2020 Year End Report: Port Carling Potable Water Plant

Drinking Water Works Permit: 143-205

Municipal Drinking Water License: 143-105

Ministry of Environment, Conservation and Parks Waterworks #: 220002119

Engineering and Public Works Department

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Introduction

The Port Carling Potable Water Plant (PWP) serving the community of Port Carling is owned and operated by the District Municipality of Muskoka.

It constructed in 2002 and has an initial design capacity of 1509 m^3 per day. The water system currently serves 405 customer connections.

The plant operates under license 143-105 and permit 143-205, issued in September 2020 under the Municipal Drinking Water Licensing Program. The plant also presently operates under MOECP permit to take water #4427-AXHH2V (expires May 7 2028), which permits the operation of up to 2,823 m^3per day.
The Raw Water intake structure is located in Lake Rosseau approximately 23.3 meters deep and 800 meters from shore.

The plant process is a conventional package filtration plant, with supplementary pH adjustment. The facility includes an intake crib, intake pipe, fixed screen, and a low lift pumping station. The treatment plant consists of flash mixing, variable speed flocculators, and two (2) dual media filters. Also located at the treatment plant are two (2) backwash holding tanks, one (1) contact chamber, two (2) clear wells, four (4) high lift pumps, two (2) backwash pumps, chemical storage, preparation, and feed equipment.

The treatment plant system features chemical treatment consisting of hydrated lime / carbon dioxide (corrosion control), powdered activated carbon (taste and odour), polyaluminum chloride (coagulation), polymer (coagulant aid), sodium hydroxide (pH control) and sodium hypochlorite (disinfection). The addition of hydrofluorosilic acid (fluoridation) to prevent tooth decay completes the treatment process. The distribution system includes a 1200 m^3 elevated storage tank.

All treatment control systems use a Supervisory Control and Data Acquisition (SCADA) system for process control and monitoring.

Legislation Requirements

Safe Drinking Water Act

In the Part Two Report of the Walkerton Inquiry, Commissioner Dennis O'Connor recommended that the Ontario Government enact a Safe Drinking Water Act to deal with matters related to treatment and distribution of drinking water. The Safe Drinking Water Act (SDWA) received royal assent in December, 2002.

The purpose of the Act is to gather in one place all legislation and regulations relating to the treatment and distribution of drinking water. The Act serves to protect human health through the control and regulation of drinking water systems and drinking water testing.

The foundation provisions of the Safe Drinking Water Act include:

- Purpose of the Act
- Definitions
- Minister's Powers and Duties
- Inspections
- Compliance and Enforcement

- Appeals and Offences

Ontario Regulations

The Ontario Government has enacted several supporting regulations under the SDWA (2002). These regulations combine previous requirements under the Ontario Water Resources Act and the new requirements under the SDWA. Key components of the regulations include:

- System Categories
- Groundwater Under Direct Influence of Surface Water (GUDI)
- Exemptions
- Approval of Systems
- Treatment
- Testing and Operational Checks (General Rules)
- Operational Checks
- Microbiological Testing
- Chemical Testing
- Adverse Conditions
- Corrective Action
- Engineer's and Summary Reports

Municipal Drinking Water Licenses / Certificates of Approval

The Municipal Drinking Water Licensing Program has replaced the Certificate of Approval program for municipal residential drinking water systems. The Ontario Government has implemented the Municipal Drinking Water Licensing Program (MDWLP) as recommended by Justice O'Connor in the Part II Report of the Walkerton Inquiry. Justice O'Connor recommended a new approvals framework for municipal drinking water systems, which would require owners to obtain a license to operate their systems as well as incorporate the concept of quality management into their operations.

A municipal drinking water license is an approval that is issued by the MOECP to owners under the Safe Drinking Water Act, 2002 for the operation of municipal residential drinking water systems. The District of Muskoka operated under various Certificates of Approval until October 2010 when the operating licenses were issued.

Previous Certificates of Approval were required for the establishment, replacement or alteration of all municipal drinking water systems. The MOECP issued Certificates of Approval to ensure that all undertakings comply with the legislation (i.e. Acts and Regulations) and the Ministry's Environmental Guidelines and Procedures developed to provide consistency of approach to various aspects of environmental protection throughout the province. Municipal Drinking Water Licenses and Permits similar to previous Certificates of Approval provide specific details about the drinking water system including:

- Drinking Water System Description

- Definitions and Information
- General Information – Compliance, Other Legal Requirements, Adverse Effects, Inspections
- Performance – Rated Capacity, Management of Residue
- Monitoring and Recording – Flow Measuring Devices, Sampling
- Operations and Maintenance

Comparison to Rated Capacity and Flow Rates

The Port Carling Potable Water Plant has a rated capacity of1,590m³ per day. In 2019, the total monthly average flow for the year was 528.3 m³ per day. The maximum day flow for theyear was 876.7 m³ per day, however the 3-year average for maximum day flow is 866 m³ per day. This represents 54.46% of the plant design capacity. No problems have been associated with this flow.

Monthly flows are shown in the attached table.

The Permit to Take Water (PTTW #4427-AXHH2V) permits 2,823 m³ per day; therefore there were no exceedances of this permit.

Summary of Analytical Results

A total of 624 microbiological regulatory tests were performed in 2020 and compliance with Provincial standards was achieved throughout the entire year.

There were 208 free chlorine residual tests performed in the distribution system and all results were satisfactory. Staff continue to routinely sample all areas of the system to ensure adequate free chlorine residuals are available throughout the distribution system.

A summary of other analytical results is also shown in this report.

Summary of Treatment Chemicals

The following chemicals are used for the treatment of drinking water at the Port Carling PWP:

- Lime: pH and Alkalinity Adjustment
- Co2: pH Adjustment
- Polyaluminum Chloride: Primary Coagulant
- Polymer: Coagulant Aid
- Sodium Hypochlorite: Disinfection
- Sodium Hydroxide: pH Adjustment
- Hydrofluosilicic Acid: Fluoride

A table summarizing the chemical use and average dosages is included in this report.

Documentation of System Repairs and Upgrades

In 2020 three turbidity analyzers were replaced including both filter and treated water units, generator batteries were replaced and the roof of the drinking water facility was replaced.

External Audits

MOE Inspection

A MOE inspection was completed on August 21st, 2020 and is attached to this report. The overall rating was 100%.

DWQMS Audit

In 2020 all drinking water systems within the District had an off-site external audit performed. There were no minor non-conformances reported and all drinking water systems have been recertified. Overall, all drinking water systems are performing satisfactorily.

Port Carling Water Distribution Summary 2020

New Services:

There were three (3) new water service installed in 2020.

Broken Watermains:

There were no broken water mains to report in 2020.

Service Leaks:

There were four (4) service leaks to report in 2020.

Service Relocation:

There were two (2) service relocations to report in 2020.

Frozen Services:

No municipal water services were frozen in 2020.

Replacement Watermains:

No watermain replacement occurred in 2020.

New Watermains:

There was one (1) new watermain installed in 2020.

Valve Replacement:

One (1) new 6” watermain gate valve was installed to service commercial property

Fire Hydrants:

There are 291 municipally assumed hydrants maintained by the District in West Muskoka. They were inspected, operated, and/or flushed at least once, pumped dry in the fall, and scoped during the winter months to ensure they are not susceptible to freezing.

Meter Installations:

A total of nine (9) water meters were installed/replaced in Port Carling in 2020 as part of the aged meter change out program.

Service Box Maintenance:

District field staff excavated and repaired fourteen (4) curb stop boxes in 2020. Field staff also responded to 85 water turn on/off requests in 2020.

Air-Vacuum Release Valves:

Four (4) air release valves were inspected and tested for proper operation in 2020. Each of the

chambers was inspected and pumped out as required.

Locates:

Field staff addressed 203 written locate requests in 2020 throughout West Muskoka.

Table 1 Water Flow Summary - 2020

Month	Total Monthly (m^3)	Average Day Flow (m^3/d)	Maximum Day Flow (m^3/d)	Minimum Day Flow (m^3/d)
January	12,655	408	518	229
February	12,224	422	519	332
March	13,458	434	547	322
April	14,017	467	584	350
May	16,140	521	746	358
June	17,618	587	770	262
July	22,465	725	877	574
August	21,766	702	843	612
September	18,440	615	764	514
October	16,334	527	663	370
November	14,370	479	687	321
December	13,913	449	556	327

Total Flow: 193,402m3
Average Day: 528.3m3
Maximum Day: 876.7m3
Minimum Day: 228.7m3

Table 2 Raw Water Monthly Analysis Summary 2020 Part 1

Month	Alkalinity (mg/L)	Hardness (mg/L)	pH	Turbidity (ntu)	True Colour (tcu)	Temperature (Celsius)
January	13.4	12.0	6.9	0.4	9	6.1
February	12.8	13.0	6.9	0.4	11	6.2
March	13.2	10.4	6.8	0.4	11	6.5
April	13.4	9.0	6.9	0.4	11	7.6
May	14.0	10.2	7.0	0.4	10	8.5
June	12.9	10.0	6.8	0.4	11	9.1
July	13.0	11.0	6.7	0.4	11	10.7
August	12.2	12.0	6.6	0.3	10	9.7
September	14.5	14.0	6.6	0.3	10	9.9
October	13.2	12.0	6.5	0.3	11	9.6
November	12.6	11.0	6.8	0.3	11	9.1
December	11.5	12.0	7.0	0.3	11	6.9
Average	13.1	11.4	6.8	0.4	10.6	8.3

Table 3 Raw Water Monthly Analysis Summary 2020 Part 2

Month	Microcystin (ug/L)	Langliers Saturation Index	Total Coliforms (CFU/100mL)	E. Coli (CFU/100mL)	Total Number of Samples
January	Not Sampled	-2.8	1.0	0.0	4
February	Not Sampled	-2.8	0.0	0.0	4
March	Not Sampled	-3.1	2.0	0.0	5
April	Not Sampled	-2.9	0.8	0.0	4
May	Not Sampled	-2.8	1.3	0.0	4
June	<0.1	-2.8	1.6	0.2	5
July	Not Sampled	-2.8	2.5	0.3	4
August	<0.1	-3.1	29.6	0.6	5
September	<0.1	-2.9	3.8	1.3	4
October	<0.1	-3.3	2.0	0.5	4
November	<0.1	-2.9	4.2	1.8	5
December	Not Sampled	-2.9	1.5	0.0	4
Average	<0.1	-2.9	4.2	0.4	4

Table 4 Chemical Usage Summary: Hydrated Lime

Month	Average Dosage mg/L	Total kg
January	17.9	232.0
February	17.9	228.6
March	17.9	251.0
April	17.9	258.1
May	17.9	302.3
June	17.8	333.5
July	15.8	373.1
August	17.3	395.5
September	18.2	350.4
October	18.2	309.8
November	18.2	271.5
December	18.2	261.4
Average	18	297.3

Total Yearly Kilograms: 3,567kg

Table 5 Chemical Usage Summary: Carbon Dioxide

Month	Average Dosage mg/L	Total kg
January	27.9	362.0
February	22.2	283.6
March	25.4	355.0
April	23.6	339.8
May	26.7	446.6
June	23.7	442.6
July	23.2	547.4
August	23.6	542.5
September	22.8	438.6
October	21.3	361.8
November	25.9	383.3
December	27.4	394.8
Average	24.5	408.2

Total Yearly Kilograms: 4,898kg

Table 6 Chemical Usage Summary: Polyaluminum Chloride

Month	Average Dosage mg/L	Total kg
January	10.6	138
February	10.4	133
March	10.2	144
April	10.4	150
May	10.7	181
June	10.8	202
July	10.8	255
August	10.8	247
September	10.8	208
October	10.8	184
November	11.3	169
December	11.5	166
Average	10.8	182

Total Yearly Kilograms: 2,178kg

Table 7 Chemical Usage Summary: Sodium Hypochlorite

Month	Average Dosage mg/L	Total kg
January	4.53	57.6
February	3.56	44.7
March	2.88	39.7
April	2.88	40.8
May	3.08	50.8
June	4.23	77.9
July	4.48	103.9
August	3.69	83.2
September	4.10	77.5
October	4.13	68.9
November	3.64	53.7
December	3.60	51.1
Average	3.76	68

Total Yearly Kilograms: 750kg

Table 8 Chemical Usage Summary: Sodium Hydroxide

Month	Average Dosage mg/L	Total kg
January	3.3	42
February	3.5	43
March	3.7	49
April	3.7	51
May	3.7	59
June	3.6	64
July	3.6	81
August	3.3	72
September	3.2	58
October	3.2	52
November	3.3	47
December	3.3	46
Average	3.4	55

Total Yearly Kilograms: 663kg

Table 9 Chemical Usage Summary: Fluoride

Month	Average Dosage mg/L	Total kg
January	0.78	9.8
February	0.65	7.9
March	0.65	8.7
April	0.65	9.1
May	0.68	10.9
June	0.78	13.7
July	0.87	19.5
August	0.86	18.7
September	0.85	15.7
October	0.85	13.9
November	0.85	12.2
December	0.85	11.8
Average	0.78	13

Total Yearly Kilograms: 152kg

Port Carling Certification of Reports

I certify that the information in this document and all attachments are correct, accurate, and complete to the best of my knowledge

Marcus Firman, C.E.T.
Director, Water and Wastewater Services

Stewart Hurd
Manager of Water and Wastewater Operations

Disclaimer: The following pages are not in an accessible format.

Ontario

Ministry of the Environment | Ministère de l'Environnement

Drinking-Water Systems Regulation O. Reg. 170/03

OPTIONAL ANNUAL REPORT TEMPLATE

Drinking-Water System Number:	220002119
Drinking-Water System Name:	Ferndale Water Treatment Plant
Drinking-Water System Owner:	District Municipality of Muskoka
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 01 to December 31, 2020

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people? Yes [ ] No [X]

Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No [ ]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

District Municipality of Muskoka
70 Pine Street
Bracebridge, Ontario
P1L 1N3
(705) 645-6764
www.muskoka.on.ca

Complete for all other Categories.

Number of Designated Facilities served:

N.A.

Did you provide a copy of your annual report to all Designated Facilities you serve?
Yes [ ] No [ ]

Number of Interested Authorities you report to: N.A.

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?
Yes [ ] No [ ]

Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
N.A.	

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?
Yes [ ] No [ ]

Drinking-Water Systems Regulation O. Reg. 170/03

Indicate how you notified system users that your annual report is available, and is free of charge.

[X] Public access/notice via the web
[X] Public access/notice via Government Office
[X] Public access/notice via a newspaper
[X] Public access/notice via Public Request
[ ] Public access/notice via a Public Library
[ ] Public access/notice via other method _____

Describe your Drinking-Water System

The water treatment plant serving the community of Port Carling was constructed in 2002. The treatment process consists of chemically assisted coagulation-flocculation, sedimentation and filtration using multi-media filters with a combination of gravel, sand and anthracite coal. Disinfection in a post-treatment chlorine contact chamber is followed by fluoridation and final pH adjustment before the treated water is pumped to our customers. . Our waterworks currently serves a population of approximately 1,000 persons. The rated water production capacity of the plant is 1590 cubic meters per day. Our raw water source is Lake Rosseau and the intake is located 1.8 meters above the lakebed at a depth of 24.3 meters and about 800 meters from shore.

List all water treatment chemicals used over this reporting period

Sodium Hypochlorite, Polyaluminum Chloride, Sodium Hydroxide, Carbon Dioxide, Hydrated Lime, Fluoride.

Were any significant expenses incurred to?

[ ] Install required equipment
[ ] Repair required equipment
[x] Replace required equipment

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

Facility Roof - $216,930.00
Turbidimeters (3) – filter effluent and treated

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

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
N.A.					

Drinking-Water Systems Regulation O. Reg. 170/03

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

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	52	0 - 6	0-53	0	N.A.
Treated	52	0 - 0	0 - 0	51	0 - 1
Distribution	156	0 - 0	0 - 0	55	0 - 4

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)	Geometric Mean Average
Turbidity	8760	0.01- 0.07 NTU	0.017 NTU
Chlorine	8760	1.62 – 2.41 mg/l	**1.98** mg/l
Fluoride (If the DWS provides fluoridation)	8760	0.04 - 0.81 mg/l	0.69 mg/l

__NOTE__: For continuous monitors use 8760 as the number of samples.

__NOTE__: Record the unit of measure if it is __not__ milligrams per litre.
MDL = Method Detection Limit

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
N.A.				

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	May 04/2020	0.09<MDL	µg/L	No
Arsenic	May 04/2020	0.2<MDL	µg/L	No
Barium	May 04/2020	10.6	µg/L	No
Boron	May 04/2020	7	µg/L	No
Cadmium	May 04/2020	0.014	µg/L	No
Chromium	May 04/2020	0.12	µg/L	No
***Lead**	Feb 10/2020, Aug 04/2020	0.01 – 1.21	µg/L	No
Mercury	May 04/2020	0.01<MDL	µg/L	No
Selenium	May 04/2020	0.04	µg/L	No
Sodium	May 04/2020	9.42	mg/L	No
Uranium	May 04/2020	0.002<MDL	µg/L	No
Fluoride	May 04/2020	0.76	mg/L	No
Nitrite	May 04/2020	0.003<MDL	mg/L	No

Nitrate	May 04/2020	0.174	mg/L	No
Nitrite	Feb 10/2020	0.003<MDL	mg/L	No
Nitrate	Feb 10/2020	0.150	mg/L	No
Nitrite	Aug 04/2020	0.003<MDL	mg/L	No
Nitrate	Aug 04/2020	0.214	mg/L	No
Nitrite	Nov 02/2020	0.003<MDL	mg/L	No
Nitrate	Nov 02/2020	0.234	mg/L	No

*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential systems.

Summary of lead testing under Schedule 15.1 during this reporting period

(applicable to the following drinking water systems; large municipal residential systems**,** small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Geometric Mean Average	Unit of Measure	Number of Exceedances
Plumbing	0	N.A.	N.A.	µg/L	N.A.
Distribution	4	0.03 – 0.18	0.08	µg/L	0

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	May 04/2020	0.02<MDL	µg/L	No
Atrazine+N-dealkylated Metabolites	May 04/2020	0.01	µg/L	No
Azinphos-methyl	May 04/2020	0.05<MDL	µg/L	No
Benzene	May 04/2020	0.32<MDL	µg/L	No
Benzo(a)pyrene	May 04/2020	0.004<MDL	µg/L	No
Bromoxynil	May 04/2020	0.33<MDL	µg/L	No
Carbaryl	May 04/2020	0.05<MDL	µg/L	No
Carbofuran	May 04/2020	0.01<MDL	µg/L	No
Carbon Tetrachloride	May 04/2020	0.17<MDL	µg/L	No
Chorpyrifos	May 04/2020	0.02<MDL	µg/L	No
Diazinon	May 04/2020	0.02<MDL	µg/L	No
Dicamba	May 04/2020	0.20<MDL	µg/L	No
1,2 Dichlorobenzene	May 04/2020	0.41<MDL	µg/L	No
1,4 Dichlorobenzene	May 04/2020	0.36<MDL	µg/L	No
1,2 Dichloroethane	May 04/2020	0.35<MDL	µg/L	No
1,1 Dichloroethylene	May 04/2020	0.33<MDL	µg/L	No
Dichloromethane	May 04/2020	0.35<MDL	µg/L	No
2,4 Dichlorophenol	May 04/2020	0.15<MDL	µg/L	No
2,4-D	May 04/2020	0.19<MDL	µg/L	No
Diclofop-Methyl	May 04/2020	0.40<MDL	µg/L	No
Dimethoate	May 04/2020	0.06<MDL	µg/L	No

Diquat	May 04/2020	1<MDL	µg/L	No
Diuron	May 04/2020	0.03<MDL	µg/L	No
Glyphosate	May 04/2020	1<MDL	µg/L	No
Malathion	May 04/2020	0.02<MDL	µg/L	No
MCPA	May 04/2020	0.00012<MDL	µg/L	No
Metolachor	May 04/2020	0.01<MDL	µg/L	No
Metribuzin	May 04/2020	0.02<MDL	µg/L	No
Monochlorobenzene	May 04/2020	0.30<MDL	µg/L	No
Paraquat	May 04/2020	1<MDL	µg/L	No
Pentachlorophenol	May 04/2020	0.15<MDL	µg/L	No
Phorate	May 04/2020	0.01<MDL	µg/L	No
Picloram	May 04/2020	1<MDL	µg/L	No
PCB	May 04/2020	0.04<MDL	µg/L	No
Prometryne	May 04/2020	0.03<MDL	µg/L	No
Simazine	May 04/2020	0.01<MDL	µg/L	No
THM (NOTE**:** Annual average of 4 samples – Distribution system**)**	Feb 10/2020 – Nov 02/2020	43.2	µg/L	No
Terbufos	May 04/2020	0.01<MDL	µg/L	No
Tetrachloroethylene	May 04/2020	0.35<MDL	µg/L	No
2,3,4,6 - Tetrachlorophenol	May 04/2020	0.20<MDL	µg/L	No
Triallate	May 04/2020	0.01<MDL	µg/L	No
Trichloroethylene	May 04/2020	0.44<MDL	µg/L	No
2,4,6,- Trichlorophenol	May 04/2020	0.25<MDL	µg/L	No
Trifluralin	May 04/2020	0.02<MDL	µg/L	No
Vinyl Chloride	May 04/2020	0.17<MDL	µg/L	No
HAA5 (NOTE: Annual average of 4 samples – Distribution system)	Feb 10/2020- Nov 02/2020	49.5	µg/L	No

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
HAA's	49.5	Ug/L	Running Avg 4 quarters