

# **PORT CARLING**

# **WATER SUMMARY**

# **2015**

# **REPORT**



**DRINKING WATER WORKS PERMIT: 143-205**  
**MUNICIPAL DRINKING WATER LICENCE: 143-105**

**M.O.E. WATERWORKS #: 220002119**

## **INTRODUCTION**

The Ferndale Water Treatment Plant (W.T.P) in Port Carling is owned and operated by the District Municipality of Muskoka.

The plant operates under Municipal Drinking Water Licence 143-105 and Drinking Water Permit 143-205, issued on October 6<sup>th</sup> 2015, under the Municipal Drinking Water Licensing Program. The plant also operates under MOE Permit To Take Water #6372-7L3U53 which permits the operation up to 2,823 cubic meters per day (m<sup>3</sup>/d). Lake Rosseau is the raw water source for the facility.

The water treatment plant began treating and supplying potable water to the town of Port Carling in October of 2002 and has a rated capacity of 1,509 cubic meters per day. The waterworks currently serves a population of approximately 1,000 persons.

The treatment process consists of raw water inlet screens and low lift pumps which deliver raw water to the twin train package treatment plant. The package treatment plant consists of two process trains, each provided with chemically assisted coagulation, flocculation, sedimentation and filtration processes. The treated water then enters the clearwell. High lift pumps deliver the finished water from the clearwell to the distribution system. Chemical treatment consists of Sodium Hypochlorite, Polyaluminum Chloride, Hydrated Lime, Carbon Dioxide, Sodium Hydroxide and Fluoride.

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 in 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 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 Safe Drinking Water Act (2000) SDWA. 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 Licences / Certificates of Approval

The Municipal Drinking Water Licencing Program has replaced the Certificate of Approval program for municipal residential drinking water systems. The Ontario Government has implemented the Municipal Drinking Water Licencing 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 licence to operate their systems as well as incorporate the concept of quality management into their operations.

A municipal drinking water licence is an approval that is issued by the MOE 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 licences were issued.

Previous Certificates of Approval were required for the establishment, replacement or alteration of all municipal drinking water systems. The Ministry of Environment (MOE) 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 Licences 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 Affects, 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 Ferndale Road water treatment plant has a rated capacity of 1,590 m<sup>3</sup>/day. In 2015, the total monthly average flow for the year was 325 m<sup>3</sup>/day. The maximum day flow for the year was 673 m<sup>3</sup>/day, however, the 3 year average for maximum day flow is 702 m<sup>3</sup>/day, which represents 44% 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 #6372-7L3U53) permits 2,823 m<sup>3</sup>/day; therefore there were no exceedances of this permit.

### **Summary of Analytical Results**

A total of 624 microbiological regulatory tests were performed in 2015 and compliance with Provincial standards was achieved throughout.

There were 155 free chlorine residual tests performed in the distribution system and all results were satisfactory.

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 Ferndale Water Treatment Plant:

Sodium Hypochlorite: Disinfectant

Polyaluminum Chloride (SternPAC): Primary coagulant

Hydrated Lime: Alkalinity and pH adjustment

Carbon Dioxide: pH adjustment

Sodium Hydroxide: Final pH adjustment

Hydrofluosilicic Acid: To help prevent tooth decay.

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

## **Documentation of System Repairs and Upgrades**

No significant capital expenses were incurred to conduct system repairs or upgrades in 2015.

## **MOE Inspection**

A MOE inspection was completed on December 9, 2015 and is attached to this report. The overall rating was 100%.

## **DWQMS Audit**

In 2015 all drinking water systems had an external recertification audit performed. There were seven (7) minor non-conformances reported, all have subsequently been addressed and as a result all drinking water systems have been recertified. Overall, all drinking water systems are performing satisfactorily.



**OPTIONAL ANNUAL REPORT TEMPLATE**

<b>Drinking-Water System Number:</b>	220002119
<b>Drinking-Water System Name:</b>	Ferndale Water Treatment Plant
<b>Drinking-Water System Owner:</b>	District Municipality of Muskoka
<b>Drinking-Water System Category:</b>	Large Municipal Residential
<b>Period being reported:</b>	January 01 to December 31, 2015

<p><b><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></b></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [ ] No [ <b>X</b> ]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [ <b>X</b> ] No [ ]</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <p>District Municipality of Muskoka 70 Pine Street Bracebridge, Ontario P1L 1N3 (705) 645-6764 www.muskoka.on.ca</p> </div>	<p><b><u>Complete for all other Categories.</u></b></p> <p>Number of Designated Facilities served:  <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">N.A.</div> </p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [ ] No [ ]</p> <p>Number of Interested Authorities you report to:  <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">N.A.</div> </p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [ ] No [ ]</p>
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**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 [ ]



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

- Public access/notice via the web
- Public access/notice via Government Office
- Public access/notice via a newspaper
- 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
- Replace required equipment

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

**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.					

**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 #)
<b>Raw</b>	52	0 - 2	0 - 43	0	N.A.
<b>Treated</b>	52	0 - 0	0 - 0	52	0 - 9
<b>Distribution</b>	155	0 - 0	0 - 0	54	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 #)	Geomean	<i>NOTE: For continuous monitors use 8760 as the number of samples.</i>
<b>Turbidity</b>	8760	0.01 - 0.19 NTU	0.03 NTU	
<b>Chlorine</b>	8760	1.98 - 2.96 mg/L	2.40 mg/L	
<b>Fluoride</b> (If the DWS provides fluoridation)	8760	0.18 - 0.71 mg/L	0.59 mg/L	

**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
<b>Antimony</b>	May 11/15	0.09	µg/L	No
<b>Arsenic</b>	May 11/15	0.2<MDL	µg/L	No
<b>Barium</b>	May 11/15	8.86	µg/L	No
<b>Boron</b>	May 11/15	33.2	µg/L	No
<b>Cadmium</b>	May 11/15	0.006	µg/L	No
<b>Chromium</b>	May 11/15	0.03<MDL	µg/L	No
<b>*Lead</b>	May 11/15		µg/L	No
<b>Mercury</b>	May 11/15	0.06	µg/L	No
<b>Selenium</b>	May 11/15	1<MDL	µg/L	No
<b>Sodium</b>	May 11/15	9.01	mg/L	No
<b>Uranium</b>	May 11/15	0.003	µg/L	No
<b>Fluoride</b>	May 11/15	0.64	mg/L	No
<b>Nitrite</b>	Feb 2/15	0.003<MDL	mg/L	No
<b>Nitrate</b>	Feb 2/15	0.182	mg/L	No
<b>Nitrite</b>	May 11/15	0.003<MDL	mg/L	No



<b>Nitrate</b>	May 11/15	0.197	mg/L	No
<b>Nitrite</b>	Aug 10/15	0.003<MDL	mg/L	No
<b>Nitrate</b>	Aug 10/15	0.224	mg/L	No
<b>Nitrite</b>	Nov 02/15	0.003<MDL	mg/L	No
<b>Nitrate</b>	Nov 02/15	0.239	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 #)	Unit of Measure	Number of Exceedances
<b>Plumbing</b>	0			
<b>Distribution</b>	1	0.03	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
<b>Alachlor</b>	May 11/15	0.02<MDL	µg/L	No
<b>Aldicarb</b>	May 11/15	0.01<MDL	µg/L	No
<b>Aldrin + Dieldrin</b>	May 11/15	0.01<MDL	µg/L	No
<b>Atrazine + N-dealkylated metabolites</b>	May 11/15	0.01<MDL	µg/L	No
<b>Azinphos-methyl</b>	May 11/15	0.05<MDL	µg/L	No
<b>Bendiocarb</b>	May 11/15	0.01<MDL	µg/L	No
<b>Benzene</b>	May 11/15	0.32<MDL	µg/L	No
<b>Benzo(a)pyrene</b>	May 11/15	0.004<MDL	µg/L	No
<b>Bromoxynil</b>	May 11/15	0.33<MDL	µg/L	No
<b>Carbaryl</b>	May 11/15	0.05<MDL	µg/L	No
<b>Carbofuran</b>	May 11/15	0.01<MDL	µg/L	No
<b>Carbon Tetrachloride</b>	May 11/15	0.16<MDL	µg/L	No
<b>Chlordane (Total)</b>	May 11/15	0.01<MDL	µg/L	No
<b>Chlorpyrifos</b>	May 11/15	0.02<MDL	µg/L	No
<b>Cyanazine</b>	May 11/15	0.03<MDL	µg/L	No
<b>Diazinon</b>	May 11/15	0.02<MDL	µg/L	No
<b>Dicamba</b>	May 11/15	0.20<MDL	µg/L	No
<b>1,2-Dichlorobenzene</b>	May 11/15	0.41<MDL	µg/L	No
<b>1,4-Dichlorobenzene</b>	May 11/15	0.36<MDL	µg/L	No
<b>Dichlorodiphenyltrichloroethane (DDT) + metabolites</b>	May 11/15	0.01<MDL	µg/L	No
<b>1,2-Dichloroethane</b>	May 11/15	0.35<MDL	µg/L	No
<b>1,1-Dichloroethylene (vinylidene chloride)</b>	May 11/15	0.33<MDL	µg/L	No
<b>Dichloromethane</b>	May 11/15	0.35<MDL	µg/L	No
<b>2-4 Dichlorophenol</b>	May 11/15	0.15<MDL	µg/L	No
<b>2,4-Dichlorophenoxy acetic acid (2,4-D)</b>	May 11/15	0.19<MDL	µg/L	No
<b>Diclofop-methyl</b>	May 11/15	0.40<MDL	µg/L	No

<b>Dimethoate</b>	May 11/15	0.03<MDL	µg/L	No
<b>Dinoseb</b>	May 11/15	0.36<MDL	µg/L	No
<b>Diquat</b>	May 11/15	1<MDL	µg/L	No
<b>Diuron</b>	May 11/15	0.03<MDL	µg/L	No
<b>Glyphosate</b>	May 11/15	1<MDL	µg/L	No
<b>Heptachlor + Heptachlor Epoxide</b>	May 11/15	0.01<MDL	µg/L	No
<b>Lindane (Total)</b>	May 11/15	0.01<MDL	µg/L	No
<b>Malathion</b>	May 11/15	0.02<MDL	µg/L	No
<b>Methoxychlor</b>	May 11/15	0.01<MDL	µg/L	No
<b>Metolachlor</b>	May 11/15	0.01<MDL	µg/L	No
<b>Metribuzin</b>	May 11/15	0.02<MDL	µg/L	No
<b>Monochlorobenzene</b>	May 11/15	0.30<MDL	µg/L	No
<b>Paraquat</b>	May 11/15	1<MDL	µg/L	No
<b>Parathion</b>	May 11/15	0.02<MDL	µg/L	No
<b>Pentachlorophenol</b>	May 11/15	0.15<MDL	µg/L	No
<b>Phorate</b>	May 11/15	0.01<MDL	µg/L	No
<b>Picloram</b>	May 11/15	1<MDL	µg/L	No
<b>Polychlorinated Biphenyls(PCB)</b>	May 11/15	0.04<MDL	µg/L	No
<b>Prometryne</b>	May 11/15	0.03<MDL	µg/L	No
<b>Simazine</b>	May 11/15	0.01<MDL	µg/L	No
<b>THM</b> (NOTE: Annual average of 4 samples – Distribution system)	May 11/15	49	µg/L	No
<b>Temphos</b>	May 11/15	0.01<MDL	µg/L	No
<b>Terbufos</b>	May 11/15	0.01<MDL	µg/L	No
<b>Tetrachloroethylene</b>	May 11/15	0.35<MDL	µg/L	No
<b>2,3,4,6-Tetrachlorophenol</b>	May 11/15	0.20<MDL	µg/L	No
<b>Triallate</b>	May 11/15	0.01<MDL	µg/L	No
<b>Trichloroethylene</b>	May 11/15	0.44<MDL	µg/L	No
<b>2,4,6-Trichlorophenol</b>	May 11/15	0.25<MDL	µg/L	No
<b>2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)</b>	May 11/15	0.22<MDL	µg/L	No
<b>Trifluralin</b>	May 11/15	0.02<MDL	µg/L	No
<b>Vinyl Chloride</b>	May 11/15	0.17<MDL	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.**

<b>Parameter</b>	<b>Result Value</b>	<b>Unit of Measure</b>	<b>Date of Sample</b>

## District of Muskoka - Ferndale Rd WTP - Port Carling

### 1.0 Water Flow Summary - 2015

Month	Total Monthly (m <sup>3</sup> )	Average Day Flow (m <sup>3</sup> /d)	Maximum Day Flow (m <sup>3</sup> /d)	Minimum Day Flow (m <sup>3</sup> /d)	Comments
January	7,715	249	482	177	
February	6,973	249	383	181	
March	8,268	267	445	144	
April	7,422	247	582	0	
May	11,510	371	618	241	
June	11,556	385	501	213	
July	14,603	471	673	338	
August	14,654	473	628	365	
September	11,702	390	532	215	
October	9,551	308	527	202	
November	7,492	250	375	143	
December	7,507	242	357	204	

Total 118,953

Average Day 325

Maximum Day 673

Minimum Day 0

## District of Muskoka - Ferndale Rd WTP - Port Carling

### 2.0 Raw Water Monthly Analysis Summary - 2015

Month	Alkalinity	Hardness	pH	Turbidity	True Colour	Temperature	Conductivity	Langliers Saturation Index	Total Coliform	E-coli	Total Number of Samples
<i>Parameter</i>	<i>mg/l</i>	<i>mg/l</i>	<i>pH</i>	<i>ntu</i>	<i>tcu</i>	<i>Celcius</i>	<i>uS/cm</i>		<i>CFU/100ml</i>	<i>CFU/100ml</i>	
January	12	13	6.7	0.3	13	6.4	59	-3.0	3	0	4
February	13	14	6.8	0.3	16	6.2	55	-2.8	2	0	4
March	12	13	6.7	0.3	12	6.6	62	-3.1	1	0	5
April	14	15	6.7	0.3	14	6.1	57	-2.9	2	0	4
May	13	15	6.7	0.4	15	7.8	57	-2.9	2	0	4
June	12	16	6.6	0.4	16	8.9	59	-3.1	3	0	5
July	14	15	6.4	0.4	13	10.0	57	-3.1	2	1	4
August	14	15	6.4	0.4	13	10.3	55	-3.1	3	0	5
September	12	16	6.4	0.4	16	10.4	54	-3.1	2	1	4
October	12	12	6.3	0.3	13	11.0	51	-3.4	1	0	4
November	13	14	6.5	0.4	11	10.5	56	-3.1	5	0	5
December	12	14	6.8	0.3	14	10.2	55	-2.9	21	0	4
Average	12.6	14.4	6.6	0.3	13.8	8.7	56.4	-3.0	3.9	0.2	4

## District of Muskoka - Ferndale Rd WTP - Port Carling

### 9.0 Chemical Usage Summary - 2015

Month	Powdered Activated Carbon		CO2		Hydrated Lime		Coagulant	
	Average Dosage mg/L	Total Kg	Average Dosage mg/L	Total Kg	Average Dosage mg/L	Total Kg	Average Dosage mg/L	Total Kg
January	0.0	0.0	33.4	279.0	52.3	436.3	8.0	67.4
February	0.0	0.0	31.6	241.0	52.6	402.8	8.3	62.4
March	0.0	0.0	26.6	235.0	53.7	476.3	8.2	71.2
April	0.0	0.0	27.3	213.0	55.9	442.8	9.3	72.0
May	0.0	0.0	24.8	292.0	50.0	593.0	9.0	107.5
June	0.0	0.0	26.3	323.0	49.3	603.7	8.6	105.6
July	0.0	0.0	23.3	345.0	46.3	688.0	8.9	132.9
August	0.0	0.0	19.9	305.0	39.3	602.6	9.0	137.9
September	0.0	0.0	20.9	257.0	42.9	525.4	8.7	105.2
October	0.0	0.0	22.1	217.0	48.4	479.5	9.3	92.2
November	0.0	0.0	27.3	214.0	52.6	415.8	9.4	74.1
December	0.0	0.0	34.6	267.0	52.6	410.4	9.5	73.3
Average Monthly	0.0	0.0	26.5	265.7	50	506.4	8.9	91.8
Total Yearly		0		3,188		6,077		1,102

Month	Sodium Hydroxide		Fluoride		Chlorine		Soda Ash	
	Average Dosage mg/L	Total Kg	Average Dosage mg/L	Total Kg	Average Dosage mg/L	Total Kg	Average Dosage mg/L	Total Kg
January	3.3	26.4	0.66	4.8	4.43	35.4	0.00	0.0
February	3.1	22.6	0.57	3.8	4.35	31.3	0.00	0.0
March	2.9	24.4	0.58	4.6	4.46	37.4	0.00	0.0
April	2.8	21.8	0.65	4.7	4.11	31.4	0.00	0.0
May	2.8	32.1	0.61	6.9	4.30	49.5	0.00	0.0
June	2.9	34.9	0.55	6.3	4.04	48.2	0.00	0.0
July	2.8	40.8	0.54	7.8	4.12	60.9	0.00	0.0
August	2.8	42.1	0.52	7.6	3.92	58.5	0.00	0.0
September	2.7	32.4	0.54	6.0	3.79	45.5	0.00	0.0
October	2.8	27.3	0.52	4.8	4.07	39.9	0.00	0.0
November	2.7	21.0	0.50	3.6	4.29	32.8	0.00	0.0
December	2.8	21.1	0.49	3.6	4.65	34.7	0.00	0.0
Average Monthly	2.9	28.9	0.56	5.4	4.14	44.6	0	0
Total Yearly		347		65		506		0

Month	Potassium Permanganate		Polymer	
	Average Dosage mg/L	Total Kg	Average Dosage mg/L	Total Kg
January	0.0	0	0.0	0
February	0.0	0	0.0	0
March	0.0	0	0.0	0
April	0.0	0	0.0	0
May	0.0	0	0.0	0
June	0.0	0	0.0	0
July	0.0	0	0.0	0
August	0.0	0	0.0	0
September	0.0	0	0.0	0
October	0.0	0	0.0	0
November	0.0	0	0.0	0
December	0.0	0	0.0	0
Average Monthly	0.0	0	0.0	0
Total Yearly		0		0

## **2015 PORT CARLING WATER DISTRIBUTION SUMMARY**

### **New Services:**

There was one new 1-½" (38 mm) service installed at 147 Medora Street, the cost of which was paid for by the applicant. One existing service was upgraded from 19mm to 50mm on Bruce Wilson Drive and a new 150mm valve and service line was installed as part of the Medora WWTP Capital project.

### **Broken Watermains:**

There were no watermain breaks to report.

### **Service Leaks:**

There were no service leaks within municipal roadways to report in 2015.

### **Frozen Services:**

There were 3 (three) frozen water services within the municipal road allowances in 2015. One service was successfully thawed with a thawing machine; the remaining two affected customers were provided water by feeding overland services from an adjacent property.

### **New Watermains:**

No new watermains were installed.

### **Valve Replacements:**

There were no new valves installed and 59 of the 110 valves were operated.

### **Fire Hydrants:**

Routine hydrant maintenance was performed which includes, inspecting, operating, and greasing each hydrant, seasonal flushing, scoping and snow removal numerous times through the winter months. A new seat was installed in hydrant #250. Two new fire hydrants were installed and commissioned as part of the Medora WWTP Capital project, bringing the total number of municipally owned fire hydrants within the Port Carling water distribution system to 88. There are also 3 (three) hydrants which are privately owned.

### **Meter Installations:**

A total of 19 meters were repaired, 11 new meters were installed and 13 meters were replaced as part of the aged meter change out program in 2015.

### **Air Vacuum Release Valves:**

All 10 Air Vacuum release valves were drained, operated, and inspected. One valve was determined to be faulty and is scheduled to be replaced in 2016.

### **Locates:**

Staff addressed 54 locates requests in 2015.

Ministry of the Environment and  
Climate Change

Safe Drinking Water  
Branch

Director's Office  
2nd floor  
40 St. Clair Ave West  
Toronto ON M4V 1M2

Ministère de l'Environnement

Direction du contrôle de la qualité de l'eau  
potable

Bureau du directeur  
2<sup>e</sup> étage  
40, avenue St. Clair Ouest  
Toronto (Ontario) M4V 1M2



December 18, 2015

The District Municipality of Muskoka  
70 Pine Street  
Bracebridge, Ontario  
P1L 1N3

**Attention:** Mr. Marcus Firman, Director of Water and Wastewater Engineering

**RE: 2015 Drinking Water Inspection Report  
Port Carling (Ferndale) Drinking Water System (DWS#220002119)  
Date of MOECC inspection: December 9, 2015**

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Please find enclosed the Ministry of the Environment and Climate Change's 2015 Inspection Report for the Port Carling (Ferndale) Drinking Water System (DWS#220002119), following an inspection of the water treatment plant and distribution system, December 2, 2015.

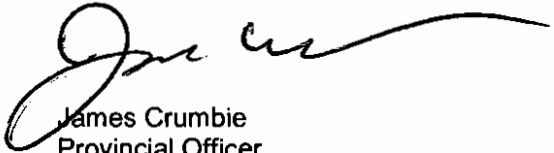
The primary focus of this inspection was to confirm compliance with Ministry of the Environment and Climate Change legislation and control documents, as well as conformance with Ministry drinking water related policies for the inspection period. The Ministry is implementing a rigorous and comprehensive approach in the inspection of water systems that focuses on the source, treatment, and distribution components as well as water system management practices.

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal and risk experts. The Inspection Summary Rating Record (IRR), included as Appendix D of the inspection report, provides the Ministry, the system Owner and the associated Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance. IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspector's Annual Report. If you have any questions or concerns regarding the rating, please contact Craig Seabrook, Water Program Supervisor, at 705-739-6392.

Section 19 of the Safe Drinking Water Act (Standard of Care) creates a number of obligations for individuals who exercise decision-making authority over municipal drinking water systems. Please be aware that the Ministry has encouraged such individuals, particularly municipal councillors, to take steps to be better informed about the drinking water systems over which they have decision-making authority. These steps could include asking for a copy of this inspection report and a review of its findings. Further information about Section 19 can be found in the Ministry's publication "Taking Care of Your Drinking Water: A guide for members of municipal council" found under the "Resources" tab on the Ministry's Drinking Water Ontario website at [www.ontario.ca/drinkingwater](http://www.ontario.ca/drinkingwater).

If you have any questions or concerns regarding this inspection report, please contact the undersigned at 705-739-6379.

Respectfully,



James Crumbie  
Provincial Officer  
Ministry of the Environment and Climate Change  
Barrie District Office  
(705) 739-6379 (Tel)  
(705) 739-6350 (Fax)  
[James.crumbie@ontario.ca](mailto:James.crumbie@ontario.ca)

CC Lee Gillan, District of Muskoka (email: [lgillan@muskoka.on.ca](mailto:lgillan@muskoka.on.ca))  
Chris Hoos, Chief Operator, District of Muskoka (email: [choos@muskoka.on.ca](mailto:choos@muskoka.on.ca))  
Medical Officer of Health, Simcoe Muskoka District Health Unit  
Barrie District Office File, Ministry of the Environment and Climate Change





**Ontario**

**Ministry of the Environment and Climate Change**

**PORT CARLING (FERNDALE) DRINKING WATER SYSTEM**

**Inspection Report**

<b>Site Number:</b>	220002119
<b>Inspection Number:</b>	1-BYLK1
<b>Date of Inspection:</b>	Dec 09, 2015
<b>Inspected By:</b>	James Crumbie

**OWNER INFORMATION:**

**Company Name:** MUSKOKA, THE CORPORATION OF THE DISTRICT MUNICIPALITY OF  
**Street Number:** 70 **Unit Identifier:** District Office  
**Street Name:** PINE St N  
**City:** BRACEBRIDGE  
**Province:** ON **Postal Code:** P1L 1N3

**CONTACT INFORMATION**

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**Type:** Owner **Name:** Marcus Firman  
**Phone:** (705) 645-6764 x368 **Fax:** (705) 645-7599  
**Email:** mfirman@muskoka.on.ca  
**Title:** Director of Water and Wastewater Engineering

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**Type:** Main Contact **Name:** Lee Gillan  
**Phone:** (705) 687-8956 **Fax:** (705) 687-8972  
**Email:** lgillan@muskoka.on.ca  
**Title:** Manager of Water & Sewer Operations

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**INSPECTION DETAILS:**

**Site Name:** PORT CARLING (FERNDALE) DRINKING WATER SYSTEM  
**Site Address:** 1091 FERNDAL RD PORT CARLING ON P0B 1J0  
**County/District:** Muskoka Lakes  
**MOECC District/Area Office:** Barrie District  
**Health Unit:** SIMCOE MUSKOKA DISTRICT HEALTH UNIT  
**Conservation Authority:** N/A  
**MNR Office:** N/A  
**Category:** Large Municipal Residential  
**Site Number:** 220002119  
**Inspection Type:** Announced  
**Inspection Number:** 1-BYLK1  
**Date of Inspection:** Dec 09, 2015  
**Date of Previous Inspection:** Jan 07, 2015

**COMPONENTS DESCRIPTION**

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**Site (Name):** MOE DWS Mapping  
**Type:** DWS Mapping Point **Sub Type:**  
**Comments:**  
Not Applicable

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**Site (Name):** LOW LIFT PUMPING STATION (RAW)  
**Type:** Treated Water POE                      **Sub Type:** Treatment Facility

**Comments:**

**Intake Works**

The intake works consists of a 400mm diameter intake pipe extending approximately 830.5m into Lake Rosseau, an intake crib at approximately 24m depth, a 15mm diameter chlorine feed line with diffuser for provisional zebra mussel control(not operational or functional), a 25 mm diameter raw water sampling line (not operational), a 405m long diameter backwash water supernatant discharge line with a normally closed valve at the water treatment plant(WTP) which discharges into the raw water intake line when operational, concrete ballast blocks and armour stone protection. At present, the backwash water supernatant line has had approximately 20m removed from the end of the line, after it separated from the intake line and floated to the surface in August, 2013. The details of the occurrence and repair have been captured in a Form 2 document:

The low lift pumping station consists of an approximately 4.5m x 3m x 7.6m concrete block building located at the base of Birch Avenue and approximately 10m south of the shoreline of Lake Rosseau. The station is equipped with two manually removable screens, two submersible pumps(duty, standby) each rated at 18.4L/s at 13.5m total dynamic head(TDH) and variable frequency drives(VFD's), a level sensor in the low lift pump well, electronically monitored pressure sensors on each pump discharge, backflow prevention, isolation valves, a valved return line and a pressure gauge on the discharge line. Pump control instrumentation is located within the station but it is typically operated remotely from the WTP by the control panel and supervisory control and data acquisition (SCADA) system located there. Level sensors on the WTP filters and the reservoir initiate low lift pump(LLP) starts and stops. Provision for a third LLP is provided at the station if required for expansion at stage 2.

**Raw Water Transmission Line**

The raw water transmission line is an approximately 361m long, 250mm diameter main running from the low lift pumping station at Birch Avenue to the water treatment plant located at Ferndale Road.

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**Site (Name):** TREATED WATER 1  
**Type:** Treated Water POE                      **Sub Type:** Treatment Facility

**Comments:**

The WTP is housed within an approximately 30 m x 30 m concrete block building and is located at 1091 Ferndale Road in Port Carling in the District Municipality of Muskoka. The WTP was commissioned on October 3, 2002. The building houses a packaged WTP rated at 1,590 cubic metres per day (m<sup>3</sup>/d), with provisions for a second packaged plant with similar capacity, for Stage 2 when required.

**Packaged Water Treatment Plant**

The WTP is designed to treat water at a maximum flow rate of 1590 m<sup>3</sup>/d. The treatment process consists of pH adjustment, taste and odour control, coagulation, flocculation, sedimentation, filtration and disinfection. The chemical addition systems will be discussed later.

Raw water is directed into the WTP from the LLPS. At the point of entry to the plant, the wastewater supernatant recycling line joins with the raw water header. The supernatant recycling system is currently not in operation and this line is valved closed.

Raw water passes on-line, electronic turbidity and pH analysers and an on-line temperature probe. After these analysers, hydrated lime is injected into the raw water, for alkalinity and pH adjustment, and this water passes through a motorized in-line blender. After this, the water enters the approximately 1.37 m diameter x 3.66 m high carbon dioxide (CO<sub>2</sub>) contact tower. CO<sub>2</sub> addition takes place within the tower, for further pH adjustment, targeting a pH=7 to enhance on coagulation. On-line pH analysers, situated in the Powdered Activated Carbon (PAC) contact chambers are used to control CO<sub>2</sub> addition. After the CO<sub>2</sub> tower, unused pre-chlorination injection points exist, and water splits to the two package filter trains.

Each of the two identical trains are equipped with individual isolation valves, on-line inlet magnetic flow meters and flow control valves before entering the two PAC contact chambers. PAC is designed to be injected into the PAC contact chambers, however PAC is not being used. Each PAC chamber is approximately 2.64 m x 1.1 m x 2.97 m deep and provides a detention time of 15 minutes at the design flow rate of 9.2 Litres per second (L/s). Each chamber is equipped with two variable speed mixers.

Water leaves the PAC chambers and enters the two coagulant flash mixing chambers. The coagulant SternPAC is added at this point. Each flash mixing tank is equipped with a variable speed mixer and provides two minutes of contact time, before the water is directed the flocculation chambers.

Injection points for the unused polymer system are located at the points of entry to the two flocculation chambers. Both have dimensions of approximately 2.64 m x 2.51 m x 2.97 m and are equipped with variable speed flocculators and floc recirculating pumps. The floc recirculation pumps draw water from the settling tanks and return it to the floc tanks to help catalyze the coagulation and flocculation process. The flocculation chambers provide contact times of 32 minutes. On-line pH analysers are located in the Floc Tanks. Water leaving the flocculation chambers enters the two settling tanks from their bottoms.

Water passes up through the tube settlers and exits by way of the perforated settled water tubes. The two settling tanks have dimensions of approximately 2.64 m x 4 m x 2.97 m deep and automatically waste sludge to the backwash wastewater system. The settling tanks provide a surface overflow rate of 3.4 cubic metres per metre squared per hour (m<sup>3</sup>/m<sup>2</sup>/h). Water leaving the settling tanks enters the two filters from the top.

The two multi media filters, one per train, have dimensions of approximately 2.64 m x 1.47 m x 2.97 m, with a maximum loading rate of 8.5 m/h. The filters are equipped with two backwash pumps (duty, standby), level sensors which initiate LLP starts in conjunction with the reservoir level, pressure differential sensors for monitoring head loss, and flow control valves for regulating filter rate. The filters are composed of layers of anthracite, sand and gravel over the underdrains. The filter effluent discharge lines are equipped with both on-line turbidimeters and particle counters. Water leaving the filters passes the analysers, exits the flow control valves and enters a common header. The filtered water flow meter is located just before the water is injected with sodium hypochlorite and enters the chlorine contact chamber (CCC).

#### Chlorine Contact Chamber

The CCC is located below grade. It is a concrete walled tank with a capacity of 60 m<sup>3</sup>. It is equipped with baffles and an overflow weir to ensure there is no short circuiting. The overflow weir maintains a consistent water level. The tank has an overflow drain with a check valve which drains to the ground outside the plant in case the tank is overfilled. A sample pump draws continuous samples for on-line analysers for pH and free chlorine residual from this tank. Chlorinated water leaves this tank and enters the two celled reservoir by way of the overflow weir. It is injected with sodium hydroxide at this point. Access to this tank is achieved through a single raised hatch with a locking plate metal lid and ladder.

#### Reservoir and High Lift Pump Well (HLPW)

The reservoir is a two celled, below grade concrete tank. Both cells are linked by normally open valves for level maintenance. These tanks are also joined to the HLPW. These three tanks have approximately 640 m<sup>3</sup> of total storage volume. These tanks are equipped with a level sensor and an overflow pipe with a check valve. If the level gets too high, water will discharge from this pipe to the ground outside the building.

**Site (Name):** TREATED WATER 2

**Type:** Treated Water POE

**Sub Type:** Treatment Facility

**Comments:**

Access to the two reservoir tanks is achieved through two raised hatches with locking plate metal lids and ladders.

The HLPW is equipped with two vertical turbine high lift pumps (HLP's) rated at 9.2 L/s, and a vertical turbine high lift pump rated at 18.4 L/s, with provision for a future fourth pump at Stage 2 of development. The two backwash pumps also draw from this chamber.

The discharges of the HLP's are all fitted with pressure sensors, automated valves and backflow prevention. They discharge into a common header with a pressure sensor, a temperature probe, a sodium hypochlorite injection point for final free chlorine adjustments, and a hydrofluosilicic acid injection point. Water then passes through a magnetic flow meter and past a line which feeds continuous on-line fluoride, pH, free chlorine residual, and turbidity analysers for finished water. This line is fitted with backflow prevention and feeds potable water to the WTP for various uses. Water leaves the WTP and enters the distribution system at this point.

Automatic control and monitoring of the various system components, on and off site, is achieved by the process logic controllers (PLC's) throughout the system, and the SCADA system at the WTP. Phone lines link the remote components of the system to the WTP. The system can be run manually if desired.

**Standby Power**

Standby power consists of a 150 kW diesel power generator set located within the WTP. It provides emergency standby power for WTP and low lift pumphouse. Fuel is stored in a 1110 L tank with secondary containment within the generator room. Fuel level is continuously monitored by the SCADA system and with a manual gauge.

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**Site (Name):** CHEMICAL FEED SYSTEM**Type:** Treated Water POE**Sub Type:** Treatment Facility**Comments:****Chemical Feed Systems**

The chemical feed systems consist of chemical pumps, storage tanks, piping and associated appurtenances to dose hydrated lime, carbon dioxide, powdered activated carbon, coagulant, polymer, sodium hydroxide, hydrofluosilicic acid and sodium hypochlorite solutions.

**Hydrated Lime Feed System**

This system incorporates a dry, hydrated lime batching system, complete with storage tank, volumetric feeder with pneumatic vibrator, and dust collector. Dry lime is fed into the batching tank. Finished water is fed into this tank from a line with flow control and a magnetic flow meter to produce lime slurry. Two peristaltic chemical metering pumps (one duty, one standby) capable of producing 0-960L/hr, are used to pump lime slurry to the 250 mm diameter raw water main upstream of the carbon dioxide contact tower for pH and alkalinity adjustment. An in-line mechanical blender ensures mixing in this main.

Hydrated lime is supplied in 500 kg bulk bags which are raised on a hoist. The hopper is equipped with alarmed level sensors. An air compressor and air dryer supplies moisture free air to the pneumatic vibrator. Dosage is flow paced.

**Carbon Dioxide Feed System**

The carbon dioxide feed system consists of two mini-bulk 340 kg carbon dioxide gas cylinders (duty/standby), an internal vaporizer, vent lines to the outside, automatic switch over capability, on-line tank weigh scales, and a flow control valve for flow paced addition to the carbon dioxide contact tower. This system is for pH adjustment.

**Powdered Activated Carbon Feed System**

This system is unused but consists of a 500 kg bulk bag supply system with hoist, a storage hopper, a dust collector, volumetric feeder with pneumatic vibrator, slurry wetting cone and tank, and an in-line

booster pump rated at 30 L/min. The booster pump draws raw water from the plant inlet and injects it into, and through, the mixing tank. The discharge line splits before injection into the two separate PAC contact chambers. Each line is equipped with a flow regulator valve, a flow meter and totalizer. Powdered activated carbon slurry is seasonally injected (as required) for taste and odour control. The hopper is equipped with alarmed level sensors. An air compressor and air dryer supplies moisture free air to the pneumatic vibrator. Dosage is flow paced.

#### Coagulant Feed System

This system consists of three chemical feed pumps (2 duty, 1 standby) each rated at 1.1 L/h, a 16 m<sup>3</sup> bulk storage tank with level sensor and containment, and a 200 L day tank with on-line weigh scale and containment. Poly aluminum chloride (SternPAC) solution is injected into the two flash mixing chambers by separate pumps. Dosage is flow paced. This chemical addition serves as a flocculant and filter aid.

#### Polymer Feed System (not in use).

The polymer feed system consists of two chemical feed pumps (duty, standby) each rated at 60 L/h, a volumetric feeder for potable water, a wetting chamber, and a slurry mixing tank with slow speed mixer and level sensor. Polymer solution is injected into the flocculation tanks and backwash wastewater line before discharge into the backwash holding tanks. Dosage is flow paced.

#### Post - Filter pH Adjustment

The sodium hydroxide feed system consists of two chemical pumps (duty, standby) each rated at 2.1 L/h, and a 450 L sodium hydroxide day tank with containment and on-line weigh scale. Sodium hydroxide solution is injected at the outlet of chlorine contact chamber. Dosage is flow paced. This chemical addition serves for pH adjustment and corrosion control.

#### Sodium Hypochlorite Feed System

This system consists of four chemical pumps (two peristaltic pumps- one duty and one standby, and two piston type). The peristaltic type are capable of 0 to 27L/hr and the piston type are rated at 2.1 L/h. A 210 L capacity day tank is equipped with containment and on-line weigh scale. The system is configured so that one chemical pump can inject for pre-chlorination to the raw water main after the CO2 tower but before the main splits to the two trains. One is for post-filter chlorination, injecting to the chlorine contact chamber. One is for final chlorination and trim control, injecting to the high lift pump discharge header. Dosage is flow paced. This chemical addition is for disinfection. Normal operating conditions will see the chemical injected at the filter discharge header location only.

#### Hydrofluosilicic Acid System

This system consists of two chemical feed pumps (duty, standby) each rated at 0.74 L/h, and a 205 L capacity day tank with containment and on-line weigh scale. Hydrofluosilicic acid solution is injected into the high lift pump discharge header. Dosage is flow paced.

All of the chemical feed pumps are equipped with backflow prevention. All are initiated by low lift pump starts and filter flows except for the hydrofluosilicic acid system and the post chlorination pump, if required. These pumps are triggered by high lift pump starts.

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**Site (Name):** FILTER BACKWASH WATER SYSTEM  
**Type:** Treated Water POE                      **Sub Type:** Treatment Facility

**Comments:**

#### Filter Backwash Pumps

Two backwash pumps (duty, standby), each rated at 47.8 L/s and located in the HLP room, pump water from the clear well to the filters for backwashing. Each is equipped with backflow prevention, a pressure sensor and flow control valves. These pumps push finished water up through the filters and the resulting wastewater is collected in troughs on top of the filters and directed to the backwash wastewater holding tanks. Filter backwashes are normally initiated manually, based upon head loss on the filters.

**Backwash Holding Tanks**

The two filter backwash holding tanks, with a combined capacity of 328 m<sup>3</sup>, collect backwash wastewater and rinse water from the filters and waste sludge from the two settling tanks. The tanks have sloped bottoms to direct sludge to the sludge pumps. Settled sludge and supernatant water is discharged to the sanitary sewer via two submersible pumps (duty, standby) each rated at 6.8 L/s. The backwash holding tanks are also equipped with two supernatant pumps (duty, standby), each rated at 2.3 L/s, to provisionally recycle supernatant to the 250 mm diameter raw watermain via a 50 mm diameter pipe equipped with a flow control valve, magnetic flow meter, turbidity meter, and composite sampler (with an option to discharge to Lake Rosseau in an emergency situation). Supernatant water can also be directed to the raw water intake line in Lake Rosseau. The supernatant recycling line joins the raw water header before the raw water flow meters and analysers. The tanks each have two level sensors, one for normal operations and one for overflow situations. The tanks are joined above a certain level and if they are overfilled, an overflow weir with a check valve allows the excess wastewater to discharge outside of the plant to ground.

All of the pumps are equipped with backflow prevention. The sludge pumps are programmed to automatically start to drain the tanks. Currently, all plant wastewater is directed to the sanitary sewer.

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**Site (Name):** DISTRIBUTION**Type:** Other**Sub Type:** Other**Comments:**

There is currently an estimated 12408 m of watermain within the distribution system. The watermains are composed of various sizes ranging from 25 mm to 400 mm in diameter and compositions including cast iron (CI), polyvinyl chloride (PVC), and polyethylene (PE). The majority of the watermains are PVC. There has been no recent large scale expansion of the distribution system.

There are approximately 85 fire hydrants, 103 main valves and 9 air relief valves within the system.

The water system currently serves a population of approximately 900 permanent residents with seasonal fluctuations. The system includes 391 total connections with approximately 293 residential services, 81 commercial services, 17 institutional services and no industrial services.

The water tower is the only notable structure located within the distribution system.

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**Site (Name):** WATER TOWER**Type:** Other**Sub Type:** Reservoir**Comments:**

The elevated water storage tower, constructed in 1992 at 165 Medora Street, has a rated capacity of 1200 m<sup>3</sup>. It is located within a fenced area at the top of a hill at the south end of the distribution system. It is surrounded by trees at the end of a paved access road.

The water tower is composed of an elevated steel storage tank on a 30 m high concrete base. The structure has a locked, double steel door with an entry alarm. The tank is accessed by way of ladders inside the concrete base with catwalks and access hatches from the bottom and through the centre of the tank. There is a common 250 mm diameter inlet/outlet pipe connected to the distribution system by a 250 mm diameter watermain. The tower is also equipped with a 200 mm diameter overflow pipe which discharges from the tower to a nearby surface drainage ditch. The overflow pipe is connected to the inlet/outlet pipe by a normally closed valve. Isolation valves are located within the tower and in a valve chamber outside of the tower on the watermain. The vents at the top of the tower are reportedly screened.

A continuously monitored and alarmed, electronic free chlorine residual analyser draws water from the inlet/outlet pipe at the base of the tower. Automated levelling equipment connected to the SCADA system initiates HLP starts and stops at the WTP at programmed water levels in the tank.

A sample tap is located in the base of the tower on the inlet/outlet pipe.





## INSPECTION SUMMARY

### INTRODUCTION

- \* The primary focus of this inspection is to confirm compliance with Ministry of the Environment and Climate Change (MOECC) legislation as well as evaluating conformance with ministry drinking water related policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment and distribution components as well as management practices.

This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O.Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.

This report is based on a "focused" inspection of the system. Although the inspection involved fewer activities than those normally undertaken in a detailed inspection, it contained critical elements required to assess key compliance issues. This system was chosen for a focused inspection because the system's performance met the ministry's criteria, most importantly that there were no deficiencies as identified in O.Reg. 172/03 over the past 3 years. The undertaking of a focused inspection at this drinking water system does not ensure that a similar type of inspection will be conducted at any point in the future.

This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

The Port Carling (Ferndale) drinking water system serves the community of Port Carling, in the Township of Muskoka Lakes, located along highway 118 in the District Municipality of Muskoka. The drinking water system serves an estimated population of 900 persons. There are approximately 391 total service connections, of which approximately 293 are residential services; 81 are commercial services; and, 17 are institutional services. The Port Carling (Ferndale) drinking water system is owned and operated by the Corporation of the District Municipality of Muskoka. The Corporation of the District Municipality of Muskoka is referred to as the Owner, Operator and Municipality for the purposes of this inspection report.

Drinking water for the Port Carling community is obtained from Lake Rosseau. The Port Carling (Ferndale) drinking water treatment plant (WTP) commenced operation in October 2002. The drinking water 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 is achieved by chlorination, through the use of sodium hypochlorite solution. Alkalinity and pH adjustment is provided to enhance on the filtration process, through the addition hydrated lime and carbon dioxide, and sodium hydroxide is added to aid in pH and corrosion control within the distribution system. Fluoridation also occurs prior to the treated water being conveyed to the distribution system. A Powdered Activated Carbon system exists, and may be used in response to any taste and odour related issues, however operation of this system has not been necessary.

The Port Carling (Ferndale) drinking water system is categorized as a Large Municipal Residential drinking water system and is regulated by the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation (O.Reg.)170/03.

Operation of the Port Carling (Ferndale) drinking water system is authorized under Municipal Drinking Water Licence #143-105 (Licence) and Drinking Water Works Permit 143-205 (Permit) which were originally issued to the District of Muskoka, respectively as Licence Issue#1 on October

## INTRODUCTION

14, 2010, and Permit Issue#1 on October 13, 2010. On February 3, 2015, an application was submitted by the Owner to renew the Licence with the Ministry of the Environment and Climate Change (Ministry), and the Ministry renewed the Licence and re-issued Licence Issue #2 and Permit Issue #2 on October 6, 2015.

Water takings from Lake Rosseau are permitted in accordance with Permit to Take Water (PTTW)# 6372-7L3U53 issued November 7, 2008. The PTTW allows the Owner to take a maximum of 2823000 Litres per day (L/d) from Lake Rosseau, at a rate not exceeding 2030 Litres per minute (L/min). The PTTW expires on November 30, 2018. Compliance with the PTTW was not assessed during the course of this inspection, however, the Owner is aware that water takings must be done in accordance with the conditions of a valid PTTW.

The Port Carling (Ferndale) Drinking Water System was last inspected by the Ministry on January 7, 2015. Findings associated with that 2014/2015 inspection were detailed in Inspection Report # 1-BBVL5, issued to the Owner on February 2, 2015.

The December 9, 2015 inspection, to which this inspection report pertains, encompasses an inspection review period between February 2, 2015 and December 9, 2015. The December 9, 2015 inspection included a physical inspection of the water treatment equipment and facilities; interviews with operational staff; and a review of relevant documents for the inspection review period. A physical inspection of the Elevated Water Tower was also undertaken.

## CAPACITY ASSESSMENT

- **There was sufficient monitoring of flow as required by the Permit and Licence or Approval issued under Part V of the SDWA**

Condition 2.1, Schedule C of the Licence requires the Owner to ensure the continuous flow measurement and recording be undertaken for the flow rate and daily volume of water conveyed into the treatment system and the flow rate and daily volume of water conveyed from the treatment system into the distribution system.

A flow meter is installed on each raw water line leading to the treatment trains, on the lime supply line and on the treated water header. There are also flow meters installed on the plant potable water line and on supernatant line, which is not currently in use.

To comply with this condition, the Owner has installed magnetic flow measuring devices on each of the two separate filter train inlets, one on the combined filter train outlet, and one on the plant discharge header entering the distribution system. Flow meters have also been installed on the lime slurry mixing line, and on the unused supernatant pumping system. A flow meter is also installed at the Port Carling (Medora St.) Water Pollution Control Plant, to measure the filter backwash/sludge wastewater being pumped from the WTP to the WPCP.

Instantaneous flow rates are measured by each flow measuring device and continuously trended and recorded on the Supervisory Control and Data Acquisition (SCADA) system associated with the drinking water system. Totalized daily flows are calculated by SCADA, and transcribed to record keeping mechanisms for reporting purposes. Several of the flow meters are also used for process control purposes.

All flow measuring devices were most recently calibrated on October 29, 2015. Prior to that, the flow measuring devices were calibrated on November 5 and 6, 2014.

There were reportedly no concerns identified with the calibrations.

- **The owner was in compliance with the conditions associated with maximum flow rate or the rated capacity conditions in the Permit and Licence or Approval issued under Part V of the SDWA.**

Condition 1.1, Schedule C of the Licence stipulates that the maximum daily volume of treated water that flows from the Port Carling (Ferndale) water treatment plant to the distribution system shall not exceed 1590 cubic metres per day (m<sup>3</sup>/d).

### CAPACITY ASSESSMENT

In 2014 the maximum day demand occurred on July 2, 2014 when a total daily flow of 753.7m<sup>3</sup> or 47.4% of the rated capacity was noted to have occurred. The average day demand for 2014 was reported to be approximately 369.9m<sup>3</sup>/d or 23% of the plant rated capacity.

Between January 1, 2015 and up to the date of this inspection, December 9, 2015, the maximum day demand occurred on July 30, 2015 when a total daily flow of 673.4m<sup>3</sup> or 42% of the rated capacity was noted to have occurred. The average day demand for this same period is reported to be approximately 337.8m<sup>3</sup>/d or 21% of the plant rated capacity.

During water production the rate of flow into the treatment system is governed by the variable frequency drive low lift pumps and actuated valving installed on each of the filtration train inlets and outlets. Low lift pump operation and valving control is done through the PLC and SCADA, based on maintaining a sufficient water level in the filters and the highlift pump reservoir. A review of records made during this inspection review period indicates that the Port Carling (Ferndale) drinking water system was not operated to exceed the plant rated capacity set out in the Licence. Similarly, records indicate that the filters were not operated in excess of their design capacities (952m<sup>3</sup>/d) during the production of water. The filters are typically operated at a filtration rate of between 12 and 14m<sup>3</sup>/hr in the summer months and 8 to 12m<sup>3</sup>/hr during the winter months. The maximum filter production volumes occurred on July 31, 2015, when Filter 1 produced 327m<sup>3</sup> and Filter 2 produced 326m<sup>3</sup>.

### TREATMENT PROCESSES

- ★ **The owner had ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.**

A review of the equipment installed at the Port Carling (Ferndale) water treatment plant was referenced and found to compare favourably to the equipment listed in the Permit issued for the Port Carling (Ferndale) Drinking Water System, with one minor exception.

As was discussed in the Ministry's 2013 and 2014 inspection reports, a 20 metre section of the 405 metre long backwash supernatant recycling line was removed in August 2013, when the ballast straps snapped and the line floated to the surface. The backwash supernatant recycling line was originally installed in to allow backwash wastewater supernatant to be returned to the water intake and be re-treated, however the line has never been used and all backwash wastewater is directed to the sanitary sewer system. A Form 2 Notice of Minor Alteration was prepared on January 27, 2014 to acknowledge the fact that the line is currently 20 metres shorter than described in the Permit and will remain as such, until a decision is made as to whether the section will be repaired or an amendment to the Permit pursued. As indicated, the supernatant return line has never been used, and there are no intentions of using the line in the immediate future.

There have reportedly been no alterations to the drinking water system to necessitate the need for an alteration of the description of the drinking water system components. Similarly, there were reportedly no watermain additions or modifications to necessitate the completion of any Form 1 documents nor were there reportedly any minor modifications undertaken or additions made which required the completion of any Form 2 or Form 3 documents, during this inspection review period.

- ★ **Records indicated that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a Permit, Licence or Approval issued under Part V of the SDWA at all times that water was being supplied to consumers.**

O.Reg.170/03 requires that treatment for a surface water source consist of chemically assisted filtration and disinfection capable of achieving at a minimum 2-log removal or inactivation of *Cryptosporidium* oocysts, 3-log removal or inactivation of *Giardia* cysts, and, 4-log removal or inactivation of viruses.

These requirements are reportedly met by conventional filtration followed by chlorination, with sodium hypochlorite, for both primary and secondary disinfection purposes.

## TREATMENT PROCESSES

According to the Ministry's Procedure for Disinfection and Schedule E of the Licence, the filtration process is credited with 2.5 log *Giardia* cyst removal, 2.0 log *Cryptosporidium* oocyst removal and 2.0 log virus removal credits, if the filtration process meets the following criteria:

- use a chemical coagulant at all times when the treatment plant is in operation;
- monitor and adjust chemical dosages in response to variations in raw water quality;
- maintain effective backwash procedures, including filter-to-waste or an equivalent procedure during filter ripening to ensure that the effluent turbidity requirements are met at all times;
- continuously monitor filtrate turbidity from each filter; and,
- meet the performance criterion for filtered water turbidity of less than or equal to 0.3 NTU in 95% of the measurements each month.

To ensure these criteria are met, the Owner has installed a chemical coagulation system comprised of chemical metering pumps dedicated to each filter train, and each equipped with chemical flow sensors linked to SCADA for alarming purposes. In the event the chemical pumping system fails, the filter inlet and outlet valves close for the respective filter train, such that water production ceases until such time the metering pump is returned to service.

Although the multimedia filters are capable of backwashing automatically, through SCADA, filter backwashes are manually initiated through SCADA so operators can be present to observe the backwash process. Operational staff initiate filter backwashes based on filter run times, filtered volumes, head loss, or turbidity.

The filter trains are designed to continuously return settled sludge to the flocculation tanks. Sludge wasting occurs automatically through SCADA at an operator adjusted time based frequency (40 seconds, every ten hours). Formalized filter backwashing and wasting procedures are available within the Operations and Maintenance Manual.

Continuous turbidimeters installed on each filter train are configured to trigger an alarm and shut down the respective filter (inlet and outlet valves close), should filter effluent turbidity exceed 0.5NTU, or should the turbidimeter register a signal loss/malfunction.

Following a backwash cycle, or when a filter is called into operation, the respective filter will enter a 480s rinse period, followed by a 200s turbidity verification rinse period, during which time the filter effluent valve remains closed and filtered water is directed to waste. If the filter effluent Turbidity has not fallen below the 0.5NTU alarm setpoint after these rinse periods, the filter effluent valves will remain closed, an alarm sequence initiated, and the filter will continue to run to waste for an additional 30m. By design, water is not directed to the clear well until the turbidity concentration drops below 0.5NTU.

Records indicate that the filters met the performance criterion of less than 0.3 NTU in 95% of the tests conducted each month during this inspection review period. SCADA is programmed to alarm should the trending results at the end of each month be out of compliance with the performance criteria. Records also indicate that the coagulant system was in operation when water was being produced, and backwash procedures were followed during this inspection review period.

To achieve the remaining 0.5-log *Giardia* cysts and 2-log Virus removal or inactivation, a free available chlorine disinfection system is utilized and the CT disinfection concept is used to quantify the capability of the disinfection system for primary disinfection purposes. Free chlorine residual is achieved through the addition of a sodium hypochlorite solution to the filtered water being directed to the dedicated chlorine contact chamber where the contact time required for CT is afforded. The chlorine contact chamber is baffled (bf= 0.3), and provides a dedicated chlorine contact volume of 59.8m<sup>3</sup>. The system is operated to target a free chlorine residual of 2.3mg/L at the end of the chlorine contact chamber, prior to the addition of sodium hydroxide and water being conveyed to the reservoirs. The chlorine analyzer used for primary disinfection monitoring, is provided samples from the end of the chlorine contact chamber and is configured to trigger an alarm sequence should chlorine residuals fall below 2.00mg/L. Should the chlorine residual fall below 1.8mg/L the

## TREATMENT PROCESSES

filters and high-lift pumps will shut down, ceasing water conveyance from the plant until operational staff respond to the site and resolve any issues.

A chlorine residual analyzer is also installed on the high-lift pump discharge header. The plant is operated to target a free chlorine residual of 1.80 mg/L in the finished water being conveyed to the distribution system. The finished water chlorine analyzer is configured to initiate an alarm should the chlorine residual drop below 0.85mg/L, and will shut down the filters and high-lift pumps if the chlorine residual falls below 0.7mg/L.

The SCADA system is also configured to calculate CT continuously and will alarm if CT is not met. A CT calculation spreadsheet is also available for operators to verify CT under varying operating conditions. Supporting documentation related to CT is available in the operations and maintenance manual.

Records reviewed, indicate that the WTP was operated to achieve the necessary CT requirements for primary disinfection purposes during this review period.

- \* **Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined.**

Following the completion of the intended chlorine contact time for primary disinfection purposes, free available chlorine residual is maintained out and into the distribution system for secondary disinfection purposes to reduce the potential for microbial re-growth within the distribution system, and in accordance with section 1-5 of Schedule 1, O.Reg.170/03. The Port Carling (Ferndale) water treatment plant is designed to target a free chlorine residual of 1.8mg/L at the point of entry into the distribution system, which should ensure a minimum free chlorine residual of 0.2mg/L is maintained throughout the distribution system as is recommended in the Ministry's Procedure for Disinfection. The free chlorine residual analyzer installed on the high lift pump discharge header is configured to initiate an alarm notification if the free available chlorine residual drops below 0.85mg/L, and the filters and high-lift pumps will shut down should the chlorine residual drop below 0.7mg/L. A trim chlorination system is installed and may be used to increase the chlorine residual in the treated water being conveyed to the distribution system; however, operation of this system has not been necessary.

A continuous analyzer is installed at the Port Carling Elevated Water Tower to measure free chlorine residual for secondary disinfection purposes. The analyzer is configured to alarm if the free chlorine residual falls below 0.35mg/L.

In addition, chlorine residuals are measured during microbiological sampling and maintenance activities throughout the distribution system. System wide hydrant flushing is conducted each spring and dead end hydrant flushing is conducted each fall or in response to any issues.

Records indicate that free chlorine residuals were maintained at or above the 0.2mg/L throughout the distribution system during this inspection review period; and, there were no records which indicated free chlorine residuals less than 0.05 mg/L at any time during the inspection review period. The recorded distribution system free chlorine residual concentrations ranged between 0.69mg/L and 2.04g/L.

- \* **The Operator-in-Charge had ensured that all equipment used in the processes was monitored, inspected, and evaluated.**

Operators evaluate the system processes at the Port Carling (Ferndale) water treatment plant daily, Monday through Friday. They verify the operating conditions through SCADA trending and record any departures from normal operating conditions. Weekends and holidays are also considered, to ensure that the review of the continuous monitoring data does not exceed 72 hours in duration. The specific operating conditions are recorded on their checklists and also stored electronically in Excel spreadsheets. Records of the checks are written in the log book at the water treatment plant.

**TREATMENT PROCESS MONITORING**

- **Primary disinfection chlorine monitoring was being conducted at a location approved by Permit, Licence or Approval issued under Part V of the SDWA, or at/near a location where the intended CT had just been achieved.**

The primary disinfection chlorine monitoring point is currently located at the end of the dedicated baffled chlorine contact chamber, prior to the sodium hydroxide injection and the water entering the high-lift pump reservoirs. The chlorine analyser is supplied samples from the end of the chlorine contact chamber by a peristaltic pump, and is linked to SCADA for continuous monitoring, trending and alarming purposes, and is used by SCADA and operational staff to calculate CT provisions.

- **Continuous monitoring of each filter effluent line was being performed for turbidity.**

In accordance with subsection 7-3(2)(b) of Schedule 7, O.Reg.170/03 the Owner has installed continuous turbidimeters on each filter train. The turbidimeters are supplied with continuous samples from the filter underdrains, such that the samples are indicative of filtered water during production as well as during the filter to waste processes. For operational purposes, the Owner has also installed continuous turbidimeters for the purpose of measuring the turbidity of the raw water and the finished drinking water conveyed to the distribution system. All four of the turbidimeters are linked to the SCADA system for continuous trending, monitoring and alarm purposes. A turbidimeter has also been installed for the supernatant recycling system, however, the supernatant recycling system and the turbidimeter have never been used.

The high turbidity alarm set points on the two filter trains is set at 0.50 NTU. SCADA is also configured to initiate an alarm should turbidity measure a low analog output (4mA), which might suggest a turbidimeter malfunction. Should either a high or low turbidity alarm condition occur, the filter inlet and outlet valves close, ceasing the production of water. The filter train alarms are present to help ensure compliance with the Procedure for Disinfection of Drinking Water in Ontario effluent turbidity requirements of being less than or equal to 0.30 NTU in 95% of the measurements recorded each month on each filter effluent line.

The turbidimeter installed to measure the treated water is configured to initiate an alarm should treated water turbidity exceed 0.6NTU, and the raw turbidimeter is configured to trigger an alarm if raw water turbidity exceeds 8.00NTU.

- **The secondary disinfectant residual was measured as required for the distribution system.**

The free chlorine residual concentration within the distribution system is being measured by a continuous analyzer installed at the Port Carling elevated water tower. The distribution chlorine residual analyzer is configured to trigger an alarm if chlorine residual drops below 0.35mg/L. In addition, chlorine residuals are measured during microbiological sampling and maintenance activities throughout the distribution system.

The recorded distribution system free chlorine residual concentrations ranged between 0.69mg/L and 2.04mg/L, during this inspection review period.

- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**

The data review is completed daily Monday through Friday. Weekends and holidays are considered. Operators are scheduled to conduct a data review so that the time between checks does not exceed the 72 hour regulatory requirement.

The weekend results of the continuous monitoring equipment are being reviewed on Mondays, or the day after in the case of a holiday and documented in the log book in order to satisfy Schedule 6, O.Reg.170/03 requirements for examination of continuous monitoring data.

**TREATMENT PROCESS MONITORING**

- \* **All continuous monitoring equipment utilized for sampling and testing required by O. Reg. 170/03, or approval or order, were equipped with alarms or shut-off mechanisms that satisfied the standards described in Schedule 6.**

Continuous monitors are used to assess primary disinfection chlorine residual concentrations, secondary disinfection chlorine residual concentrations, and turbidity on each filter effluent. At the time of inspection, the analyzer used for primary disinfection monitoring had a low chlorine alarm set point of 2.0mg/L and a low/low chlorine alarm set point of 1.80mg/L. The high and high/high chlorine alarm set points were at 3.20 and 3.40mg/L. By activating the low or high setpoints an alarm notification process is initiated and an operator responds to the site. By activating the low/low or high/high alarm, the filters and high-lift pumping capabilities will cease and allow time for an operator to intervene.

As previously discussed, secondary disinfection is also monitored in the distribution system at Port Carling Elevated Water Tower. The distribution chlorine analyzer is configured to trigger an alarm notification if chlorine residual drops below 0.35mg/L.

The filter effluent turbidity high set point alarms are set at 0.50(NTU), and SCADA is configured to alarm if the turbidimeter generates a low analog signal (4mA). Should either the low or high turbidity alarms be triggered, the filter inlet and outlet valves shut down, ceasing the production of water, until rectified. By design, water is not directed to the clear well until the turbidity concentration drops below 0.5NTU.

- \* **Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and recording data with the prescribed format.**

Schedule 6 of O.Reg.170/03 outlines the recording frequency requirements for continuous on line analysers. It requires that the free chlorine residual for primary disinfection be tested and recorded with a frequency of every five minutes. Turbidity monitoring must be performed with a minimum frequency of 15 minutes. If secondary disinfection monitoring uses continuous analysers, as is the case for secondary disinfection monitoring conducted at the Elevated Water Tower, the free chlorine residual in a distribution sample must have a minimum recording frequency of 1 hour.

Complying with these requirements, continuous monitoring data is recorded and trended on the SCADA system at ten second intervals.

The chlorine residual is being recorded in milligrams per litre(mg/L) and the turbidity is being recorded in Nephelometric Turbidity Units(NTU) in order to comply with the requirements contained in Schedule 6.

- \* **All continuous analysers were calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.**

The Port Carling (Ferndale) water treatment plant is equipped with continuous analysers for pH, chlorine residual, turbidity and fluoride. Calibrations are completed a minimum of at least once per month, exceeding the manufacturer's recommendations to ensure effective operation and accuracy.

Procedures are available in the operations and maintenance manual for the calibration of the continuous analyzers.

The continuous chlorine analysers are calibrated when the unit reads .5% above or below in-house titration results. Records of each calibration are made in the daily log book and the maintenance log book at the treatment plant. Handheld colorimeters are verified against titration tests on a weekly basis, and the hand held unit is used to verify the calibration of the analyzer at the Port Carling Elevated Water Tower.

The turbidity and pH meters are calibrated on a monthly frequency and a record is made in the daily log book and the maintenance log book at the treatment plant.

**OPERATIONS MANUALS**

- **The operations and maintenance manuals contained plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.**

An operations and maintenance manual has been created and is available on-site for the utility operator's use at the water treatment plant. The operations manual is reviewed annually. The contingency plans were last fully reviewed in May 2013, and were reportedly under review at the time of this inspection.

The contents of the manuals appear to be sufficient, enabling staff to safely operate the drinking water system. Process flow diagrams included in Schedule D of the Permit also appear to be accurate.

- **The operations and maintenance manuals did meet the requirements of the Permit and Licence or Approval issued under Part V of the SDWA.**

Condition 16, Schedule B of the Licence prescribes that the operations and maintenance manual include at a minimum:

- the requirements of the licence and associated procedures;
- the requirements of the drinking water works permit for the drinking water system;
- a description of the processes used to achieve primary and secondary disinfection within the drinking water system, including a copy of the CT calculations that were used as the basis for primary disinfection under worst case operating conditions.
- procedures for monitoring and recording the in-process parameters necessary for the control of any treatment subsystem and for assessing the performance of the drinking water system;
- procedures for the operation and maintenance of monitoring equipment;
- contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown; and,
- procedures for the dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in respect of the complaint.

Procedures necessary for the operation and maintenance of any alterations to the drinking water system must also be incorporated into the operations and maintenance manual prior to the alterations coming into operation.

The operations manual and the contingency plans for the drinking water system appear to address all of these topics sufficiently, providing the utility operators enough information to effectively operate the drinking water system.

The requirement for the operations manual to include a description of the processes used to achieve primary and secondary disinfection within the drinking water system, is a new condition, Condition 16.2.3, Schedule B), of the Licence that was issued on October 6, 2015 and the Owner has until April 13, 2016 to comply with this condition.

In review of the information contained in the Operations Manual provided for this inspection, all of the information would appear to be available to satisfy this condition. The SCADA system is also configured to calculate CT continuously to ensure adequate disinfection is provided and will alarm if CT is not met, and a CT calculating spreadsheet is also installed on the computer in the control room which allows operators to verify CT under various conditions.

**LOGBOOKS**



### LOGBOOKS

- \* **Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.**

Records reviewed indicate that only the certified utility operators are the individuals that are performing the operational tests throughout the system. Operator certification was verified with the Ontario Water Wastewater Certification Office and all operators were in possession of valid certificates.

### SECURITY

- \* **The owner had provided security measures to protect components of the drinking-water system.**

Security measures in place throughout the Port Carling (Ferndale) drinking water system include fencing, locked gates, secure entrance doors and security systems. The security alarms utilized are connected to the alarm dialer system. The on call operator is alerted to an alarm condition, must acknowledge it, and determine the appropriate response to the situation.

The owner reported no concerns with security or vandalism over the inspection review period.

### CERTIFICATION AND TRAINING

- \* **The overall responsible operator had been designated for each subsystem.**

In accordance with Ontario Regulation 128/04 (Certification of Drinking Water System Operators and Water Quality Analysts) made under the SDWA, the Port Carling (Ferndale) Water Treatment Plant is classified as a Class 4 Water Treatment Subsystem (#3288 issued September 6, 2005), while the Port Carling Water Distribution System is classified as a Class 1 Water Distribution Subsystem (#1089 issued September 6, 2005).

At the time of this inspection, individuals possessing Class 4 Water Treatment Subsystem and Class 3 Water Distribution certificates, at a minimum, have been designated to act in the capacity of Overall Responsible Operator (ORO). Other operators, who possess, at a minimum, Class 2 Water Treatment and Distribution certification, are also available and may serve in the ORO capacity, if required.

Records identifying the name of the individual serving in the capacity of ORO are documented within facility logbooks on a daily basis. There were no records to indicate that individuals other than sufficiently certified operators were acting in the capacity of ORO during this inspection review period.

The water treatment plant, distribution system and operator certificates are prominently displayed at the water treatment plant.

- \* **Operators in charge had been designated for all subsystems which comprised the drinking-water system.**

The Owner has designated the operators who possess the appropriate level of certification to act as Operator-in-Charge (OIC) as required. Typically, the operator doing facility checks is considered the OIC of the facility on that particular day.

- \* **Only certified operators made adjustments to the treatment equipment.**

Records provided for review indicate that the District of Muskoka utility operators appear to be the only persons who are adjusting water treatment equipment and processes at the water treatment plant. Operator certification was verified with the Ontario Water Wastewater Certification Office and all operators were in possession of valid certificates.

### WATER QUALITY MONITORING

**WATER QUALITY MONITORING**

- \* **All microbiological water quality monitoring requirements for distribution samples were being met.**

The owner of a large municipal residential drinking water system shall ensure that if the system serves a population of 100,000 or less, at least eight distribution samples plus one for every thousand people served by the system are taken every month. At least one of the samples must be taken each week. As Port Carling's population is estimated to be 900 residents, eight samples must be collected monthly as a minimum requirement from the distribution system. These samples are required to be tested for E.Coli. and total coliform; and at least 25 percent of the samples are required to be tested for general bacteria populations expressed as colony counts on a heterotrophic plate count.

Records reviewed in the course of this inspection indicate that the Owner complied with these requirements, collecting a minimum of three distribution samples each week, in order to comply with, and exceed, the regulatory requirement. Each of those samples were tested for E.Coli., total coliform, and at least one of the three samples collected were tested for general bacteria populations expressed as colony counts on a heterotrophic plate count.

- \* **All microbiological water quality monitoring requirements for treated samples were being met.**

Section 10-3 of Schedule 10, O.Reg.170/03 requires the Owner to ensure samples are collected at least once every week from the system's treated water at the point of entry into the distribution system. The samples collected are required to be tested for E.Coli and total coliform, and general bacteria populations expressed as colony counts on a heterotrophic plate count.

Records reviewed in the course of this inspection indicate that the Owner complied with these requirements.

- \* **All inorganic water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Section 13-2 of Schedule 13, O.Reg.170/03 requires the Owner and the operating authority to ensure that at least one water sample is taken every 12 months if the system obtains water from a raw water supply that is surface water, and have those samples tested for every inorganic parameter set out in Schedule 23, O.Reg.170/03.

Complying with these requirements, the Owner last conducted this sampling on May 11, 2015. Prior to that, this sampling was last conducted May 5, 2014. There were no concerns identified with the results obtained.

- \* **All organic water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Section 13-4 of Schedule 13, O.Reg.170/03 requires the Owner and the operating authority to ensure that at least one water sample is taken every 12 months if the system obtains water from a raw water supply that is surface water, and have those samples tested for every organic parameter set out in Schedule 24, O.Reg.170/03.

Complying with these requirements, the Owner last conducted this sampling on May 11, 2015. Prior to that, this sampling was last conducted May 5, 2014. There were no concerns identified with the results obtained.

- \* **All trihalomethanes water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Section 13-6 of Schedule 13, O.Reg.170/03 requires the Owner and the operating authority to ensure that at least one distribution sample is taken every 3 months from a point in the drinking water system's distribution system, or in plumbing that is connected to the drinking water system, that is likely to have an elevated potential for the formation of Trihalomethanes (THMs), and tested for THMs. Section 6-1.1 of Schedule 6, O.Reg.170/03 requires that these samples be taken at least 60 days, and not more than 120 days, after a sample was taken for that purpose in the previous three month period.

**WATER QUALITY MONITORING**

Complying with these requirements, the Owner conducted this quarterly sampling on February 2, 2015; May 11, 2015; August 10, 2015 and November 2, 2015. In addition, THM sampling is currently being conducted every month at the Elevated Water Tower.

THM results during this inspection review period ranged between 38 and 60 micrograms per Litre (ug/L). The running annual average of the samples collected is 52.2ug/L, below the Ontario Drinking Water Quality Standard of 100ug/L.

- **All nitrate/nitrite water quality monitoring requirements prescribed by legislation were conducted within the required frequency for the DWS.**

Section 13-7 of Schedule 13, O.Reg.170/03 requires the Owner and the operating authority to ensure that at least one water sample is taken every three months and tested for nitrates and nitrites. Section 6-1.1 of Schedule 6, O.Reg.170/03 requires that these samples be taken at least 60 days, and not more than 120 days, after a sample was taken for that purpose in the previous three month period. Complying with these requirements, the Owner conducted this sampling on February 2, 2015; May 11, 2015; August 10, 2015 and November 2, 2015. There were no concerns identified with the results obtained.

- **All sodium water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Section 13-8 of Schedule 13, O.Reg.170/03 requires that the owner of a municipal residential drinking-water system ensure that a treated water sample is taken every 60 months and is tested for sodium. Records, provided by the Owner and reviewed during the course of this inspection, indicate that the Owner conducted sampling for sodium on May 11, 2015. Prior to that, sampling for sodium had been undertaken May 5, 2014. There were no concerns identified with the results obtained.

- **The required daily samples were being taken at the end of the fluoridation process.**

As previously discussed, the Port Carling (Ferndale) Drinking Water System practices fluoridation through the addition of hydrofluosilic acid. Hydrofluosilic acid addition is flow paced. As fluoridation is practiced, section 7-4 of Schedule 7, O.Reg.170/03 requires the owner to ensure that a water sample is taken at the end of the fluoridation process at least once every day and is tested for fluoride. Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5 - 0.8 mg/L, the optimum level for the control of tooth decay. A result indicating that the concentration of fluoride exceeds 1.5mg/L is considered an adverse drinking water test, and is required to be reported the Ministry and the Simcoe Muskoka District Health Unit.

Complying with the fluoride monitoring requirements, the owner has ensured fluoride concentrations are measured using a continuous analyser which is supplied water from the treated water high-lift discharge header. The continuous analyzer is linked to the SCADA system for continuous monitoring, trending and alarming purposes. To ensure fluoride levels remain within the optimal range, the analyzer, through SCADA is configured to initiate an alarm notification, if fluoride levels fall below 0.3mg/L or rise above 1.3mg/L. Should fluoride levels increase above 1.4mg/L, the fluoridation system is configured to shut down. Fluoride measurements are trended on SCADA every 10 seconds, however an alarm delay of two minutes is programmed into SCADA, to compensate for spikes and dips which occur on high-lift pump start up.

Records reviewed, indicate that fluoride concentrations were typically maintained around 0.6mg/L during this inspection review period. It is acknowledged that spikes do occur on high-lift pump start up. The spikes typically last for less than two minutes, and are followed by a dip, before the analyzer stabilizes. These spikes and dips are believed to be associated with pressure fluctuations. If after two minutes the fluoride readings have not stabilized, and remain above 1.4mg/L, the high-lift pump would shut down, as previously described.

**WATER QUALITY MONITORING**

- \* **All sampling requirements for lead prescribed by schedule 15.1 of O. Reg. 170/03 were being met.**

Based on the results of historical lead sampling, the Owner is exempt from the requirement to sample lead within the plumbing of the private residences in the Port Carling community. Instead, the Owner must ensure to test for total alkalinity and pH during each of the prescribed sampling periods (December 15 to April 15 and June 15 and October 15), and must ensure lead is sampled within the distribution system in each of the prescribed sampling periods in every third 12 month period. Based on the estimated population (900) of the Port Carling community, the Owner is required to ensure this sampling is conducted from two locations within the distribution system. Typically, the Owner continues to sample for lead at two locations within the distribution system on an annual basis, during each sampling period. Alkalinity and pH sampling is also undertaken at one location within the distribution system on a weekly basis as part of the Langelier Saturation Index (LSI) sampling implemented by the Owner.

During this inspection review period, sampling for lead occurred from two locations within the distribution system on February 2, 2015 and August 24, 2015.

The Lead results ranged between 0.12 and 0.39ug/L, well within the Ontario Drinking Water Quality Standard of 10ug/L. Alkalinity results ranged between 35 and 54mg/L and pH ranged between 7.38 and 7.88.

- \* **Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.**

Subsection 6-3 (1) of Schedule 6 of O.Reg.170/03 prescribes that if a microbiological sample required by the regulation is taken, that another sample must be taken at the same time from the same location and tested immediately for free chlorine residual. Records reviewed during the course of this inspection indicate that the Owner ensured that the free chlorine residual was tested at the time of all microbiological samples. Operational staff recorded the free available chlorine residual tests directly on the Laboratory Sample Submission / Chain of Custody Form at the same time that microbiological samples were obtained. The chlorine residuals associated with microbiological sample were then included by the laboratory on the analytical report associated with results of the microbiological test.

**WATER QUALITY ASSESSMENT**

- \* **The audit samples collected by the inspector met the applicable Ontario Drinking Water Quality Standards and/or the aesthetic objectives or operation guidelines. The results of the audit sampling are summarized as follows:**

The free available chlorine residual within the distribution system, on the date of inspection, was found to be acceptable with a concentration of 1.25mg/L being measured at the Port Carling WPCP and a concentration of 1.01mg/L being measured at the Elevated Water Tower.

Microbiological and chemical audit samples were not collected as part of this inspection.

- \* **Records show that all water sample results taken during the review period met the Ontario Drinking Water Quality Standards (O. Reg. 169/03).**

The standards for drinking water quality in Ontario are prescribed in O.Reg.169/03 "Ontario Drinking Water Quality Standards" (ODWQS). Background and supporting information for each of the standards can be found in the Ministry's "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines".

Results of sampling conducted during this inspection review period met the microbiological and chemical requirements of the ODWQS.

**REPORTING & CORRECTIVE ACTIONS**

**REPORTING & CORRECTIVE ACTIONS**

- ★ Where required continuous monitoring equipment used for the monitoring of chlorine residual and/or turbidity triggered an alarm or an automatic shut-off, a qualified person responded in a timely manner and took appropriate actions.

A review of the continuous monitoring data and the log books was performed for any alarm conditions and actions taken by operators in response to incidents at the water treatment plant. Any after hours alarm calls appear to have been responded to in a timely fashion by the utility operators and notes have been entered in the log book of their actions taken for each instance.

- ↳ Explanations appear to have been consistently provided for power interruptions, maintenance activities, process operation alarm calls, and any communication errors that triggered alarms.

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**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.**

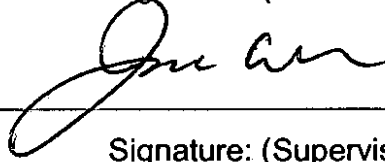
Not Applicable

**SIGNATURES**

Inspected By:

James Crumbie

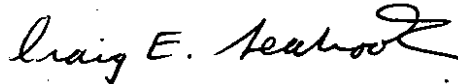
Signature: (Provincial Officer):



Reviewed &amp; Approved By:

Craig Seabrook

Signature: (Supervisor):



Review &amp; Approval Date:

2015-12-18

Note: This inspection does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they apply or may apply to this facility. It is, and remains, the responsibility of the owner and/or operating authority to ensure compliance with all applicable legislative and regulatory requirements.

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**SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES**

This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following issues and consider measures to address them.

Not Applicable





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**Stakeholder Appendix**

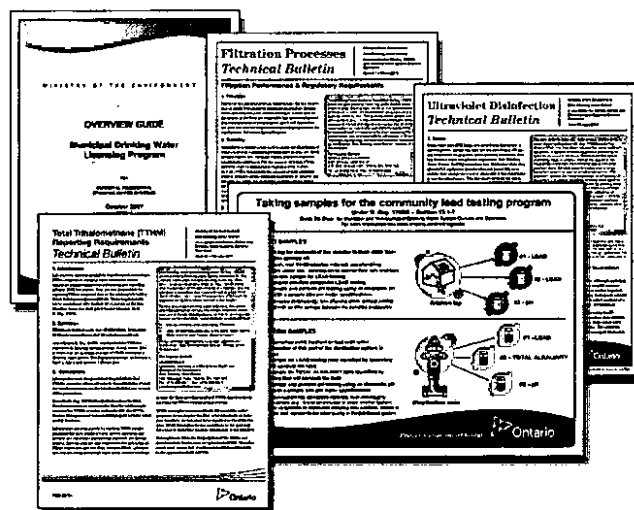
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# Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are posted on the Ministry of the Environment's **Drinking Water Ontario** website at [www.ontario.ca/drinkingwater](http://www.ontario.ca/drinkingwater) to help in the operation of your drinking water system.

Below is a list of key materials frequently used by owners and operators of municipal drinking water systems. To read or download these materials, go to **Drinking Water Ontario** and search in the **Resources** section by **Publication Number**.

Visit **Drinking Water Ontario** for more useful materials. Contact the Public Information Centre if you need assistance or have questions at 1-800-565-4923/416-325-4000 or [picemail.moe@ontario.ca](mailto:picemail.moe@ontario.ca).



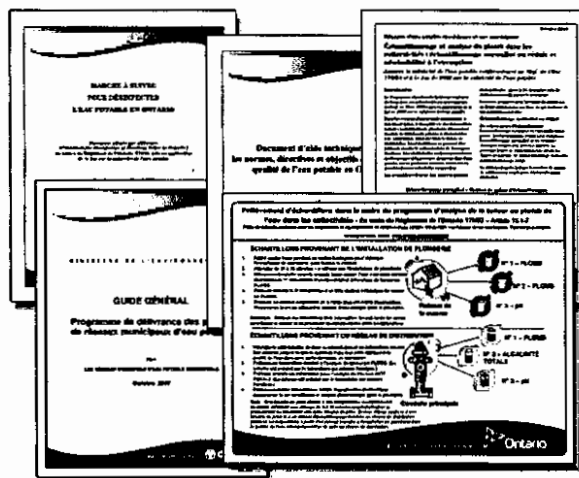
PUBLICATION NUMBER	PUBLICATION TITLE
4448e01	Procedure for Disinfection of Drinking Water in Ontario
7152e	Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids
7467	Filtration Processes Technical Bulletin
7685	Ultraviolet Disinfection Technical Bulletin
8215	Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (February 2011)
2601e	Overview Guide: Municipal Drinking Water Licensing Program
0000	Municipal Drinking Water Licensing Program Bulletin, Issue 1, January 2011
0000	Certification Guide for Operators and Water Quality Analysts
6560e	Taking Samples for the Community Lead Testing Program
7423e	Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption
7128e	Drinking Water System Contact List
4449e01	Technical Support Document for Ontario Drinking Water Quality Standards

[ontario.ca/drinkingwater](http://ontario.ca/drinkingwater)

# Principaux guides et documents de référence sur les réseaux résidentiels municipaux d'eau potable

Beaucoup de documentation sur le fonctionnement d'un réseau d'eau potable se trouve sur le site Web du ministère de l'Environnement.

Vous trouverez ci-dessous la liste des principaux documents que les propriétaires et les exploitants de réseaux municipaux d'eau potable utilisent fréquemment. Pour lire ou télécharger ces documents, allez sur le site Web du Ministère, et effectuez une recherche par numéro de publication dans la section RESSOURCES.



Consultez le site d'Eau potable Ontario pour obtenir d'autre documentation. Communiquez avec le Centre d'information du public au 1 800 565-4923

ou au 416 325-4000, ou encore à [picemail.moe@ontario.ca](mailto:picemail.moe@ontario.ca) si vous avez des questions ou besoin d'aide.

NUMÉRO DE PUBLICATION	TITRE DE LA PUBLICATION
4448f01	Marche à suivre pour désinfecter l'eau potable en Ontario
7152e	Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids (en anglais seulement)
7467	Filtration Processes Technical Bulletin (en anglais seulement)
7685	Ultraviolet Disinfection Technical Bulletin (en anglais seulement)
8215	Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (février 2011) (en anglais seulement)
2601f	Guide général - Programme de délivrance des permis de réseaux municipaux d'eau potable
0000	Bulletin du Programme des permis de réseaux municipaux d'eau potable, numéro 1, janvier 2011
0000	Guide sur l'accréditation des exploitants de réseaux d'eau potable et des analystes de la qualité de l'eau de réseaux d'eau potable
6560f	Prélèvement d'échantillons dans le cadre du programme d'analyse de la teneur en plomb de l'eau dans les collectivités
7423f	Échantillonnage et analyse du plomb dans les collectivités : échantillonnage normalisé ou réduit et admissibilité à l'exemption
7128f	Liste des personnes-ressources du réseau d'eau potable
4449f01	Document d'aide technique pour les normes, directives et objectifs associés à la qualité de l'eau potable en Ontario

[ontario.ca/drinkingwater](http://ontario.ca/drinkingwater)



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**MOE Audit Sample Results**

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Not Applicable



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**Provincial Officer's Report & Order**

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Not Applicable



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**Inspection Rating Record**

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**Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2015-2016)**

<b>DWS Name:</b> PORT CARLING (FERNDALE) DRINKING WATER SYSTEM
<b>DWS Number:</b> 220002119
<b>DWS Owner:</b> Muskoka, The Corporation Of The District Municipality Of
<b>Municipal Location:</b> Muskoka Lakes
<b>Regulation:</b> O.REG 170/03
<b>Category:</b> Large Municipal Residential System
<b>Type Of Inspection:</b> Focused
<b>Inspection Date:</b> December 9, 2015
<b>Ministry Office:</b> Barrie District

**Maximum Question Rating: 443**

<b>Inspection Module</b>	<b>Non-Compliance Rating</b>
Capacity Assessment	0 / 30
Treatment Processes	0 / 77
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 28
Water Quality Monitoring	0 / 112
Reporting & Corrective Actions	0 / 21
Treatment Process Monitoring	0 / 133
<b>TOTAL</b>	<b>0 / 443</b>

**Inspection Risk Rating 0.00%**

**FINAL INSPECTION RATING: 100.00%**

**Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2015-2016)**

**DWS Name:** PORT CARLING (FERNDALE) DRINKING WATER SYSTEM  
**DWS Number:** 220002119  
**DWS Owner:** Muskoka, The Corporation Of The District Municipality Of  
**Municipal Location:** Muskoka Lakes

**Regulation:** O.REG 170/03  
**Category:** Large Municipal Residential System  
**Type Of Inspection:** Focused  
**Inspection Date:** December 9, 2015  
**Ministry Office:** Barrie District

**Maximum Question Rating:** 443

**Inspection Risk Rating** | 0.00%

**FINAL INSPECTION RATING:** | 100.00%