-level alarm at Main Lift Station because Pump #2 had an air buildup and was blocked by a rag. Pump was bled and blockage was cleared.

Staff Changes at the Sewage Treatment Plant:

1. Brian Periera started 20 March 2017 as operator and finished 4 August 2018
2. Cale Ward started 20 March 2017 as operator and finished 21 July 2018
3. Connor Patten started 27 August 2018 as operator and finished 1 September 2018
4. Terry Zapf started 4 September 2018 as OIC
5. Leaha Kane started 18 September 2018 as operator
6. Sarah Loisel started 1 November 2018 as operator