FAIRYVIEW

HUNTSVILLE

WATER SUMMARY

2016

REPORT

DRINKING WATER WORKS PERMIT: **143-203**
MUNICIPAL DRINKING WATER LICENCE: **143-103**

M.O.E. WATERWORKS#: **220002093**

INTRODUCTION

The Fairyview Water Treatment Plant (W.T.P.) is owned and operated by the District of Muskoka. The plant serving the Town of Huntsville, was constructed in 1988. The treatment process consists of chemically assisted coagulation-flocculation, sedimentation, filtration, disinfection by chlorination and pH adjustment. There are reservoirs located at the water treatment plant, Dufferin Street, Skyline Drive and Hanes Road. The Fairyview WTP has a rated capacity of 9,000 cubic meters per day (m3/day) and the water system currently serves a population of approximately 8,800 people.

In 2011 the plant operated under Certificate of Approval # 9148-869Q5H Issued June 17, 2010. In addition, in October, 2015 the plant was issued license 143-103 and permit 143-203 under the Municipal Drinking Water Licensing Program. The plant also presently operates under MOE Permit To Take Water # 01-P-1091, expiring January 15, 2021 and which permits the operation of up to 22,500 m3/day.

The water source is Fairy Lake, a fairly large and clear body of water. The intake is located in 15 metres of water, about 280 metres from shore.

Legislation Requirements

Safe Drinking Water Act

In the Part Two Report of the Walkerton Inquiry, Commissioner Dennis O'Connor recommended that the Ontario Government enact a Safe Drinking Water Act to deal with matters related to treatment and distribution of drinking water. The Safe Drinking Water Act 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 Licenses / Certificates of Approval

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

A municipal drinking water license is an approval that is issued by the 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 licenses were issued, these have since been renewed on 5 year intervals..

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 Licenses and Permits similar to previous Certificates of Approval provide specific details about the drinking water system including:

Drinking Water System Description
Definitions and Information
General Information – Compliance, Other Legal Requirements, Adverse Affects, Inspections
Performance – Rated Capacity, Management of Residue
Monitoring and Recording – Flow Measuring Devices, Sampling
Operations and Maintenance

Comparison to Rated Capacity and Flow Rate

The Fairyview Water Treatment plant has a rated capacity of 9,000 m3/day. In 2016, the average daily flow for the year was 3,318 m^3/day, which represents 37% of the plant's design capacity. The maximum day flow for the year was 6,056 m^3/day, however, the 3 year average for maximum day flow is 5,654 m^3/day, which represents 56% 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 #01-P-1091) permits 22,500 m^3/day, therefore there were no exceedances of this permit.

Summary of Analytical Results

A total of 398 microbiological regulatory tests were performed in 2016. There were 416 free chlorine residual tests performed in the distribution system and all results were satisfactory. Response was carried out for all adverse results by proper notification and corrective actions.

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 Fairyview Water Treatment Plant:

Chlorine: Disinfectant
Polyaluminum Chloride (SternPAC): Primary coagulant
Soda Ash: Alkalinity and pH adjustment

Documentation of System Repairs and Upgrades

No major upgrades were performed in 2016.

External Audits

MOE Inspection

An unannounced MOE inspection occurred September 23, 2016 and is attached to this report. The overall rating was 100%.

DWQMS Audit

In 2016 all drinking water systems had an internal audit performed. There were nine minor non-conformances, all have subsequently been addressed. Overall, all drinking water systems are performing satisfactorily.

HUNTSVILLE WATER DISTRIBUTION SUMMARY 2016

New Services

- A total of 48 customers connected to water services in 2016, 4 of which were installed in 2016.
    1. One 25 mm Poly water service installed by owner's contractor. This service is located at 27 Susan St W.
    2. One 25 mm Poly water service installed by owner's contractor. This service is located at 4 Lake Dr.
    3. One 25 mm Poly water service installed by owner's contractor. This service is located at 105 Lindgren Rd.
    4. One 25 mm Poly water service installed by owner's contractor. This service is located at 1799 Valley Rd.

New Watermains

- 290 meters of 150 mm watermain was replaced on George St in 2016.
- 238 meters of new 200mm PVC watermain was installed on Serenity Place Dr in 2016 by owner's contractor.
- 3 meters of new 200 mm PVC watermain was installed on Woodstream Dr.
- Approximately 171 meters of 150 mm PVC watermain was removed and 128 meters of new 150 mm PVC watermain was installed on Deerhurst Lakeside Dr.

Broken Watermains

- District staff repaired a total of 4 watermain breaks during 2016. The average cost to repair each water main break was $24,292.27

Water Service Leaks

- District staff repaired a total of 17 water service leaks during 2016. The average cost to repair each water service leak was $287.68

Frozen Water Mains

- There were no watermains that froze in 2016.

Frozen Water Services

- There were no frozen water services reported in 2016.

Water Valve Replacement

- 5 new watermain valves were installed in 2016.
- 4 watermain valves were replaced in 2016.
- 19 watermain valve boxes were repaired in 2016.

Curb stops

- A total of 36 curb stops were repaired, raised or lowered in 2016
- 3 curb stop valves were replaced in 2016.

Fire Hydrants

- There were 3 new fire hydrants added to the water system in 2016.
    1. One at 2 George St – Municipal assumed hydrant
    2. Two at Serenity Place – Two Municipal assumed hydrants
- One fire hydrant was replaced in 2016.
- There are at total of 612 hydrants in Huntsville, 63 of which are privately owned.
- All hydrants in Huntsville were flushed at least once in 2016.

Water Meters

- District staff replaced 93 water meters in 2016 either under our scheduled meter change out program or due to failure.

Air Release Valves

- All water Air-Vacuum Release Valves were inspected in 2016.

Locates

- District staff addressed 837 locate requests in 2016.

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OPTIONAL ANNUAL REPORT TEMPLATE

Drinking-Water System Number:	220002093
Drinking-Water System Name:	Fairyview Water Treatment Plant
Drinking-Water System Owner:	District Municipality of Muskoka
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 01 to December 31, 2016

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

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

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

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

District Municipality of Muskoka
70 Pine Street
Bracebridge, Ontario
P1L 1N3
705-687-6764
www.muskoka.on.ca

Complete for all other Categories.

Number of Designated Facilities served:

N.A.

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

Number of Interested Authorities you report to:

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

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

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

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

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

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

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

Describe your Drinking-Water System

The Water Treatment plant serving the Town of Huntsville was constructed in 1988. The treatment process consists of chemically assisted coagulation-flocculation, sedimentation, filtration and disinfection by chlorination and pH adjustment. The capacity of the plant is 9000 cubic meters per day. The water source is Fairy Lake, a fairly large and clear body of water. The intake is located in 15 meters of water, about 280 meters from shore.

List all water treatment chemicals used over this reporting period

Chlorine, Polyaluminum Chloride, and Soda Ash

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
April 4, 216	Pressure	<140 at Dufferin Reservoir	kPa	Restore booster pump operation	April 4, 216
June 3, 2016	Total Coliform	39	Count /100 ml	Resample	June 6, 2016
October 20,	Pressure	<140at	kPa	Restore booster pump	October 20,

2016		Skyline Reservoir		operation	2016
November 11, 2016	Pressure	<140 at Skyline Reservoir	kPa	Restore booster pump operation	November 11, 2016
November 13, 2016	Pressure	<140 at Dufferin Reservoir	kPa	Restore booster pump operation	November 13, 2016

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 #) cfu/100 mL	Range of Total Coliform Results (min #)-(max #) cfu/100 mL	Number of HPC Samples	Range of HPC Results (min #)-(max #) cfu/100 mL
Raw	52	0-5	0-70	0	
Treated	52	0	0	52	0-2
Distribution	294	0	0-39	85	0-2

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

	Number of Grab Samples	Range of Results (min #)-(max #)	Geometric Average
Turbidity	8760	0.01-0.50	0.07
Chlorine	8760	1.01-1.99	1.42
Fluoride (If the DWS provides fluoridation)			

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

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__NOTE__: Record the unit of measure if it is __not__ milligrams per litre.
MDL = Method Detection Limit, NDOG = No Data, Over Grown

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

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	May 9/16	0.02<MDL	ug/L	No
Arsenic	May 9/16	0.2<MDL	ug/L	No
Barium	May 9/16	11.5	ug/L	No
Boron	May 9/16	2<MDL	ug/L	No
Cadmium	May 9/16	0.010	ug/L	No

Chromium	May 9/16	0.35	ug/L	No
***Lead**	May 9/16	-	ug/L	No
Mercury	May 9/16	0.01<MDL	ug/L	No
Selenium	May 9/16	0.07	ug/L	No
Sodium	May 9/16	13.3	mg/L	No
Uranium	May 9/16	0.006	ug/L	No
Fluoride	May 9/16	0.06<MDL	mg/L	No
Nitrite	Feb 8/16	0.003<MDL	mg/L	No
Nitrate	Feb 8/16	0.253	mg/L	No
Nitrite	May 9/16	0.003<MDL	mg/L	No
Nitrate	May 9/16	0.193	mg/L	No
Nitrite	Aug 8/16	0.003<MDL	mg/L	No
Nitrate	Aug 8/16	0.268	mg/L	No
Nitrite	Nov 8/16	0.003<MDL	mg/L	No
Nitrate	Nov 8/16	0.174	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 #)	Number of Exceedances
Plumbing			
Distribution	6	0.01-0.34ug/L	m0

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	May 9/16	0.02<MDL	ug/L	No
Atrazine+N-dealkylated Metabolites	May 9/16	0.01<MDL	ug/L	No
Azinphos-methyl	May 9/16	0.05<MDL	ug/L	No
Benzene	May 9/16	0.32<MDL	ug/L	No
Benzo(a)pyrene	May 9/16	0.004<MDL	ug/L	No
Bromoxynil	May 9/16	0.33<MDL	ug/L	No
Carbaryl	May 9/16	0.05<MDL	ug/L	No
Carbofuran	May 9/16	0.01<MDL	ug/L	No
Carbon Tetrachloride	May 9/16	0.16<MDL	ug/L	No
Chorpyrifos	May 9/16	0.02<MDL	ug/L	No
Diazinon	May 9/16	0.02<MDL	ug/L	No
Dicamba	May 9/16	0.20<MDL	ug/L	No
1,2 Dichlorobenzene	May 9/16	0.41<MDL	ug/L	No
1,4 Dichlorobenzene	May 9/16	0.36<MDL	ug/L	No
1,2 Dichloroethane	May 9/16	0.35<MDL	ug/L	No
1,1 Dichloroethylene	May 9/16	0.33<MDL	ug/L	No
Dichloromethane	May 9/16	0.35<MDL	ug/L	No

2,4 Dichlorophenol	May 9/16	0.15<MDL	ug/L	No
2,4-D	May 9/16	0.19<MDL	ug/L	No
Diclofop-Methyl	May 9/16	0.40<MDL	ug/L	No
Dimethoate	May 9/16	0.03<MDL	ug/L	No
Diquat	May 9/16	1<MDL	ug/L	No
Diuron	May 9/16	0.03<MDL	ug/L	No
Glyphosate	May 9/16	1<MDL	ug/L	No
Malathion	May 9/16	0.02<MDL	ug/L	No
MCPA	May 9/16	0.00012<MDL	ug/L	No
Metolachor	May 9/16	0.01<MDL	ug/L	No
Metribuzin	May 9/16	0.02<MDL	ug/L	No
Monochlorobenzene	May 9/16	0.30<MDL	ug/L	No
Paraquat	May 9/16	1<MDL	ug/L	No
Pentachlorophenol	May 9/16	0.15<MDL	ug/L	No
Phorate	May 9/16	0.01<MDL	ug/L	No
Picloram	May 9/16	1<MDL	ug/L	No
PCB	May 9/16	0.04<MDL	ug/L	No
Prometryne	May 9/16	0.03<MDL	ug/L	No
Simazine	May 9/16	0.01<MDL	ug/L	No
Trihalomethanes Total Distribution Water	Annual Avg	47	ug/L	No
Terbufos	May 9/16	0.01<MDL	ug/L	No
Tetrachloroethylene	May 9/16	0.35<MDL	ug/L	No
2,3,4,6 - Tetrachlorophenol	May 9/16	0.20<MDL	ug/L	No
Triallate	May 9/16	0.01<MDL	ug/L	No
Trichloroethylene	May 9/16	0.44<MDL	ug/L	No
2,4,6,- Trichlorophenol	May 9/16	0.25<MDL	ug/L	No
Trifluralin	May 9/16	0.02<MDL	ug/L	No
Vinyl Chloride	May 9/16	0.17<MDL	ug/L	No
Alachlor	May 9/16	0.02<MDL	ug/L	No
Atrazine+N-dealkylated Metabolites	May 9/16	0.01<MDL	ug/L	No
Azinphos-methyl	May 9/16	0.05<MDL	ug/L	No
Benzene	May 9/16	0.32<MDL	ug/L	No
Benzo(a)pyrene	May 9/16	0.004<MDL	ug/L	No
Bromoxynil	May 9/16	0.33<MDL	ug/L	No
Carbaryl	May 9/16	0.05<MDL	ug/L	No
Carbofuran	May 9/16	0.01<MDL	ug/L	No
Carbon Tetrachloride	May 9/16	0.16<MDL	ug/L	No
Chorpyrifos	May 9/16	0.02<MDL	ug/L	No
Diazinon	May 9/16	0.02<MDL	ug/L	No
Dicamba	May 9/16	0.20<MDL	ug/L	No

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

Parameter	Result Value	Unit of Measure	Date of Sample

District of Muskoka - Hwy 60 WTP - Huntsville

1.0 Water Flow Summary - 2016

Month	Total Monthly (m^3)	Average Day Flow (m^3/d)	Maximum Day Flow (m^3/d)	Minimum Day Flow (m^3/d)	Comments
January	110,595	3,568	4,701	2,599	
February	87,147	3,005	3,429	2,398	
March	91,484	2,951	3,324	2,626	
April	88,661	2,955	3,332	2,639	
May	110,270	3,557	4,073	2,984	
June	113,375	3,779	4,442	3,244	
July	118,398	3,819	4,157	3,473	
August	115,131	3,714	5,458	3,160	
September	98,750	3,292	3,882	3,055	
October	99,199	3,200	3,579	2,820	
November	93,290	3,110	6,057	2,640	
December	87,805	2,832	3,166	2,433	

Total	1,214,104
Average Day	3,318.2
Maximum Day	6,056.8
Minimum Day	2,397.7

District of Muskoka - Hwy 60 WTP - Huntsville

2.0 Raw Water Monthly Analysis Summary - 2016

Month	Alkalinity	Hardness	pH	Turbidity	True Colour	Temperature	Cond	Langliers Saturation Index	Total Coliform	E-coli	Total Number of samples taken
Parameter	*mg/l*	*mg/l*	*pH*	*ntu*	*tcu*	*Celcius*			*CFU/100ml*	*CFU/100ml*	
January	12.5	26	6.8	0.7	28	3.6	37.0	-2.7	66	5	4
February	13.2	26	6.7	0.5	33	2.3	43.0	-2.8	37	2	5
March	16.5	23	6.5	0.6	34	2.1	49.3	-3.0	120	8	4
April	17.0	23	6.8	1.0	33	3.8	39.9	-2.6	95	5	4
May	10.8	17.6	6.8	0.7	37	6.8	43.4	-2.7	50	8	4
June	8.5	13.5	7.1	0.7	35	7.0	37.4	-2.5	148	3	5
July	9.5	15.5	6.9	0.5	35	8.3	38.1	-2.4	11	4	4
August	10.8	14.4	6.8	0.5	35	8.5	40.0	-2.9	78	4	5
September	9.0	13.0	6.1	0.5	24	8.6	44.0	-3.8	25	1	4
October	10.8	10.8	6.3	0.6	33	11.4	45.2	-3.7	48	3	5
November	10.5	11.0	6.5	0.7	34	7.5	47.5		30	1	4
December	12.5	20.0	6.6	0.6	28	5.3	44.0	-3.0	55	4	4
Average	11.8	17.7	6.6	0.6	32	6.3	42.4	-2.9	63.6	4.0	4

District of Muskoka - Hwy 60 WTP - Huntsville

9.0 Chemical Usage Summary - 2016

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	0.0	0.0	0.0	0.0	13.2	1,546
February	0.0	0.0	0.0	0.0	0.0	0.0	13.2	1,213
March	0.0	0.0	0.0	0.0	0.0	0.0	13.2	1,261
April	0.0	0.0	0.0	0.0	0.0	0.0	15.9	1,515
May	0.0	0.0	0.0	0.0	0.0	0.0	17.6	2,047
June	0.0	0.0	0.0	0.0	0.0	0.0	17.6	2,087
July	0.0	0.0	0.0	0.0	0.0	0.0	17.5	2,175
August	0.0	0.0	0.0	0.0	0.0	0.0	17.6	2,136
September	0.0	0.0	0.0	0.0	0.0	0.0	17.8	1,872
October	0.0	0.0	0.0	0.0	0.0	0.0	17.8	1,885
November	0.0	0.0	0.0	0.0	0.0	0.0	18.0	1,785
December	0.0	0.0	0.0	0.0	0.0	0.0	18.6	1,795
Average Monthly	0.0	0.0	0.0	0.0	0	0.0	16.5	1776
Total Yearly		0		0		0		21,317

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	0.0	0	0.00	0.0	3.74	414.0	13.00	1,437.7
February	0.0	0	0.00	0.0	3.72	324.0	13.00	1,132.9
March	0.0	0	0.00	0.0	3.67	336.0	13.00	1,189.3
April	0.0	0	0.00	0.0	3.79	336.0	13.00	1,152.6
May	0.0	0	0.00	0.0	3.72	410.0	13.00	1,433.5
June	0.0	0	0.00	0.0	3.70	419.0	13.00	1,473.9
July	0.0	0	0.00	0.0	3.70	438.0	13.00	1,539.2
August	0.0	0	0.00	0.0	3.72	428.0	13.00	1,496.7
September	0.0	0	0.00	0.0	3.75	370.0	13.00	1,283.7
October	0.0	0	0.00	0.0	3.76	373.0	13.00	1,289.6
November	0.0	0	0.00	0.0	3.76	351.0	13.00	1,212.8
December	0.0	0	0.00	0.0	3.88	341.0	13.00	1,141.5
Average Monthly	0.0	0	0.00	0	3.75	385	13	1,336
Total Yearly		0		0		4,540		15,783

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

District of Muskoka - Hwy 60 WTP - Huntsville

4.0 Treated Water Monthly Analysis Summary - 2016

Month	Alkalinity	Hardness	pH	Turbidity			True Colour	Iron	Temperture	Chlorine			Con	Langliers Saturation Index	Total Coliform	E-coli	Total Number of Samples	HPC	Total Number of Samples
				Average	High	Low				Free	High	Low							
Parameter	*mg/l*	*mg/l*	*pH*	*ntu*	*ntu*	*ntu*	*tcu*	*mg/l*	*C*	*mg/l*	*mg/l*	*mg/l*			*CFU/100ml*	*CFU/100ml*		*CFU/1ml*	
January	25.3	23.2	7.18	0.06	0.09	0.05	0		8.1	1.67	1.84	1.44	59.1	-1.9	0	0	4	1	4
February	28.1	23.4	7.12	0.06	0.09	0.01	0		7.4	1.65	1.87	1.03	63.8	-1.7	0	0	5	0	5
March	28.9	22.6	7.07	0.06	0.07	0.05	0		8.0	1.64	1.87	1.06	66.3	-2.0	0	0	4	0	4
April	32.0	27.0	7.27	0.06	0.10	0.05	0		8.9	1.59	1.77	1.03	70.9	-1.7	0	0	4	0	4
May	26.5	23.5	7.37	0.06	0.09	0.04	0		10.9	1.62	1.79	1.32	74.6	-1.7	0	0	4	1	4
June	25.5	17.8	7.39	0.05	0.07	0.02	0		12.4	1.62	1.80	1.04	69.8	-2.0	0	0	5	0	4
July	29.5	18.3	7.54	0.06	0.09	0.04	0		13.7	1.63	1.87	1.05	79.0	-2.1	0	0	4	0	4
August	30.5	16.0	7.43	0.05	0.07	0.01	0		16.0	1.70	1.86	1.45	86.3	-1.6	0	0	5	0	5
September	30.8	16.8	7.43	0.06	0.08	0.05	0		17.0	1.70	1.92	1.08	98.5	-1.1	0	0	4	1	4
October	33.1	15.4	7.58	0.06	0.10	0.04	0		14.7	1.62	1.90	1.01	94.5	-1.4	0	0	5	2	5
November	28.5	17.9	7.39	0.07	0.50	0.03	0		12.1	1.70	1.85	1.21	83.1		0	0	4	0	4
December	26.4	19.4	7.33	0.06	0.08	0.04	0		10.0	1.77	1.99	1.53	75.4	-0.9	0	0	4	1	4
Average	28.8	20.1	7.34	0.06	0.12	0.03	0.0		11.6	1.66	1.86	1.19	76.8	-1.6	0.0	0.0	4	0.5	4

Ministry of the Environment and Climate Change

Safe Drinking Water Branch

Director's Office
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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
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40, avenue St. Clair Ouest
Toronto (Ontario) M4V 1M2

Ontario

October 11, 2016

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

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

RE: 2016 Drinking Water Inspection Report
Huntsville (Fairyview) Drinking Water System (DWS#220002093)
Date of MOECC inspection: September 23, 2016

Please find enclosed,the Ministry of the Environment and Climate Change's 2015 Inspection Report for the Huntsville (Fairyview) Drinking Water System (DWS#220002093), following an inspection of the water treatment plant and distribution system, September 23, 2016.

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.

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

CC Mark Pringle, District of Muskoka (email: mpringle@muskoka.on.ca)
Jason Richardson, Chief Operator, District of Muskoka (email: jrichardson@muskoka.on.ca)
Medical Officer of Health, Simcoe Muskoka District Health Unit
Barrie District Office File, Ministry of the Environment and Climate Change

Ministry of the Environment and Climate Change

HUNTSVILLE (FAIRYVIEW) DRINKING WATER SYSTEM

Inspection Report

Site Number:	220002093
Inspection Number:	1-CLL1P
Date of Inspection:	Sep 23, 2016
Inspected By:	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

Type:	Main Contact	**Name:**	Mark Pringle
Phone:	(705) 645-6764	**Fax:**	(705) 687-8972
Email:	mpringle@muskoka.on.ca		
Title:	Manager of Water and Sewer Operations		

INSPECTION DETAILS:

Site Name:	HUNTSVILLE (FAIRYVIEW) DRINKING WATER SYSTEM
Site Address:	330 HIGHWAY 60 HWY HUNTSVILLE P1H 1B5
County/District:	Huntsville
MOECC District/Area Office:	Barrie District
Health Unit:	SIMCOE MUSKOKA DISTRICT HEALTH UNIT
Conservation Authority:	
MNR Office:	
Category:	Large Municipal Residential
Site Number:	220002093
Inspection Type:	Unannounced
Inspection Number:	1-CLL1P
Date of Inspection:	Sep 23, 2016
Date of Previous Inspection:	Aug 06, 2015

COMPONENTS DESCRIPTION

Site (Name): MOE DWS Mapping
Type: DWS Mapping Point **Sub Type:**

Site (Name): RAW WATER
Type: Source **Sub Type:** Surface Water
Comments:
The raw water intake facilities, located in Fairy Lake, consist of 380 metres of 600 millimetre inside diameter intake pipe extending from the intake crib structure to the low lift pumping station (LLPS). The crib is comprised of lap joint timber beams that rest on the lake bottom. The piping is polyethylene Series 80 intake pipe. The intake is located at a depth of approximately 15 metres (49 feet).

Site (Name): LOW LIFT PUMP FACILITY
Type: Source **Sub Type:** Surface Water
Comments:

Low Lift Pumping Station (LLPS)
The LLPS, located at 335 Highway 60 East, is a concrete block structure with a locking steel door, an electronic entry alarm, a paved drive, and signage indicating "Authorized Personnel Only".
Raw water from the intake structure enters the facility by gravity, passes through two isolation valves, passes the valved (normally closed) intake flushing line from the backwash pumps at the water treatment plant (WTP), enters the screen well and passes through the manual coarse screen (25 mm mesh size) and the automatic traveling screen (9 mm mesh size). The traveling screen is powered by a small electric motor and is equipped with a spray backwash system. The water for the screen cleaning is drawn from the raw water header by a centrifugal pump and the produced waste is captured and directed to the facility drain line which empties back to Fairy Lake.
The screen well is fitted with an unused chlorine diffuser for prechlorination practices if needed.
This well is also the inlet point for the unused backwash waste tank supernatant recycling line from the WTP. This line can be valved to direct supernatant/ backwash tank waste water to either the screen well or the lake.
Water flows from the screen well into the low lift pump well (LLPW). This tank is situated below grade and is fitted with alarmed level sensors. Four (two duty, two standby) vertical turbine low lift pumps (LLP's) are situated above, and draw from, this tank. Each pump has a rated capacity of 52 L/s (litres per second) at 16 m total dynamic head (TDH) and a constant speed drive. In 2013 low lift pump P-0220 was replaced and a fourth low lift pump was added. There is provision for one more pump. The discharge from each pump is equipped with an air relief valve, an on-line pressure sensor and gauge, a check valve, and an automated flow valve before it ties into the common raw water header. The common raw water header is constructed in a loop. It has a raw water sample tap, a pressure gauge, an air relief valve, a gate valve, a magnetic flow meter, a gate valve, an on-line turbidimeter, an on-line temperature sensor, an on-line pressure transducer, and an automated flow control valve before it exits the building. On the bottom of the loop, there is a manual butterfly valve.
A 178 m long, 500 mm diameter polyethylene raw water feedermain extends from the LLPS, under Highway 60 and into the WTP.
Floor drains reportedly empty to the lowlift overflow which discharges back out into Fairy Lake. Raw water used to clean the screens, leaking from a pump seal or from the sample sink is generally the only substance which would enter the floor drain.
Pump control instrumentation is located on site. LLP starts are triggered by programmed filter water levels and WTP reservoir water levels.
All controls, monitoring and alarms on site are routed through the PLC (Programmable Logic Controller) at the facility and on to the SCADA (Supervisory Control and Data Acquisition) system at the WTP.
The 450 mm drain line which empties to the lake can capture WTP overflow from the flocculation tanks, overflow from the reservoir, washing effluent from the traveling screen, and supernatant on an emergency basis (if recycling and discharge to sanitary sewer are not available).

Site (Name): TREATED WATER - PART 1
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
The Huntsville (Fairyview) WTP was commissioned in 1988 to produce drinking water by chemically assisted filtration and disinfection practices, and to supply that water to the Town of Huntsville. It is a concrete block facility with a below grade reservoir and contact tanks. It is located at 330 Highway 60 East. It has numerous entries, all of which have electronic entry alarms, a paved drive, an outdoor, locked power transformer station, an on-site sewage pumping station, and posted contact information signage.
Pre-Treatment Facility
Raw water from the LLPS enters the WTP through a valved 400mm main. It flows into the 6.7m3 Soda Ash Mixing Chamber under pressure. Soda ash solution is injected at this point. This tank has an approximate detention time (DT) of one minute. It is equipped with a mechanical mixer, a level sensor, and a sluice gate over which water splits into two trains and flows into the Soda Ash Retention Chambers.
These two parallel 35 m3 retention chambers are each split into two smaller chambers with sluice gates at inlet and outlet. Mixing results due to manipulation of water flow. They provide a DT of 10 minutes. On-line pH analysers are situated in these tanks. Water flows from these tanks into a common Flash Mix Chamber.
Rapid Mixing Facility

Water enters from the bottom of this 6.7 m3 tank, coagulant (SternPAC) is added and mixed with a ducted mechanical mixer, and flows out the top through a sluice gate. A shelf spare mechanical mixer is on-site.
Flocculation Facility
The water splits into two parallel trains before it enters the flocculation tanks through mechanical gates and over a sluice. The flocculation facility consists of four 62 m3 flocculation tanks constructed in two parallel trains of two tanks in series with emergency overflow provision to Fairy Lake. The trains are equipped with sluice gates to isolate one train or extend one train to consist of three basins. Each tank provides 10 minutes DT and is equipped with a variable speed drive mixer. Water flows from these tanks into the Flocculated Water Channel which can be valved to by-pass the Settling Tanks but typically is not. On-line pH analysers are located in these channels.
Sedimentation Facility
The sedimentation facility consists of two 216 m3 Settling Tanks constructed in parallel. Each tank consists of four modules of plate settlers with a minimum angle of inclination of 55° to provide a 69 minute retention time. The tanks are equipped with an automatic withdrawal system consisting of a suction-type sludge collector. The withdrawal system collects settled sludge and discharges it via gravity to the sewage pumping station. This system is powered by a pneumatic air compressor system.
Water flows from these tanks into the sluice gated Filter Influent Channel.
Filtration Facility
The filtration facility consists of two dual media filters (sand/anthracite) in 84 m3 tanks (Filters 4100 and 4200). Each filter has a surface area of 48 m2 and a filtration rate of 7.8 m/h (metres per hour). Both filters are equipped with a 305 mm layer of silica sand and an 800 mm layer of anthracite over stainless steel underdrain laterals. The underdrains associated with the filters were replaced in May 2008 (Filter 4100) and June 2009 (Filter 4200). Inlet flow is controlled by motorized sluice gates from an inlet/ backwash channel while backwash discharge enters the same channel with a second set of motorized sluice gates. Each tank has an on-line, alarmed level sensor for LLP control, a pressure differential sensor for head loss monitoring, a sample pump drawing from the effluent line to supply the lab with filtered water samples, pressure transducers, and individual, on-line turbidimeters on the filter effluent lines. Both filters are equuipped with on-line magnetic flow meters, and flow control valves monitor and control effluent flow volumes into the Filter Effluent and Backwash Well.
Two (duty and standby) vertical turbine backwash pumps, rated at 260 L/s at 12m TDH, and located in a room adjacent to the filters, draw from the backwash water well and supply water to the bottoms of the filters for backwashing. The emergency intake flushing capability has been removed. The backwash pump discharges are equipped with check valves and gate valves before combining into a common header which spilts to each filter and is equipped with an air relief valve, an on-line magnetic flow meter and motorized valves which regulate flow to the respective filters.
During backwashing, one of two (duty and standby) air blowers, rated at 425 L/s, provide air scour to break up heavy materials. The supply lines for the blowers are equipped with mechanical flow valves.
Backwashes are currently manually initiated on each filter, but can be automated. Although piping tees are in place to allow for filter-to-waste capabilities, the tees are flanged and filter-to-waste valving and discharge piping is not yet installed for filter-to-waste to be practiced following the backwash cycles.

Site (Name): TREATED WATER - PART 2
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
Clearwell System
The clearwell system includes a 363 m3 Backwash Well constructed to provide contact time for disinfection. Water from the filters is chlorinated at the point of entry to this tank. The backwash water well receives water from the filters, is hydraulically connected to the filter effluent well, and overflows to the reservoir. The joined 242 m3 filter effluent well provides contact time for disinfection. Water from this well overflows to the reservoir. An on-line free chlorine residual analyser with pH adjustment and a 0-5 mg/L range draws continuous samples from this point by way of a pump.
Reservoir System
A 1457 m3 baffled reservoir provides contact time for disinfection and in-plant storage, with emergency overflow provision to Fairy Lake.

High Lift Pumping Station (HLPS)
The HLPS consists of a 1044 m3 capacity high lift pump well and four (two duty, two standby) vertical turbine high lift pumps (HLP's). Two pumps have a rated capacity of 40 L/s at 78 m TDH and Two pumps have a rated capacity of 140 L/s at 78 m TDH with variable frequency drives.
This tank is equipped with an on-line level sensor, and an on-line free chlorine residual analyser with pH adjustment and a 0-2 mg/L range draws continuous samples from the reservoir, for primary disinfection monitoring purposes, using centrifugal pump. Each highlift pump discharge is equipped with an on-line pressure sensor and gauge, an air relief valve, a check valve, and a mechanical flow valve before they join into a common discharge header, which is equipped with an unused injection point for fluoride, and a valved flow meter by-pass line. Following this is a pressure relief valve which returns water to the reservoir if system pressure gets too high, the trim chlorine injection point, an on-line magnetic flow meter for finished water flow monitoring, an on-line pressure transducer, a gate valve, the post soda ash injection point for pH adjustment, a pressure transducer, a pressure gauge, and a domestic water supply line with backflow prevention, before water is discharged to Zone 1 of the distribution system.
A supply line draws water from the point it enters the supply water main at Highway 60. This line supplies an on-line free chlorine residual analyser with pH adjustment and a 0-5 mg/L range for finished water, an on-line finished water turbidimeter, a temperature sensor, and a pH analyser.
Floor drains reportedly empty to the sanitary sewers.
Pump and process control instrumentation is located on site.
All controls, monitoring and alarms on site are routed through the PLC on-site and on to the SCADA system at the WTP.
The HLP's are triggered by receipt of programmed low reservoir level signals from the Deerhurst Reservoir, the Hanes Road Reservoir, the Skyline Reservoir, and/or the Dufferin Street Reservoir. The SCADA system monitors and controls all of these sites remotely. Alarms from the above sites are routed through the WTP SCADA system.
Standby Power Facility
A 500 kW standby diesel generator with a contained 4,540 L diesel fuel storage tank provides emergency power to critical process equipment. The tank has manual and electronic fuel gauges. The generator is programmed for automatic starts and stops during power outages. There is a capped fill line to the outside and a vent line to the outside.

Site (Name): CHEMICAL FEED SYSTEMS
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
Chemical Storage and Feed Systems
The soda ash storage and feed system consists of a 36000 kg storage silo with pressure and level sensors in a below grade and ventilated room, a 425 kg/d (kilogram per day) volumetric dry feeder, a level alarmed mixing tank which is supplied with finished water, a transfer pump, a 350 L solution day tank with level alarms, and two (duty and standby) positive displacement pre-soda ash metering pumps. Each metering pump has a rated capacity of 394 L/h and injects soda ash solution into the Soda Ash Mixing Chamber for pH and alkalinity adjustment. One post-soda ash pump rated at 228 L/hr, replaced in 2013 with a Watson Marlow Peristaltic Hose Pump Mod. Apex 20, with a max flow rate of 350l/hr at a discharge pressure of 95psi, injects soda ash solution in the HLP discharge header for final pH adjustment and corrosion control. A shelf spare pump is available. There is a level alarmed sump pit and pump in the bottom of this chamber which discharges to the sanitary sewers.
The pumps are equipped with backflow prevention, but not failure alarms.
The coagulant storage and feed system consists of two contained 30,000 L solution storage tanks with alarmed ultrasonic level sensors, drain valves, and access hatches, two (duty and standby) positive displacement chemical metering pumps with a rated capacity of 72 L/h and backflow prevention, and chemical feed lines to inject the coagulant (SternPAC) into the Flash Mixing Chamber. The pumps are equipped with flow monitors and failure alarms through SCADA.
The gas chlorine disinfection system consists of two, one tonne cylinder alarmed weigh scales, storage capacity for five one tonne cylinders, two automatic switchover vacuum regulators and automatic chlorine gas feed systems, and three chlorinators (one duty for the filter effluent and backwash water well duty, one duty for the HLP discharge header top up, one standby). Chemical feed lines inject chlorine at two of the following injection points: the low lift

pumping well (provisional pre-chlorination), the Flash Mixing Chamber (provisional chlorination), the filter effluent/backwash water well (duty chlorination), and in the HLP discharge header (top-up chlorination, as needed). Two in-line positive displacement pumps have been installed where the removed chlorine dioxide system was located. These pumps circulate high pressure finished domestic water past the chlorinators and provide enough pressure to inject this water into the pressure main at the HLP discharge. An alarmed chlorine gas detector is in-place. The chlorination room is separated from rest of the WTP and is separately ventilated.
All chemical feed systems are flow paced and only operate while the WTP is producing water. These systems alarm through, and are monitored and controlled by, the SCADA system.
The hydrofluosilicic acid system equipment remains in place but is no longer being used.

Site (Name): BACKWASH PROCESS RESIDUALS - TREATMENT AND RE-CIRCULATION
Type: Treated Water POE **Sub Type:** Treatment Facility
Comments:
Backwash Process Residuals – Treatment and Re-Circulation System
A two-cell filter backwash holding/settling tank, with a combined volume of 524 m3 and hopper bottoms, stores filter backwash water and settles out suspended solids. The tank is equipped with an emergency overflow provision to Fairy Lake. Two (one for each cell) self-priming suction lift type supernatant pumps, rated at 11 L/s at 7 m TDH and equipped with float suction, isolation valves, and backflow prevention, are installed to allow for supernatant to be returned to the LLPS for recycling, however this system has never been used, and all wastewater is directed to the sanitary sewers via the on-site sewage pumping station. Emergency discharge provisions of backwash wastewater supernatant is also available to the plant overflow, and out to Fairy Lake, if recycling and sanitary discharge are not available. Two (one for each cell) submersible sludge pumps, rated at 63 L/s at 6.2 m TDH, and with backflow prevention and mechanical flow valves, discharge the settled sludge to the plant sewage pumping station (typical practice).
The two tanks have alarmed level sensors.
The inlet lines from the filters have mechanical flow valves.
Sewage Pumping Station
The sewage pumping station, located in front of the WTP, is equipped with two (duty and standby) submersible pumps, each pump having a rated capacity of 9.9 L/s at 8.7 m TDH, collects all backwash water including supernatant, settled sludge, liquid from floor drains, plant domestic wastewater, generator cooling water, and sump pump discharges and directs it to the sanitary sewer system.

Site (Name): DISTRIBUTION (WATER INSPECTION)
Type: Other **Sub Type:** Other
Comments:
The water distribution system for the community of Huntsville serves a population of approximately 8793 to 9000 persons. The piping within the distribution system is reported to be composed mostly of PVC watermain with some other types (polyethylene (PE), ductile iron, cast iron). The cast iron pipes are being relined or replaced, depending on main size, regularly. The watermain ranges in diameter from 25 mm to 500 mm with a total estimated installed length of 96 km and approximately 1012 main valves, 40 air release valves and 643 fire hydrants (58 privately owned).
There are two rechlorination/ booster stations/ reservoirs located within the distribution system: the Hanes Road facility and the Skyline Reservoir (formerly the Hidden Valley WTP).
There is one reservoir/ booster station: The Dufferin Street Reservoir.
There is one booster station: the Homestead (Settler's Ridge) Booster station.
Based upon October 2016 information, the system incorporates 3382 total services – approximately 2944 residential services, approximately 368 commercial services, approximately 57 institutional services and approximately 13 industrial services.

Site (Name): SKYLINE (HIDDEN VALLEY) RESERVOIR, BOOSTER STATION, AND RECHLORINATION

FACILTY

Type: Other **Sub Type:** Reservoir

Comments:

The Skyline (Hidden Valley) Reservoir, Booster Station and Rechlorination Facility, located at 1632 Skyline Drive, consists of a below grade, concrete, two cell clearwell/reservoir approximately 18.3 m by 9.1 m by 5.5 m deep which provides an approximate total volume of 916 m3 and an electronically alarmed concrete block building with a locking steel door. It is located at a high point in the distribution system.

At a programmed low water level, the facility PLC signals the SCADA system at the WTP to start the HLP's and fill the reservoir. Distribution water from Zone 1 (Grandview) enters the station through a 250 mm inlet line and passes a normally closed gravity outlet line, an isolation valve, an on-line magnetic flow meter for inlet flow monitoring, a flow control valve which regulates inlet flow, a check valve, an on-line pressure transducer, and past an unused chlorine injection point. A sample line supplies an alarmed, on-line continuous free chlorine residual analyser which has pH adjustment and a 0-2 mg/L range from this location. If rechlorination is used, this analyser would trigger (through the PLC and SCADA system) sodium hypochlorite pump starts and stops at programmed free chlorine residual concentrations. Immediately after the chlorine injection point, the inlet line splits into two valved reservoir fill lines. Typically both valves are open and the reservoir cell levels are maintained with an equalization valve between them. The cells can be operated individually if needed.

Both cells are equipped with on-line level sensors, overflow ports which empty outside to the rear of the facility, raised access hatches with plate metal covers and ladders, two vertical turbine pressure pumps, and valved discharge lines which join into a common gravity discharge line.

Two HLP's (duty and standby) rated at 15.1 L/s at 53 m TDH draw from Cell 2, and two HLP's (duty and standby) rated at 15.1 L/s at 33.1 m TDH draw from Cell 1. These pumps direct water to Zone 3 of the distribution system. The discharge of each pump is equipped with backflow prevention, an air relief valve, and an isolation valve before joining to form the common discharge header. The common header is fitted with a pressure relief valve which will automatically open and direct water back into the reservoir cells if system pressure gets too high, an on-line pressure transducer, an on-line magnetic flow meter for monitoring pumped discharge volume, a chlorine injection point, and an alarmed, on-line continuous free chlorine residual analyser which has pH adjustment and a 0-2 mg/L range. Before leaving the facility, this line splits into two valved lines to feed the distribution system.

The pumps at the reservoir start and stop on programmed system pressure readings. They will start and run sequentially as demand increases.

Gravity draws water out of the two cells through a common outlet line. It passes a check valve, the tie in for the Zone 4 gravity by-pass to the inlet line, a valve, an on-line magnetic flow meter for gravity discharge flow monitoring, a valve, and an alarmed, on-line continuous free chlorine residual analyser which has pH adjustment and a 0-2 mg/L range before water leaves the facility to supply Zone 4 of the distribution system and on to the Deerhurst Reservoir.

A currently unused rechlorination system is in place which consists of two contained 100 L sodium hypochlorite day tanks, one on an alarmed, on-line weigh scale, and two alarmed metering pumps (duty and standby) rated at 3.6 L/h. The pumps can be triggered by inlet or outlet water free chlorine residual.

A diesel generator to provide standby power for the booster pumps, chemical feed system, and control equipment has also been installed in a separate room at the facility. It is programmed for automatic starts and stops during power outages. Diesel fuel is stored on site in a contained steel tank with an approximate 900 L capacity, a manual fuel gauge, a capped and locked fill line to the outside and a vent line to the outside.

Contact information signs are posted on site.

There is no gate or fence on the grounds.

Floor drains reportedly empty to the sanitary sewers.

All controls, monitoring and alarms on site are routed through the PLC at the facility and on to the SCADA system at the WTP.

The reservoir vents are screened. One is located inside the building while the second is located outside beside a locked plate metal access hatch.

The below grade pipe gallery is equipped with an automatic sump pump with a check valve on the discharge line. It directs water to the sanitary sewers. The pipe gallery is alarmed for floods.

Backflow preventers are in place on domestic water lines in the facility.

Site (Name): DUFFERIN STREET RESERVOIR AND BOOSTER STATION
Type: Other **Sub Type:** Reservoir
Comments:
The Dufferin Street Reservoir and Booster Station, located at 40 Florence Street, consists of two in-ground, concrete cells with a total approximate volume of 2270 m3, a below grade valve chamber, and a concrete block building with two locking steel doors, all within a locked chain link fence compound. All of the doors are equipped with electronic entry alarms and the compound is monitored by video cameras at all times. It is located at the end of a dead-end street at a high point in Huntsville.
Treated water enters the below grade valve chamber from the distribution system via the WTP or other booster stations by way of a common inlet/ gravity outlet line. This chamber is accessed by a locked steel door set in the hillside below the reservoir chambers. The chamber is alarmed for flooding and for entry. The common inlet main splits in two just after it enters the chamber. The smaller, pressure water fill line tees off the common line and is fitted with a continuously monitored pressure transducer and a gate valve. The fill line is fitted with an on-line magnetic flow meter and a flow control valve which acts as a check valve and regulates inlet flow before it splits into two individually valved reservoir cell fill ports.
The straight run of the common inlet/ gravity outlet line is of much larger diameter than the fill line and is fitted with a gate valve for isolation purposes. This line is the gravity drain line. It is fitted with an on-line magnetic flow meter, a second gate valve before it splits into two lines, both equipped with valves and check valves which empty the two reservoir cells from the bottom by gravity. These valves are accessed by way of locked plate steel hatches on the outside top of the reservoir cells. Gravity discharge from this reservoir supplies Zone 1 - Huntsville.
A third locked plate steel hatch next to the valve chamber hatches provides access to the reservoir overflow chamber. Unscreened holes in the sides of both cells empty into a catchment basin which has a drain hole in its base to carry away overflow water to the town storm sewers.
The building on site contains the pumps, the diesel generator, the PLC and control equipment, valves, piping and an on-line free chlorine residual analyser.
Each cell is fitted with individual on-line, alarmed level sensors, isolation valves, and plate metal access hatches with ladders which are elevated above floor level on concrete pads. The cells are approximately 4 m in depth. Typically the water levels in the cells are equalized by a gate valve between them but they can be operated independently.
Three vertical turbine pumps draw from the reservoir cells. Two, rated at 25.2 L/s at 34 m TDH, draw from one cell and one rated at 38 L/s at 32 m TDH draws from the second cell. Each pump discharge is equipped with a check valve, a pressure gauge, an air relief valve, and a gate valve before they combine into a common discharge pressure header. A line from this header supplies an alarmed, on-line continuous free chlorine residual analyser which has pH adjustment and a 0-2 mg/L range, an on-line, alarmed pressure transducer, and a pressure gauge. The common discharge line is fitted with a pressure relief valve which will automatically open and return water to both reservoir cells if system pressure gets too high. A solenoid valve is also fitted on this line which opens regularly to ensure fresh water is circulated to the reservoir if the pumps do not run regularly.
After the pressure relief valve, there is a gate valve, a tee to a valved line for flow meter by-pass, an on-line magnetic flow meter for pressure flow to Zone 2 of the distribution system, another gate valve, the return line for the flow meter by-pass, and the point of discharge to the distribution system.
The reservoir fills when the facility PLC registers a specific low set point in the cells and signals the SCADA and PLC at the WTP. Filling stops when the cells reach a programmed level and the PLC signals the SCADA at the WTP to shut down the HLP's.
The pumps at the reservoir start and stop on programmed system pressure readings. They will start and run sequentially as demand increases.
A stand-by diesel generator is located in a separate room at the facility. It is rated at 40 kW and is programmed for automatic starts and stops during power outages.
Diesel fuel is stored on site in a contained steel tank with an approximate 500 L capacity, a manual fuel gauge, a capped fill line to the outside and a vent line to the outside.
No Entry and video surveillance signs are posted on site.
Floor drains reportedly empty to the sanitary sewers.
All controls, monitoring and alarms on site are routed through the PLC at the facility and on to the SCADA system at the WTP.

Site (Name): HOMESTEAD (SETTLER'S RIDGE) BOOSTER
Type: Other **Sub Type:** Booster Station
Comments:
The Homestead Lane (Settler's Ridge) Booster station is located within a brick and concrete block building at 824 Muskoka Road 3 North. The building is approximately 6.1 m by 3.7 m with a locking steel door and electronic entry alarms. It is supplied from a water main from Muskoka Road 3 and supplies the Settler's Ridge development of approximately 35 homes on a dead-end line along Homestead Lane and designated as Zone 1A.
Water enters the booster station through a 300 mm stainless steel supply line. This line supplies a pressure gauge, two 100 mm pump inlet lines, one 200 mm pump inlet line, a 100 mm pressure relief return line, an in-line check valve and joins with the discharge line to which the pressure relief valve is joined.
The three pump supply lines are all equipped with isolation valves. The two smaller lines supply identical centrifugal pressure pumps while the large supply line inlets to a larger centrifugal supply pump for a total of three pressure pumps. Water discharged from these pumps passes through individual flow control/check valves, isolation valves and into the common discharge header. The common discharge header splits to return to the inlet header/pressure relief valve, to four valved bladder pressure tanks, and to a magnetic flow meter for monitoring discharge flows. This flow meter is not monitored on-line. The bladder tanks maintain line pressure when the pumps are not operating.
The discharge line is increased to 300 mm and supplies a pressure gauge, four pressure switches for pump control and a sample line.
The floor drains empty into the sanitary sewers.
Pump control is independent of the SCADA system and PLC(s) at the WTP or any other facility with a panel contained within the building.
An outlet is provided for emergency generator hook up.
Alarms generated at this facility are routed through an independent autodialer. There is no signage at this site.

Site (Name): HANES RESERVOIR
Type: Other **Sub Type:** Reservoir
Comments:
The Hanes Road Reservoir, Rechlorination Facility and Booster Station, located at 10 Hanes Road, consists of two, 1170 m3 in-ground, concrete cells with a total approximate volume of 2340 m3, and a below grade valve and works chamber accessed from the outside with two locking steel doors. There is a locked bar steel gate on the paved access road and a sign with contact information. All of the doors are equipped with electronic entry alarms. It is located at a high point in Huntsville.
Treated water enters the below grade valve and works chamber from the distribution system via the WTP or other booster stations by way of a common inlet/ gravity outlet line. This chamber is accessed by a locked steel door set in the hillside below and in front of the reservoir chambers. The inlet main splits in two just after it enters the chamber. One direction leads to a valve and a pressure relief valve which will automatically open and return water to the inlet line from the pressure discharge line and both reservoir cells if system pressure gets too high. Typically, water is directed in the other direction, towards the reservoir cells. The inlet line is fitted with a valve, a sodium hypochlorite injection point, an on-line magnetic flow meter, an alarmed, on-line continuous free chlorine residual analyser which has pH adjustment and a 0-2 mg/L range, an on-line, alarmed pressure transducer, a flow control valve which acts as a check valve and regulates inlet flow (along with the PLC and pressure transducer), and a check valve before it splits into two individually valved reservoir cell fill lines. Both inlet lines have air relief valves. Rechlorination is currently used. The inlet free chlorine analyser triggers (through the PLC and SCADA system) sodium hypochlorite pump starts and stops at programmed free chlorine residual concentrations.
Both cells are fitted with individual on-line, alarmed level sensors, isolation valves on the discharge lines, and locked plate metal access hatches with raised concrete pads, located outside, above ground on top of the reservoir cells with ladders. Typically the water levels in the cells are equalized by a gate valve between them but they can be operated independently. Venting occurs through the overflow piping.
One valved 300 mm line empties each cell by gravity. The two lines are linked but remain separated so both will supply the pressure discharge and the gravity discharge. A pressure gauge is located at the link. After the link, one line becomes the gravity outlet line. It is fitted with a check valve and an on-line magnetic flow meter before directing

water back to Zone 1 – Huntsville.
The second line supplies the four centrifugal pressure pumps for pressure discharge to Zone 2B or if desired, back to Zone 1.
Two pumps rated at 18L/s at 40 m TDH (duty and standby) with variable frequency drives (VFD's), and two pumps rated at 105 L/s at 30 m TDH (duty and standby) are in-place. The pumps at the reservoir start and stop on programmed system pressure readings. They will start and run sequentially as demand increases.
Each pump discharge is equipped with a pressure gauge, a check valve, and a flow control valve before they combine into a common discharge pressure header.
This header has an air relief valve and a line with a solenoid valve which opens regularly to ensure fresh water is circulated to the reservoir if the pumps do not run regularly. The common discharge line ties into the pressure relief /inlet line and the main pressure discharge line to Zone 2B. The discharge line has a chlorine injection point (not in use), an isolation valve, an on-line magnetic flow meter, an alarmed, on-line continuous free chlorine residual analyser which has pH adjustment and a 0-2 mg/L range, an on-line, alarmed pressure transducer which, along with the PLC and SCADA at the WTP, controls pressure pump operation, an isolation valve and a domestic water line with backflow prevention before it discharges to the distribution system.
The reservoir fills when the facility PLC registers a specific low set point in the cells and signals the SCADA and PLC at the WTP. Filling stops when the cells reach a programmed level and the PLC signals the SCADA at the WTP to shut down the HLP's.
The rechlorination system consists of one contained 100 L sodium hypochlorite day tank on an alarmed, on-line weigh scale and two alarmed metering pumps (duty and standby) rated at 3.6 L/h. The pumps can be triggered by inlet (current practice) or outlet water free chlorine residual.
A stand-by diesel generator is located in a separate room at the facility. It is rated at 125 kW and is programmed for automatic starts and stops during power outages.
Diesel fuel is stored on site in two contained steel tanks with a total approximate 2200 L capacity, manual fuel gauges, electronic fuel gauges, a capped fill line to the outside and a vent line to the outside.
Reservoir overflows are captured in a catch basin within the building and are then directed to a barred culvert discharge point in a rock lined ditch beside the access road.
Floor drains reportedly empty to the sanitary sewers.
All controls, monitoring and alarms on site are routed through the PLC at the facility and on to the SCADA system at the WTP.
This facility was put in service on April 25, 2007.

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 Huntsville (Fairyview) drinking water system serves the Town of Huntsville. Huntsville is the northernmost community in the District Municipality of Muskoka, along Provincial Highway 11. The drinking water system services an estimated population of between 8793 and 9000 persons. There are approximately 3382 total service connections, of which approximately 2944 are residential services; 368 are commercial services; 57 are institutional services, and approximately 13 are industrial services.

  The Huntsville (Fairyview) 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 Huntsville community is obtained from Fairy Lake. The Huntsville (Fairyview) drinking water treatment plant was constructed in 1988, with a number of replacements, alterations and upgrades occurring since that time. The drinking water treatment process consists of chemically assisted coagulation-flocculation, sedimentation and filtration using multi-media filters with a combination of silica sand and anthracite coal. Disinfection is achieved by chlorination through the use of chlorine gas. Alkalinity and pH adjustment also occurs during the treatment process and prior to the treated water being conveyed to the distribution system. Historically, drinking water treatment had also included fluoridation, however fluoridation has not been practiced since February 3, 2014, following the passing of By-law No. 2014-2 by the District Municipality of Muskoka Council in January 2014.

  The Huntsville (Fairyview) drinking water treatment plant is rated to treat up to 9000 cubic meters of water per day.

  The drinking water system is comprised of outstations. An outstation is defined as a component of a drinking water system that is not located at either a water treatment plant or well supply and is not associated with primary treatment. The Huntsville(Fairyview) drinking water system is comprised of the following six outstations:
  1. Raw Water Intake

Introduction

2: Low Lift Pump Station
3. Dufferin Street Reservoir and Booster Station
4. Homestead/Settler's Ridge Booster Station
5. Hanes Reservoir, Booster and Rechlorination Station
6. Skyline(Hidden Valley) Reservoir, Booster and Rechlorination Station
As discussed below, the Highlands Booster Station and the Deerhurst Residence(Highway 60) Booster Station were also formerly outstations associated with the works.

The Huntsville (Fairyview) 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 Huntsville (Fairyview) drinking water system is authorized under Municipal Drinking Water Licence #143-103 (Licence) and Drinking Water Works Permit 143-203 (Permit) which were issued to the District of Muskoka respectively on October 14, 2010 and October 13, 2010. An application was submitted by the Municipality to renew the Licence with the Ministry on February 3, 2015, and the Ministry renewed the Licence and re-issued the Licence Issue #2 and Permit Issue #2 on October 6, 2015.

On May 30, 2016, the Municipality submitted an application to the Ministry requesting approval to completely decommission and remove the Deerhurst Residence Booster Station, which was situated at 1401 Highway 60 East, Huntsville, and the Highlands Booster Station which was situated at 1 Deerhurst Highlands Drive, Huntsville. The two booster pumping stations were no longer considered necessary and had been taken out of service following the installation of a new watermain in 2012, to service the Deerhurst Resort expansion using the Skyline Reservoir, Booster Station, and Rechlorination facility. The Ministry removed the descriptions of the Deerhurst Residence Booster Station and the Highlands Booster Station through the re-issuance of the Permit Issue #3, on August 29, 2016, and the Municipality is in the process of fully decommissioned and removing the structures associated with those facilities.

Water takings from Fairy Lake are permitted in accordance with Permit to Take Water (PTTW)#2801-8FNPSN issued April 12, 2011. The PTTW allows the Owner to take a maximum of 22500000 Litres per day (L/d) from Fairy Lake at a rate not exceeding 16700 Litres per minute (L/min). The PTTW expires on January 15, 2021. 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 Huntsville (Fairyview) Drinking Water System was last inspected by the Ministry on August 6, 2015. Findings associated with that 2015/2016 inspection were detailed in Inspection Report # 1-BYLD9, issued to the Owner on August 20, 2015.
The September 23, 2016 inspection, to which this inspection report pertains, encompasses an inspection review period between August 6, 2015 and September 23, 2016. The September 23, 2016 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. The Dufferin Street Reservoir and Booster Station; Hanes Reservoir, Booster and Rechlorination Station; and, the Skyline(Hidden Valley) Reservoir, Booster and Rechlorination Station were also attended on September 30, 2016, as part of this inspection.

Capacity Assessment

- **There was sufficient monitoring of flow as required by the Municipal Drinking Water Licence or Drinking Water Works Permit 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.

Capacity Assessment

To comply with this condition, the Owner has installed a flow meter on the combined raw water discharge header at the low lift pumping station, flow meters on each of the two separate filter train discharges, and one on the plant discharge header entering the distribution system. A flow meter is also installed on the filter backwash line to measure the backwash flow rates and volumes, and flowmeters are installed at each of the reservoir outstations to measure flows both into and out of those facilities.
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 between October 26th and the 28th, 2015.

- **The owner was in compliance with the conditions associated with maximum flow rate or the rated capacity conditions in the Municipal Drinking Water Licence 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 Huntsville (Fairyview) Water Treatment Plant to the distribution system shall not exceed 9000 cubic metres per day (m3/day).
  In 2015 the maximum day demand occurred on May 12, 2015 when a total daily flow of 4631m3 or 51% of the rated capacity was noted to have occurred. The average day demand for 2015 was reported to be approximately 3254m3/d or 36% of the plant rated capacity.
  Between January 1, 2016 and up to the date of this inspection, September 23, 2016, the maximum day demand occurred on August 3, 2016 when a total daily flow of 5458m3 or 61% of the rated capacity was noted to have occurred. The average day demand for this same period is reported to be approximately 3286m3/d or 37% of the plant rated capacity.
  During water production, the rate of flow into the treatment system is governed by valving installed on each of the filtration trains and low lift pump operation is based on maintaining a sufficient water level in the filters. A review of records made during this inspection review period indicates that the Huntsville (Fairyview) 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 (215m3/hr) during the production of water. The filters are typically operated at a filtration rate of 120m3/hr in the summer months and 80m3/hr during the winter months.

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.**

  With the exception of the Fluoridation system, all equipment described in the Permit issued August 29, 2016, and supporting documents prepared since that time, appeared to be installed and operating on the date of this inspection. As previously discussed, fluoridation of the Huntsville drinking water system ended on February 3, 2014, and although the fluoridation equipment remains in place it is not being used.

  As previously discussed, the Municipality submitted an application to the Ministry, on May 30, 2016 requesting approval to completely decommission and remove the Deerhurst Residence Booster Station and the Highlands Booster Station. The Ministry removed the descriptions of the booster stations through the re-issuance of the Permit Issue #3, on August 29, 2016, and the Municipality is in the process of fully decommissioned and removing the structures associated with those facilities.

  During this inspection review period, and since the issuance of Permit Issue #3, on August 29, 2016, the

Treatment Processes

Municipality prepared two separate Form 2 Records of Modification or Replacement documents. These Form 2 documents are discussed in more detail in a following section of this inspection report.

Although several HVAC related upgrades have occurred, this work did not necessitate the completion of a Form 3 document and there were reportedly no other additions or alterations made which required the completion of a Form 3 document, during this inspection review period.

- **The owner/operating authority was in compliance with the requirement to prepare Form 1 documents as required by their Drinking Water Works Permit during the inspection period.**

  During the inspection review period, the Owner prepared six separate "Form 1 – Record of Watermains Authorized as a Future Alteration" documents to facilitate the extension of the distribution system through the addition/replacements of watermains and appurtenances. There were no concerns identified with the content included on the documents.

  Specifically, a Form 1 document was prepared on:
  -December 15, 2015, for the construction of a 150mm diameter P.V.C. watermain and appurtenances to service Huntsville Muskoka Lumber;
  -December 16, 2015, for the construction of a 150mm diameter P.V.C. watermain and appurtenances to service Deerhurst Resort Lakeside Lodge;
  -June 1, 2016, for the construction of a 200mm diameter watermain and appurtenances on Legacy Lane;
  -June 1, 2016 for the construction of 150mm and 50mm diameter watermains and appurtenances on Legacy Lane;
  -June 1, 2016, for the construction/extension of watermains on Chaffey Road; and,
  -June 6, 2016, for the construction of a 150mm diameter P.V.C. watermain and appurtenances on South Dufferin Street between Lansdowne Street and Mary Street.

- **The owner/operating authority was in compliance with the requirement to prepare Form 2 documents as required by their Drinking Water Works Permit during the inspection period.**

  During this inspection review period, and since the issuance of Permit Issue #3, on August 29, 2016, the Municipality prepared two separate "Form 2 - Records of Modification or Replacement" documents.

  Specifically, Form 2 documents were prepared on April 22, 2016. One was prepared for the Settlers Ridge Subdivision Pumping Station where the pump control valves for pumps number 1 and 2 were replaced with 100 mm swing check valves. The second Form 2 document was prepared for the Raw water Low-Lift Pumping Station where the raw water turbidimeter was replaced, and the Municipality installed a raw water pH meter. Both analyzers are linked to SCADA for trending, control and alarming purposes. The addition of the pH analyzer at the low lift pumping station provides operational staff with an early warning of Lake turnover, which can impact on the coagulant process. The raw water pH analyzer, through SCADA is configured to trigger an alarm sequence and shut down the low lift pumps should the raw water pH fall outside pre-determined set-points.

  In addition to those changes, the Municipality had also undergone a number of replacements, alterations and upgrades to the works, which had been discussed during the Ministry's 2015 inspection. This included the replacement of a low lift pump, addition of a fourth low lift pump, installation of new pH analysers, the replacement of the venturi flow meter on the high-lift pump discharge header with a magnetic flow meter, the replacement of the filter effluent turbidimeters, and the replacement of the 228L/h post soda ash pump with a 350L/h Watson Marlow Peristaltic Hose Pump. The appropriate Form 2 – Record of Minor Modification documents were prepared in conjunction with these alterations. The submission of Director Notifications were not required for these alterations.

  In September 2014, the Municipality also replaced the gas chlorinators with new Trent Severn gas chlorine systems. A Form 2 – Record of Minor Modification form was completed to support this replacement, and a Directors

Treatment Processes

Notification form was submitted to the Ministry following the new chlorinators being placed into service.

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

Treatment for a surface water source is required to achieve 2-log removal or inactivation of Cryptosporidium oocysts, a 3-log removal or inactivation of Giardia cysts and a 4-log removal or inactivation of viruses.
These requirements are intended to be met through chemically assisted filtration and chlorination.
According to 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 closed and the Low Lift pumps shut down, ceasing water production until the metering pumps are returned to service.
Continuous turbidimeters installed on each filter train are configured to trigger an alarm and lock out the low-lift pumps, should filter effluent turbidity exceed 0.3NTU, or should the turbidity meter register a signal loss/malfunction.
The multimedia filters are configured through SCADA to backwash automatically. Typically, the filters are backwashed each day at a prescribed time, however the filters may also be backwashed manually or programmed to backwash based on run time or filter headloss. Formalized filter backwashing procedures are available within the Operations and Maintenance Manual.
The filters do not have filter-to-waste capabilities. Following a backwash cycle, the respective filter enters into a five minute rest period prior to the filter effluent valve opening. The filter effluent turbidimeters are continuously supplied with filter effluent from a location downstream of the filter but upstream of the respective filter effluent control valve, such that the turbidimeter is supplied with continuous samples during the backwash rest period. Should the filter effluent turbidity remain above the 0.3NTU alarm set point, at the end of the rest period, the effluent valve will not open and an alarm sequence will be triggered.

Although a filter issue did occur on December 30, 2015, when a flow meter signalling issue resulted in the flow-paced coagulation system under-dosing coagulant and led to increased turbidity levels (0.38NTU) that triggered the auto shut down, records indicate that the filters were still operated to meet the performance criterion for filtered water turbidity of less than or equal to 0.3 NTU in 95% of the measurements each month during this inspection review period, including the month of December 2015. Although the effectiveness of the coagulation and flocculation process was impacted during the December 30 event, coagulation and flocculation did continue, and there were no other records to indicate that coagulation did not occur when water was being produced during the remainder of this inspection review period. There were also no records to indicate that filtered water turbidity exceeded 1.0NTU during this inspection review period, when water was being produced, and records indicate that backwash procedures were followed. The December 30, 2015 filter issue was responded to immediately and proactive notifications were made to the Ministry and the SMDHU. There was no indication that the occurrence resulted in improper disinfection.

Treatment Processes

To achieve the remaining 0.5-log Giardia cysts and 2-log Virus removal or inactivation, a free available chlorine residual chemical disinfection system is utilized and the CT disinfection concept is used to quantify the capability of the disinfection system for primary disinfection purposes. Free available chlorine residual is achieved through the addition of gas chlorine solution. The effective disinfectant contact time required for the CT concept is afforded in the reservoir cells. The treatment system is typically operated to target a free available chlorine residual of 1.0mg/L, throughout the reservoirs and prior to the trim chlorination injection point, where secondary chlorine addition occurs in efforts of increasing the chlorine residual to approximately 1.6mg/L before entering the distribution system. The chlorine residual analyzer used for primary disinfection monitoring purposes is configured to trigger an alarm sequence in the event free chlorine residuals fall below 0.65mg/L. Should the free chlorine residual fall below 0.50mg/L the high-lift pumps will shut down, ceasing water conveyance from the plant until operational staff respond to the site and resolve any issues. The SCADA system is also configured to calculate CT continuously to ensure adequate disinfection is provided and will alarm if CT is not met.
A manual CT calculator is installed on the computer in the control room and is available for operators to verify any occurrence using the worst case scenario values. Supporting documentation related to CT is also available in the operations and maintenance manual.
Records reviewed indicate that the water treatment plant was operated to achieve the necessary CT requirements for primary disinfection purposes during this inspection 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 completion of the intended chlorine contact time for primary disinfection purposes, trim chlorination is provided to target a free available chlorine residual of 1.6mg/L in the water being conveyed to the distribution system. Trim chlorination is practiced, to allow for the chlorine concentrations through the treatment process to be reduced in efforts of controlling/reducing Trihalomethane formation, and also to ensure that sufficient free available chlorine residual is maintained out and into the distribution system for secondary disinfection purposes in accordance with section 1-5 of Schedule 1, O.Reg.170/03.
  The Huntsville (Fairyview) water treatment plant is designed to target a free chlorine residual between 1.5 and 1.6 mg/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. In addition to the trim chlorination which occurs on the high-lift pump discharge header, re-chlorination facilities also exist at both the Hanes Reservoir and the Skyline Reservoir within the distribution system, however re-chlorination typically only occurs at the Hanes Reservoir. The free chlorine residual concentrations within the distribution system are being measured by continuous analyzers installed at the Skyline Reservoir, Dufferin Reservoir and Hanes Reservoir. In each of these locations analyzers are installed to measure the chlorine residuals in the water conveyed both into and out of these facilities.
  A chlorine analyzer installed at the plant is supplied with continuous samples of water from a location within the distribution system approximately 200 metres downstream of the trim chlorine injection point. This analyzer is used to control the trim chlorine injection rate, and is configured to trigger an alarm at 0.9mg/L, and shut down the high-lift pumps if the chlorine residual being conveyed from the plant drops below 0.7mg/L.
  The distribution chlorine residual analyzers installed at the Hanes Reservoir location are configured to trigger an alarm if the chlorine residual in the incoming water drops below 0.2mg/L and or the chlorine residual in the water being discharged drops below 0.6mg/L.
  The analyzers at the Skyline Reservoirs are configured to alarm if the chlorine residual in either the incoming water or the water being pumped falls below 0.4mg/L. The Skyline Reservoir also has an analyzer installed on the gravity discharge line, which is configured to alarm if the chlorine residual drops below 0.6mg/L.
  The analyzer installed at the Dufferin Reservoir is configured to alarm if the free chlorine residual falls below 0.4mg/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.

Treatment Processes

Records indicate that free chlorine residuals were maintained at or above the 0.2 mg/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 0.38 mg/L and 1.75 mg/L.

Treatment Process Monitoring

- **Primary disinfection chlorine monitoring was conducted at a location approved by Municipal Drinking Water Licence and/or Drinking Water Works Permit issued under Part V of the SDWA, or at/near a location where the intended CT has just been achieved.**

  The primary disinfection chlorine monitoring point is currently located at the end of the high-lift pump well. A centrifugal pump is used to draw water from the well to supply the analyzer, ensuring that this monitoring is being conducted prior to the trim chlorine injection point, which is situated on the high-lift pump discharge header. The chlorine analyser is situated in the high-lift pump room, 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 effluent lines. 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.
  The high turbidity alarm set points on the two filter trains is at 0.30 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 1.00NTU, and the raw turbidimeter is configured to trigger an alarm if raw water turbidity exceeds 5.00NTU.

- **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 continuous analyzers installed at the Skyline Reservoir, Dufferin Reservoir and Hanes Reservoir. The distribution chlorine residual analyzers are configured to trigger an alarm if chlorine residual drops below the setpoints, previously discussed, at either of the reservoir locations. 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 0.38 mg/L and 1.75 mg/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.**

  Operators evaluate the system processes at the Fairyview 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 considered. Operators are scheduled to conduct a data review so that the

Treatment Process Monitoring

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.
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.
In addition to the regular on-going review of continuous turbidity records, operational staff also reportedly review the filter turbidity measurements at the end of each calendar month to ensure the filter criterion are being met and records of this review are typically made within the record keeping mechanisms.

- **All continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were equipped with alarms or shut-off mechanisms that satisfy 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, and pH throughout the treatment process for operational control purposes. At the time of inspection, the analyzer used for primary disinfection monitoring had a low chlorine alarm set point of 0.65mg/L and a low/low chlorine alarm set point of 0.50mg/L. The analyzer had also been configured with a high chlorine alarm set point and a high/high chlorine alarm set point of 2.0mg/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 high-lift pumping capabilities will cease and allow time for an operator to intervene. As previously discussed, an analyzer is also installed to monitor chlorine residuals downstream of the trim chlorine injection point effectively measuring the chlorine residual in the water being conveyed to the distribution system. This analyzer is configured to alarm and shut down the high-lift pumps if chlorine residuals fall below 0.7mg/L or are above 2.50mg/L. Secondary disinfection was monitored in the distribution system at Skyline Reservoir, Dufferin Reservoir and Hanes Reservoir. The distribution chlorine analyzers are configured to trigger an alarm if chlorine residual drops below the setpoints, previously discussed, at either of the reservoir locations.
  The filter effluent turbidity high set point alarm was set at 0.30(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.
  A pH analyzer was installed during this inspection review period at the low-lift pumping station to measure raw water pH. The raw water pH analyzer has been linked to SCADA for trending, alarming and control purposes. The addition of the pH analyzer at the low lift pumping station provides operational staff with an early warning of Lake turnover, which can impact on the coagulant process. The raw water pH analyzer, through SCADA is configured to trigger an alarm sequence and shut down the low lift pumps should the raw water pH fall outside a pH range of 5.5 to 7.0.

- **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 Reservoirs, 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 five to ten second intervals.

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

Treatment Process Monitoring

The Huntsville (Fairyview) water treatment plant is equipped with continuous analysers for pH, chlorine residual, turbidity, fluoride and temperature.
Analyzer verifications are completed a minimum of at least once per month, or as needed to exceed the manufacturer's recommendations, to ensure effective operation and accuracy. These verifications are typically performed using secondary standards. The information is noted in the electronic spreadsheets and in the log books.
A third party is retained to perform annual verifications and calibrations to primary standards.
Procedures are available in the operations and maintenance manual for the calibration of the continuous analyzers. The continuous chlorine analysers are verified on a monthly basis at a minimum. Calibration of the chlorine analyzers occur when the unit reads 5% above or below hand held readings. Records of each verification/calibration are made in the daily log book and the maintenance log book at the plant. Handheld colorimeters are verified against secondary standards on a regular basis, and the hand held unit is used to verify the calibration of the analyzers at the reservoirs.

The turbidity and pH meters are verified/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 Huntsville (Fairyview) water treatment plant.

  As discussed, in the following section of this inspection report, the Municipality is currently reviewing sections of the operations and maintenance manual to ensure the manual is consistent with the requirements of the new Licence issued October 6, 2015, the new Permit Issued August 29, 2016, and to ensure that the manual conforms to their Operational Plan.

- **The operations and maintenance manuals met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence 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 where applicable 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.

Operations Manuals

The manual has been updated to reflect the new Trent Severn Gas Chlorinators installed in 2015, and supporting documentation related to CT is also available in the manual. The SCADA system is also configured to calculate CT continuously to ensure adequate disinfection is provided and will alarm if CT is not met. A manual CT calculator is installed on the computer in the control room and is available for operators to verify any occurrence using the worst case scenario values.

With the issuance of Permit Issue #3 on August 29, 2016, the Municipality, effective February 19, 2017, is required to ensure that the Ministry's Watermain Disinfection Procedure is followed during any watermain repairs, alterations or installations. Historically, the Municipality was required, to and did, follow the watermain disinfection procedures set out in the AWWA Standard C651. The Municipality has developed Standard Operating Procedure (SOP) WS-12, which provides operational staff directives regarding Watermain Distribution Repairs, and incorporates the procedures set out in the Ministry's Disinfection Procedure.

The Municipality is in the process of reviewing the relevant sections of the Operations Manual to ensure the manual is consistent with the requirements of the Licence and conforms to their Operational Plan.

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.

Security

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

  Security measures in place throughout the Huntsville (Fairyview drinking water system include fencing, locked gates, secure entrance doors and security systems. The security alarms utilized are connected to the SCADA 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 "Huntsville Highway 60 Water Treatment Plant" is classified as a Class 3 Water Treatment Subsystem (#939 issued September 6, 2005) while the "Huntsville Water Distribution System" is classified as a Class 3 Water Distribution Subsystem (#942 issued May 25, 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 3 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 is 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 and operator certificates are prominently displayed at the Fairyview water treatment plant

Certification and Training

and the distribution and lines crew certificates are posted at the Chaffey Street Lines Shop.

- **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.

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 8 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 Huntsville's population is estimated to be between 8793 and 9000 residents, 17 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.

  A review of the data supplied by the Owner indicates that the owner is routinely collecting a minimum of five to six 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 approximately 25 to 30% of the samples were tested for general bacteria populations expressed as colony counts on a heterotrophic plate count.

  The results of distribution microbiological sampling are discussed in more detail in a later section of this inspection report.

- **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 (HPC).
  Records reviewed in the course of this inspection indicate that the Owner complied with these requirements.
  It is acknowledged that the treated water sample collected June 1, 2016 was analyzed only for E.Coli and total coliform bacteria. Although, the Municipality complied with their sampling requirement and requested HPC analysis be conducted on the treated water sample that had been submitted to their licenced laboratory, a laboratory issue prevented the sample from being analyzed for HPC. The laboratory issue is documented on the laboratory report associated with the June 1, 2016 samples.

- **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

Water Quality Monitoring

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 9, 2016. Prior to that, this sampling was last conducted on April 13, 2015. 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 9, 2016. Prior to that, this sampling was last conducted April 13, 2015. 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.
  Complying with these requirements, the Owner conducted this quarterly sampling October 13, 2015; February 8, 2016; May 9, 2016 and August 8, 2016. In 2014 and 2015, THM sampling had also been undertaken on a monthly basis from various locations throughout the distribution system. This additional monitoring was conducted in conjunction with changes which had been made with the chlorine addition processes at the water treatment plant and adjustments which had been made at the reservoirs and within the distribution system. The changes and additional monitoring was implemented in efforts of reducing THM formation through the treatment process and throughout the distribution system. The changes at the plant included adjustment to the chlorine dosage rates within and through the plant and improvements in the control of the trim chlorine injection. Reservoir levels and valve changes within the distribution system also occurred in efforts of reducing the age of water within the distribution system, keeping the water fresher and significantly lowering the level of THM formation within the distribution system.
  THM results during this inspection review period ranged between 32 to 77 micrograms per Litre (ug/L). The running annual average of the four most recent samples collected is 47.5ug/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 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 required monitoring on October 13, 2015; February 8, 2016; May 9, 2016 and August 8, 2016. 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 the Owner to 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

Water Quality Monitoring

inspection, indicate that the Owner conducted sampling for sodium on May 9, 2016. Prior to that, sampling for sodium had been undertaken April 13, 2015.
Results of Sodium sampling are discussed in more detail in a later section of this inspection report.

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

  Section 13-9 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 60 months and tested for Fluoride, if the system does not provide fluoridation. As previously discussed, the Huntsville (Fairyview) WTP had historically provided fluoridation, however this practice was stopped on February 3, 2014.
  Complying with the Section 13-9 requirement, the Owner last conducted Fluoride sampling on May 9, 2016 and prior to which had conducted this sampling on April 13, 2015. The May 9, 2016 sample indicated a Fluoride concentration of 0.06mg/L, below the Ontario Drinking Water Quality Standard of 1.5 mg/L.

- **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 a free chlorine residual was taken 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

- **Records did not show that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of 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".

  During this inspection review period there were four separate Adverse Water Quality Incidents (AWQIs) reported for the drinking water system, only one of these AWQI's pertained to a microbiological sample result exceeding the ODWQS.

  AWQI (121326) was reported on June 3, 2016, when one of the six samples collected on June 1, 2016 indicated the presence of total coliform bacteria (TC=39cfu/100ml) at one location within the distribution (plumbing) system. The Municipality made all appropriate notifications, and re-samples collected, June 3, 2016, showed no further indication of adverse water quality at the time of collection.

  Two of the other AWQI's reported, pertained to low pressure events which occurred within the distribution system, and a third pertained to a precautionary notice that was made when the coagulant system malfunctioned and triggered a filter shut down. The corrective actions taken in response to these three AWQI's are discussed in more detail in the following section of this inspection report.

  Aside from the June 1, 2016 adverse microbiological result, all other results for sampling conducted during this

Water Quality Assessment

inspection review period, met the microbiological and chemical requirements of O.Reg.169/03.

It is acknowledged that prior to this inspection review period, a sample collected on April 12, 2013 did indicate a slightly elevated level of Sodium in the treated water, with a result of 20.4mg/L being rendered. Where the concentration of sodium exceeds 20mg/L in a drinking water sample the Owner is required to make a report in accordance with subsection 16-3(1) of Schedule 16, O.Reg.170/03; if such a report had not been made in the previous 60 months. The Owner made the appropriate notification for the April 12, 2013 test result (AWQI 110511) and resamples collected did not confirm the elevated sodium result with a concentration of 12.5mg/L being rendered and reported to the SMDHU. Similarly, sampling for sodium conducted on April 14, 2015 (16.6mg/L), April 13, 2015 (18.5mg/L) and again on May 9, 2016 (13.3mg/L) have not indicated elevated levels of sodium.

Reporting & Corrective Actions

- **Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.**

  Adverse Water Quality Incident (AWQI) notifications were made on four occasions during this inspection review period.

  AWQI #127510 was reported on November 25, 2015 in response to low pressure event which occurred within the distribution system. To facilitate a watermain repair, a portion of the distribution system required isolation and resulted in low pressure conditions for approximately 100 residences, in pressure zone 3. The Municipality adhered to the AWWA disinfection procedures during the repair, and following the repairs ensured the impacted portions of the distribution system were flushed, to confirm that adequate chlorine residuals were maintained in those areas. Microbiological samples collected following the event showed no indication of adverse water quality as a result of the occurrence. The Municipality made all appropriate notifications of the event to the Ministry and the Simcoe Muskoka District Health Unit (SMDHU), and the SMDHU was reportedly satisfied with the corrective actions implemented.

  AWQI #127873 was reported on December 30, 2015 in response to a coagulant system issue which occurred that day, and resulted in a filter shut down, when filtered water turbidity levels increased above the high alarm setpoint (0.3NTU). It was identified that a flow meter signalling issue had occurred which resulted in the flow-paced coagulation system under-dosing coagulant during water production. The under-dosing of coagulant is believed to have resulted in the filtered water turbidity increasing until the high alarm set-point was triggered and, as designed, the filters shut down. After repairs were made to the flow meter signalling, filtered water turbidity levels returned to normal levels (0.05NTU). Confirmation was made that filtered water turbidity levels never exceeded 1.0NTU, and that the necessary log removals and CT inactivations, necessary for primary disinfection continued to have been met during the occurrence. Filtered water turbidity levels did reach 0.38NTU for a short duration during the event, however the plant continued to meet the filter criterion of 0.30NTU in 95% of the samples tested in December 2015. There was no impact on the primary chlorine disinfection, and chlorine residuals remained above 1.0mg/L throughout the event. The Municipality made all appropriate notifications of the event to the Ministry and the SMDHU, and the SMDHU was reportedly satisfied with the corrective actions implemented.

  AWQI #129175 was reported April 15, 2016, when an electrical failure occurred with the booster pump controls at the Dufferin Street Reservoir, causing the booster pumps to shut down for approximately 38 minutes and resulting in low water pressure in portions of the distribution system serviced by the station. The control issues were addressed and pressure was restored. The affected portions of the distribution system were flushed, confirming that adequate chlorine residuals were maintained in those areas. The Municipality made all appropriate notifications of the event to the Ministry and the SMDHU, and the SMDHU was reportedly satisfied with the corrective actions implemented.

  AWQI #121326 was reported on June 3, 2016, when one of the six samples collected on June 1, 2016 indicated the

Reporting & Corrective Actions

presence of total coliform bacteria (TC=39cfu/100ml) at one location within the distribution (plumbing) system. The Municipality made all appropriate notifications, and re-samples collected, June 3, 2016, showed no further indication of adverse water quality at the time of collection.

Aside from these occurrences, there were no other adverse water quality events identified during this inspection review period.

- **All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.**

- **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.**

  Following a review of the SCADA and the log book entries for the inspection review period, where required, operators responded to and took appropriate measures where necessary, in response to alarm conditions. Explanations appear to have been consistently provided for power interruptions, maintenance activities and any communication errors that triggered alarms. No concerns were identified.

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.

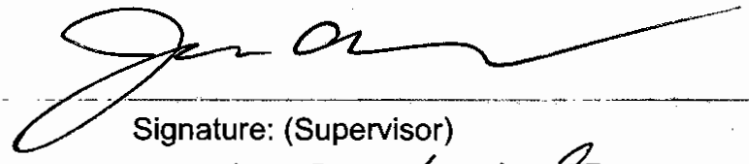
Not Applicable

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

SIGNATURES

Inspected By:	Signature: (Provincial Officer)
James Crumbie	
Reviewed & Approved By:	Signature: (Supervisor)
Craig Seabrook	Craig E. Seabrook
Review & Approval Date:	2016 - 10 - 11

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.

Stakeholder Appendix

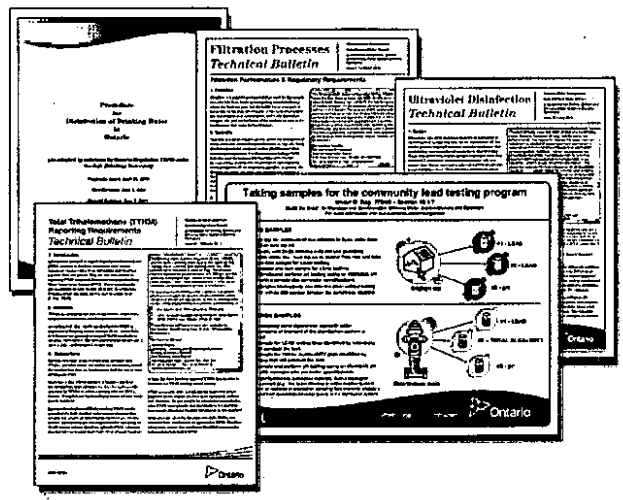
March 2015

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are available to help you operate your drinking water system. Below is a list of key materials owners and operators of municipal residential drinking water systems frequently use.

To access these materials online click on their titles in the table below or use your web browser to search for their titles. 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**.

For more information on Ontario's drinking water visit **www.ontario.ca/drinkingwater** and email **drinking.water@ontario.ca** to subscribe to drinking water news.



PUBLICATION TITLE	PUBLICATION NUMBER
Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils	7889e01
FORMS: Drinking Water System Profile Information, Laboratory Services Notification, Adverse Test Result Notification Form	7419e, 5387e, 4444e
Procedure for Disinfection of Drinking Water in Ontario	4448e01
Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids	7152e
Total Trihalomethane (TTHM) Reporting Requirements Technical Bulletin (February 2011)	8215e
Filtration Processes Technical Bulletin	7467
Ultraviolet Disinfection Technical Bulletin	7685
Guide for Applying for Drinking Water Works Permit Amendments, Licence Amendments, Licence Renewals and New System Applications	7014e01
Certification Guide for Operators and Water Quality Analysts	
Guide to Drinking Water Operator Training Requirements	9802e
Taking Samples for the Community Lead Testing Program	6560e01
Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption	7423e
Guide: Requesting Regulatory Relief from Lead Sampling Requirements	6610
Drinking Water System Contact List	7128e
Technical Support Document for Ontario Drinking Water Quality Standards	4449e01

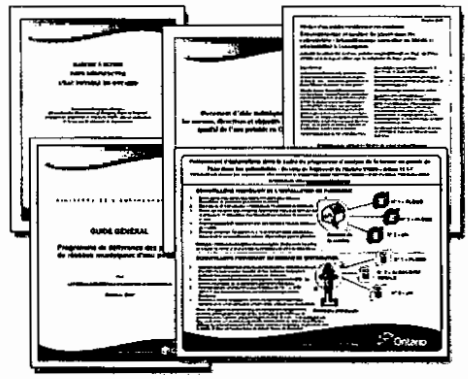
PIBS 8990b01

Ontario

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

De nombreux documents utiles peuvent vous aider à exploiter votre réseau d'eau potable. Vous trouverez ci-après une liste de documents que les propriétaires et exploitants de réseaux résidentiels municipaux d'eau potable utilisent fréquemment.

Pour accéder à ces documents en ligne, cliquez sur leur titre dans le tableau ci-dessous ou faites une recherche à l'aide de votre navigateur Web. Communiquez avec le Centre d'information au public au 1 800 565-4923 ou au 416 325-4000, ou encore à **picemail.moe@ontario.ca** si vous avez des questions ou besoin d'aide.



Pour plus de renseignements sur l'eau potable en Ontario, consultez le site **www.ontario.ca/eaupotable** ou envoyez un courriel à **drinking.water@ontario.ca** pour suivre l'information sur l'eau potable.

TITRE DE LA PUBLICATION	NUMÉRO DE PUBLICATION
Prendre soin de votre eau potable – Un guide destiné aux membres des conseils municipaux	7889f01
Renseignements sur le profil du réseau d'eau potable, Avis de demande de services de laboratoire, Formulaire de communication de résultats d'analyse insatisfaisants et du règlement des problèmes	7419f, 5387f, 4444f
Marche à suivre pour désinfecter l'eau potable en Ontario	4448f01
Strategies for Minimizing the Disinfection Products Thrihafomethanes and Haloacetic Acids (en anglais seulement)	7152e
Total Trihalomethane (TTHM) Reporting Requirements: Technical Bulletin (février 2011) (en anglais seulement)	8215e
Filtration Processes Technical Bulletin (en anglais seulement)	7467
Ultraviolet Disinfection Technical Bulletin (en anglais seulement)	7685
Guide de présentation d'une demande de modification du permis d'aménagement de station de production d'eau potable, de modification du permis de réseau municipal d'eau potable, de renouvellement du permis de réseau municipal d'eau potable et de permis pour un nouveau réseau	7014f01
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	
Guide sur les exigences relatives à la formation des exploitants de réseaux d'eau potable	9802f
Prélèvement d'échantillons dans le cadre du programme d'analyse de la teneur en plomb de l'eau dans les collectivités	6560f01
Échantillonnage et analyse du plomb dans les collectivités : échantillonnage normalisé ou réduit et admissibilité à l'exemption	7423f
Guide: Requesting Regulatory Relief from Lead Sampling Requirements (en anglais seulement)	6610
Liste des personnes-ressources du réseau d'eau potable	7128f
Document d'aide technique pour les normes, directives et objectifs associés à la qualité de l'eau potable en Ontario	4449f01

PIBS 8990b01

Ontario

MOE Audit Sample Results

Not Applicable

Provincial Officer's Report & Order

Not Applicable

Inspection Rating Record

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2016-2017)

DWS Name:	HUNTSVILLE (FAIRYVIEW) DRINKING WATER SYSTEM
DWS Number:	220002093
DWS Owner:	Muskoka, The Corporation Of The District Municipality Of
Municipal Location:	Huntsville
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	September 23, 2016
Ministry Office:	Barrie District

Maximum Question Rating: 467

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	0 / 64
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 28
Water Quality Monitoring	0 / 104
Reporting & Corrective Actions	0 / 66
Treatment Process Monitoring	0 / 133
TOTAL	**0 / 467**

Inspection Risk Rating	**0.00%**

FINAL INSPECTION RATING:	**100.00%**

Inspection Rating Record Generated On 11-OCT-16 (Inspection ID: 1-CLL1P).

Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2016-2017)

DWS Name:	HUNTSVILLE (FAIRYVIEW) DRINKING WATER SYSTEM
DWS Number:	220002093
DWS Owner:	Muskoka, The Corporation Of The District Municipality Of
Municipal Location:	Huntsville
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	September 23, 2016
Ministry Office:	Barrie District

Maximum Question Rating: 467

Inspection Risk Rating	**0.00%**

FINAL INSPECTION RATING:	**100.00%**

Inspection Rating Record Generated On 11-OCT-16 (Inspection ID: 1-CLL1P).