

CLARKE CRESCENT WELL PORT SYDNEY WATER SUMMARY 2016 REPORT



**DRINKING WATER WORKS PERMIT :
MUNICIPAL DRINKING WATER LICENCE:**

**143-204
143-104**

M.O.E. WATERWORKS#:

220005688

INTRODUCTION

The Clarke Crescent Well Water system in Port Sydney is owned and operated by the District of Muskoka and was originally constructed in 1984. It has a capacity of 90 cubic meters per day (m³/day), and the water system currently serves 34 homes.

The plant operates under licence 143-104 and permit 143-204 under the Municipal Drinking Water Licencing Program. The plant also presently operates under MOE Permit To Take Water #92-P-3015, expiring January 15, 2021 and which permits operation up to 90.92 m³/day.

The treatment system had significant improvements take place in 2004/2005. These upgrades include a filtration system and primary disinfection by Ultraviolet (UV) light. Secondary disinfection continues to be maintained by chlorination. Water is obtained from a drilled well located at 46 Clarke Crescent.

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
- Engineers 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.

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 Clarke Crescent Well Water System has a rated capacity of 90 m³/day. In 2016, the total monthly average flow was 33.4 m³/day, which represents 37% of the plant's design flow rate. The maximum day flow for the year was 40.7 m³/day, however, the 3 year average for

maximum day flow is 43.7 m³/day, which represents 49% of the design capacity (No problems have been associated with this flow). The District of Muskoka has initiated Bylaw #2003-31 during the summer months, imposing lawn-watering restrictions.

Monthly flows are shown in the attached table.

Summary of Analytical Results

A total of 266 microbiological regulatory tests were performed in 2016 and all were acceptable results. 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.

Summary of Treatment Chemicals

The following chemical is used for the treatment of drinking water at the Clarke Crescent Water Supply System:

Sodium Hypochlorite: Disinfectant

Documentation of System Repairs and Upgrades

No system upgrades or significant repairs were undertaken in 2016.

External Audits

MOE Inspection

A MOE inspection occurred September 23, 2016 and is attached to this report. The overall rating was 95.99%.

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.

CLARKE CRESCENT WATER DISTRIBUTION SUMMARY 2016

New Services

- No customers connected to existing water services in 2016.
- There were no new water services were installed 2016.

Broken Water mains

- There were no broken water mains in 2016.

Service Leaks

- There were no service leaks in 2016.

Frozen Services

- There were no frozen services in 2016.

New Water mains

- There were no new water mains installed in 2016.

Valve Replacement

- No valves were added, replaced or repaired in 2016.

Curb stops

- No curb stops were replaced or repaired in 2016.

Locates

- District staff addressed 5 locate requests 2016.



OPTIONAL ANNUAL REPORT TEMPLATE

Drinking-Water System Number:	220005688
Drinking-Water System Name:	Clarke Crescent Well Water Treatment System
Drinking-Water System Owner:	District Municipality of Muskoka
Drinking-Water System Category:	Small Municipal Residential
Period being reported:	January 01 to December 31, 2016

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

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.

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

Describe your Drinking-Water System

The Clarke well system services one subdivision consisting of 34 homes. The system was constructed in 1984. The system had significant upgrades in 2004/2005. The treatment process consists of disinfection by UV, chlorination and filtration. The rated water production capacity of this facility is 90 cubic meters per day. The water is obtained from a drilled well located at 46 Clarke Crescent.

List all water treatment chemicals used over this reporting period

Sodium Hypochlorite

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
June 3, 2016	Total Coliform	47	Count/100 ml	Resample	June 6, 2016
November 2, 2016	Total Coliform	1	Count/100 ml	Resample	November 4, 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	0-5	0	0
Treated	53	0	0-47	52	0-460
Distribution	161	0	0-1	83	0-460

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

	Number of Grab Samples	Range of Results (min #)-(max #)	Geometric Mean
Turbidity	8760	0.01-0.11	0.02 NTU
Chlorine	8760	1.29-1.74	1.49 mg/L
Fluoride (If the DWS provides fluoridation)	N/A		

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

*NOTE: Record the unit of measure if it is not milligrams per litre.
MDL = Method Detection Limit*

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

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure

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	21.5	ug/L	No
Boron	May 9/16	2	ug/L	No
Cadmium	May 9/16	0.005	ug/L	No
Chromium	May 9/16	0.50	ug/L	No
*Lead	May 9/16	-	ug/L	No
Mercury	May 9/16	0.01<MDL	ug/L	No
Selenium	May 9/16	0.13	ug/L	No
Sodium	May 9/16	38.3	mg/L	Yes
Uranium	May 9/16	0.057	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	1.75	mg/L	No
Nitrite	May 9/16	0.003<MDL	mg/L	No
Nitrate	May 9/16	1.83	mg/L	No
Nitrite	Aug 8/16	0.003<MDL	mg/L	No
Nitrate	Aug 8/16	1.68	mg/L	No
Nitrite	Nov 8/16	0.003<MDL	mg/L	No
Nitrate	Nov 8/16	1.69	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	0	N/A	N/A
Distribution	2	0.57– 0.75 ug/L	0

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	May 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	Annual Avg.	2.2	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

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 - Well - Port Sydney

Table 1: Treated Water Flow Summary - 2016

Month	Total Monthly (m ³)	Average Daily Flow (m ³ /d)	Peak Daily Flow (m ³ /d)	Minimum Daily Flow (m ³ /d)	Comments
January	962.4	31.0	36.1	28.3	
February	881.3	30.4	34.5	27.6	
March	923.5	29.8	33.4	26.5	
April	947.4	31.6	39.4	28.3	
May	1,051.0	33.9	38.7	30.8	
June	1,195.8	39.9	56.9	30.0	
July	1,144.6	36.9	46.1	30.5	
August	1,094.1	35.3	48.1	30.0	
September	939.4	32.4	42.6	29.6	
October	990.2	33.0	37.9	30.2	
November	964.6	32.2	35.4	29.4	
December	1,061.5	34.2	39.6	30.1	
		33.4	40.7	29.3	
Yearly Total	12,155.7				

District of Muskoka - Well - Clarke Crescent

Table 2: Raw Water Summary - 2016

Date	Alkalinity	Hardness	pH	Turbidity	Max	True Colour	Temp	Cond.		UV T%	LSI	Raw EC / TC Samples	Range
January	26	56	6.61	0.09	0.15	0	8.5	221.1		101.6	-2.2	4	0
February	25	56	6.58	0.16	0.19	0	8.6	236.1		98.2	-2.0	5	0
March	30	55	6.40	0.10	0.13	0	8.0	236.2		99.8	-2.4	4	0
April	29	52	6.45	0.17	0.26	0	8.2	241.7		100.5	-2.4	4	0
May	24	46	6.69	0.22	0.71	0	8.0	253.8		99.0	-1.9	4	0
June	22	43	6.35	0.12	0.18	0	8.1	261.7		100.3	-2.3	5	0
July	26	55	6.37	0.22	0.50	0	8.0	245.2		100.2	-2.6	4	0
August	24	46	6.33	0.31	0.99	0	8.1	256.5		99.8	-2.2	5	1
September	24	46	6.44	0.09	0.15	0	7.9	255.4		100.0	-2.5	4	5
October	29	48	6.49	0.07	0.08	0	8.5	257.1		98.2	-2.3	5	1
November	31	51	6.59	0.06	0.09	0	7.9	194.1		100.0	-2.2	4	0
December	29	49	6.47	0.06	0.08	14	7.5	240.0		99.7	-57.9	4	0
Average	26	50	6.48	0.14	0.29	1.2	8.1	241.6		99.8	-6.9	52	1

District of Muskoka - Well - Clarke Crescent

Table 3: Treated Water Summary - 2016

Date	Free Cl2 Residual	Total Cl2 Residual	Alkalinity	Hardness	pH	Turbidity	Max	True Colour	Temp	Cond.	UV T%	LSI	Treated EC/TC Samples	Range	Treated HPC Samples	Range
January	1.74	1.84	30	61	6.47	0.07	0.09	0	8.4	240.0	101.4	-2.3	4	0	4	0
February	1.61	1.73	33	57	6.43	0.08	0.11	0	8.6	254.7	99.5	-2.1	5	0	5	0
March	1.50	1.70	34	55	6.30	0.07	0.09	0	8.3	242.6	100.2	-2.5	4	0	4	0
April	1.37	1.60	39	55	6.47	0.08	0.10	0	8.2	253.5	100.5	-2.2	4	0	4	0
May	1.29	1.48	26	48	6.64	0.08	0.11	0	8.4	262.0	99.7	-2.1	4	0	4	0
June	1.41	1.57	25	54	6.40	0.07	0.08	0	8.9	281.7	100.9	-2.4	5	0	4	0
July	1.45	1.70	28	54	6.40	0.06	0.07	0	8.8	257.9	100.5	-2.4	4	0	4	0
August	1.57	1.73	29	46	6.37	0.06	0.07	0	9.2	271.6	99.9	-2.6	5	0	5	1
September	1.33	1.45	29	47	6.55	0.07	0.07	0	8.9	275.9	100.3	-2.3	4	0	4	1
October	1.42	1.57	30	55	6.58	0.05	0.06	0	9.1	265.5	98.4	-2.2	5	0	5	460
November	1.41	1.62	29	56	6.66	0.06	0.10	0	8.5	166.5	100.0	-2.1	4	0	4	1
December	1.44	1.65	30	50	6.58	0.07	0.09	0	8.1	253.9	99.3	-23.1	4	0	4	0
Average	1.46	1.64	30	53	6.49	0.07	0.09	0	8.6	252.1	100.0	-4.0	4	0	4	39

Ministry of the Environment and
Climate Change

Safe Drinking Water
Branch

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

Ministère de l'Environnement

Direction du contrôle de la qualité de l'eau
potable

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



October 3, 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
Port Sydney (Clarke Well) Drinking Water System (DWS#220005688)
Date of MOECC inspection: September 23, 2016**

Please find enclosed the Ministry of the Environment and Climate Change's 2016 Inspection Report for the Port Sydney (Clarke Well) Drinking Water System (DWS#220005688), following an inspection of the water treatment plant and distribution system on September 23, 2016.

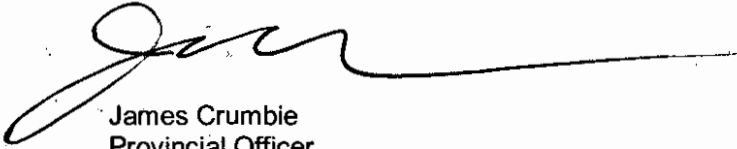
The primary focus of this inspection was to confirm compliance with Ministry of the Environment and Climate Change legislation and control documents, as well as conformance with Ministry drinking water related policies for the inspection period. The Ministry is implementing a rigorous and comprehensive 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



Ontario

Ministry of the Environment and Climate Change

**PORT SYDNEY (CLARKE WELL) DRINKING WATER SYSTEM
Inspection Report**

Site Number:	220005688
Inspection Number:	1-CLLA1
Date of Inspection:	Sep 23, 2016
Inspected By:	James Crumbie

OWNER INFORMATION:

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

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:	PORT SYDNEY (CLARKE WELL) DRINKING WATER SYSTEM
Site Address:	40 CLARKE CRES PORT SYDNEY P0B 1L0
County/District:	Huntsville
MOECC District/Area Office:	Barrie District
Health Unit:	SIMCOE MUSKOKA DISTRICT HEALTH UNIT
Conservation Authority:	
MNR Office:	
Category:	Small Municipal Residential
Site Number:	220005688
Inspection Type:	Announced
Inspection Number:	1-CLLA1
Date of Inspection:	Sep 23, 2016
Date of Previous Inspection:	Oct 08, 2015

COMPONENTS DESCRIPTION

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

Site (Name):	RAW WELL 1	Sub Type:	Other
Type:	Other		

Comments:

Well 1 (non-potable fire supply) consists of a 50 mm diameter steel casing within a precast concrete casing extending to a depth of 5.2 m with a 1.5 kW (3,450 rpm) submersible well water pump having a rated capacity of 3.1 L/s complete with piping and valves for filling the on-site, non-potable fire storage tank. This concrete, 9 m³ underground fire storage tank is used to refill depleted fire tanker trucks in emergency situations and is equipped with float switches for well pump operation.

This well was reportedly drilled in 1976 and was provided a withdrawal rate of 204 l/min under the now revoked Permit to Take Water (PTTW) 78-P-3051.

This well is located approximately 4 m from the WTP, 5 m from the water course and 7 m from Well 2. The surrounding land slopes away from the well towards the creek.

Site (Name): RAW WELL 2**Type:** Other**Sub Type:** GUDI**Comments:**

Well 2 (production well) consists of a 200 mm diameter steel casing extending to a depth of 12.2 m with a stick up above grade of approximately 66 cm and a stainless steel screen with 0.2 mm slot size to a depth of 18.9 m. The well was drilled in 1982 (Water Well Record 4202750). A 2.24 kW (3,450 rpm) submersible well water pump with a rated capacity of 3.15 L/s is installed within the well which discharges to the water treatment plant (WTP) through a pitless adaptor. The well is also equipped with 50 mm diameter discharge piping and a continuously monitored magnetic flow meter, valves and an electronic level monitoring system within the WTP. A hydraulic flow control valve regulates the instantaneous water taking to less than 204.5 L/min.

A vented, screened, vermin proof cap is securely attached to the top of the casing.

The well is located approximately 3 m from the WTP, 7 m from Well 1, and 2 m from the adjacent water course.

The surrounding area appears to slope to the south (towards the creek).

Site (Name): TREATED WATER**Type:** Source**Sub Type:****Comments:****Clarke Crescent Well Pumphouse**

A 5.1 m x 7.5 m concrete block pumphouse with exterior wood paneling is located at 46 Clarke Crescent, Port Sydney in the District Municipality of Muskoka. The pumphouse contains water treatment equipment consisting of chlorination, cartridge filtration, and ultraviolet (UV) lights for primary and/or secondary disinfection.

Water enters the pumphouse by way of a 50 mm diameter line from the well, passes a raw water sample tap, a pressure gauge, a hydraulic flow control valve regulating flows to less than 204.5 L/min, a continuously monitored magnetic flow meter, a pressure gauge and two valved chlorine injection points.

The sodium hypochlorite disinfection system consists of a contained, 100 L sodium hypochlorite solution storage tank with alarmed weigh scale, two peristaltic metering pumps (duty, standby) each equipped with individual lines, valves, and integrated flow sensors.

After the chlorine injection points, water can be directed to the two individually lined and valved cartridge filters (typical), or to the filter bypass line (normally valved closed).

The filtration system consists of two cartridge filters (duty, standby) each rated at 204.5 L/min and equipped with 1 micron (um) cartridge filters. Inlet and outlet lines are valved for isolation and maintenance. The common filter effluent line is equipped with a continuously monitored and alarmed pressure differential sensor. This line rejoins the filter bypass line, passes a pressure gauge and directs water to the two, individually valved and lined ultraviolet (UV) disinfection units. A sampling line comes off the common filter effluent line and leads to a continuously monitored and alarmed turbidity analyzer.

The UV disinfection system consists of two primary UV disinfection reactors (duty, standby) each with a light flux density of at least 40 mJ/cm² throughout the lamp lifetime. The lights are capable of handling a peak flow rate of 204.5 L/min and are equipped with an online UV intensity monitor with alarm, continuous alarmed dosage calculation and monitoring, manual cleaning mechanism, automatic switch-over capabilities, flow control valves on discharge, and associated controls and alarms. The common discharge line empties into the clearwell, where a continuously monitored and alarmed chlorine analyzer has been installed to measure the chlorine residual in the water at the head of the clearwell.

The clearwell consists of a 3.62 m x 1.93 m x 2.1 m, 10.83 m³ volume precast concrete underground tank that is equipped with four internal baffling curtains providing an effective detention time of 18 minutes at the maximum high lift pump flow rate. There is a continuously monitored and alarmed level sensor installed and a 100 mm diameter PVC screened vent which protrudes through the pumphouse wall. Two high lift pumps (HLP's) draw from this tank and direct treated water to the distribution system.

The two (duty, standby) centrifugal, 5.6 kW (3,500 rpm) HLP's, each rated at 432m³/day at 61m total dynamic head (TDH) and equipped with valves and back flow prevention, direct treated water past six individually valved, 135 L hydropneumatic tanks for system pressure maintenance between 433 and 690 kPa and storage, a continuously

monitored and alarmed finished water turbidity analyser, a continuously monitored and alarmed finished water free chlorine residual analyser, a domestic water supply line with backflow prevention and pressure gauge, a continuously monitored discharge pressure transmitter for HLP pump control, a continuously monitored magnetic flow meter, a sample line and a valve before water is discharged to the distribution system.

The on-site programmable logic controller (PLC), monitors and controls all of the equipment, registers alarm states and continuously communicates with the supervisory control and data acquisition system (SCADA) at the Huntsville Water Treatment Plant (WTP). Any generated alarms are first generated through the autodialer in the pumphouse. After a 20 minute delay, alarms are also routed through the autodialer at Huntsville as a backup. Automatic and manual control of the equipment is maintained through Huntsville. Manual over-rides can be achieved at the site. A permanent standby diesel generator set is located at the Clarke Crescent Well Pumping Station. It provides power to the facility by way of an external plug. The permanent, steel encased, 50 kW standby diesel generator with automatic start and stop capability, and internal fuel tank has been positioned outside the pumphouse, in an adjacent structure.

Site (Name): DISTRIBUTION (WATER INSPECTION)

Type: Other

Sub Type:

Comments:

The Port Sydney water system, built in 1984, services one subdivision consisting of approximately 35 homes or approximately 91 persons. There are three sampling stations installed on potential dead ends, where all distribution sampling is performed.

There is approximately 1100 m of polyvinyl chloride (PVC) watermain installed with six valves. There are no hydrants.

There are no commercial, industrial, institutional or agricultural users on this system. There are no known designated facilities served by this system.

INSPECTION SUMMARY:

Introduction

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

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

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

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

The Port Sydney (Clarke Well) drinking water system serves the residential subdivision that has been developed in the community of Port Sydney. It is located within the Town of Huntsville boundary, in the District Municipality of Muskoka. Port Sydney is situated along the east side of Provincial Highway 11, at the south west end of Mary Lake. The drinking water system services a residential development consisting of 35 private residences, and an estimated population of 91 persons. There are presently no plans to expand the development. The Port Sydney (Clarke Well) 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.

The drinking water system obtains water from a single 18.9 m deep, drilled production well, Well 2 (Clarke Well), which is considered to be Groundwater Under the Direct Influence of surface water (GUDI). The Port Sydney (Clarke Well) drinking water treatment process consists of cartridge filtration and a combination of both UV disinfection and chlorination, with effective chlorine contact time, for primary disinfection purposes. The Port Sydney (Clarke Well) drinking water system is rated to treat up to 90.92 cubic meters of water per day. The drinking water system was originally commissioned in 1984, with significant upgrades to the works being undertaken in 2004/2005.

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

Operation of the Port Sydney (Clarke Well) drinking water system is authorized under Municipal Drinking Water Licence #143-104 (Licence) and Drinking Water Works Permit 143-204 (Permit) which were originally issued to the Municipality, respectively as Licence Issue#1 on October 14, 2010, and Permit Issue#1 on 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.

The groundwater takings from Well 2, the Clarke Well, are permitted in accordance with Permit to Take Water (PTTW) #5134-8FNR64 issued April 12, 2011. The PTTW allows the Municipality to take a maximum of 90920 Litres per day (L/d) from the Clarke Well at a rate not exceeding 205 Litres per minute (L/min). The PTTW expires

Introduction

on January 15, 2021. Compliance with the PTTW was not assessed during the course of this inspection; however, the Municipality is aware that water takings must be done in accordance with the conditions of a valid PTTW. The Port Sydney (Clarke Well) Drinking Water System was last inspected by the Ministry on October 8, 2015. Findings associated with that 2015/2016 inspection were detailed in Inspection Report # 1-BYLMF, issued to the Municipality on October 26, 2015.

The September 23, 2016 inspection, to which this inspection report pertains, encompasses an inspection review period between October 8, 2015 and September 23, 2016. This 2016/2017 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.

Source

- **The owner was maintaining the production well(s) in a manner sufficient to prevent entry into the well of surface water and other foreign materials.**

Paragraph 1-2 (1)(1) of Schedule 1, O.Reg.170/03 requires the Owner and Operating Authority of a small municipal residential drinking water system to ensure that any well used as a raw water supply is constructed and maintained to prevent surface water and other foreign materials from entering the well. It is critical that the integrity of the aquifer be protected from contamination by surface water or other foreign material.

As previously discussed, the Port Sydney (Clarke Well) Drinking Water System obtains water from a single 18.9m deep drilled production well, Well 2 (Clarke Well), which is considered to be Groundwater Under the Direct Influence of surface water (GUDI). An initial hydrogeologic assessment conducted in conjunction with the preparation of the First Engineers Report in 2001, suggested that the source water may not be GUDI based on chemical, microbiological and physical water quality characteristics. However, given that the well is situated in close proximity to surface water sources, the Municipality decided not to conduct further assessments and have determined to treat the well as GUDI water source.

Although the well is considered to be GUDI, the Municipality does appear to be maintaining the well in such a manner that would prevent the direct entry of surface water and foreign materials into the well, and the weekly raw well water samples collected over this inspection review period did not suggest any significant contamination issues.

The production well was constructed in 1982 by C. Marshall and Sons Well Drilling of Emsdale, Ontario. The well was reportedly drilled to a depth of 60 feet (18.9 metres). The 200mm diameter steel well casing extends approximately 66cm above adjacent grade and, according to the water well construction record (4202750), the well casing continues to a depth of 12.8 metres. A 171mm diameter telescopic steel screen extends down from within the casing at a depth of 12.2 metres to the bottom of the well, 18.9m. There is no information on the well record of the plugging and sealing details for the well, however there is no indication of subsidence adjacent to the casing which would suggest that the annular space is sufficiently sealed.

The top of the well's casing is sealed with a vermin-proof well cap with a screened vent. The ground area around the well is graded in such a way as to ensure that water does not collect or pond in the vicinity of the well. On the date of the physical inspection, there were no obvious visible sources, or potential sources, of pollution within eyesight of the general area of the source well. Privately owned homes and woodlands make up this small development. The homes are all equipped with septic systems. There was no evidence of industrial, agricultural or other potentially polluting activities around the well at the time of inspection.

There is a second well, Well 1, constructed on the property. Well 1 is reported to consist of a 50 mm diameter well point installed to a depth of 17.7m which yields an artesian flow in the range of 6 imperial gallons per minute. The well point casing is reportedly finished below grade within concrete well crocks which were installed to a depth of 5.2 m. The well crocks provide water storage for the well. A submersible pump is installed within the well crocks and is used to pump water via a 50mm diameter raw watermain to a 9 m³ in-ground emergency fire reservoir located at the street line on the pumphouse property. Well 1 is located approximately 7 m west of the production well, Well 2 (Clarke Well). Well 1 is not a production well, and is not connected to the regulated drinking water system. The concrete crocks are finished greater than a 40 cm above grade and has a locked access hatch. Both the production well, Well2, and the non-potable well emergency fire well, Well 1, are accessible for cleaning,

Source

treatment, repair, testing, inspection and visual examination.

The Municipality conducts regular inspections of the above grade components of the production well. Below grade inspections of the production well are also scheduled to be conducted by a licensed technician every ten years, or when water quality results warrant further investigation. As discussed in more detail in the following section of this inspection report, the Municipality retained Lotowater Technical Services Inc. in May 2015 to conduct a video inspection of the production well's casing and an evaluation of the well's performance. Lotowater reported on those findings in a well inspection report, dated June 18, 2015.

- **Measures were in place to protect the groundwater and/or GUDI source in accordance with any the Municipal Drinking Water Licence and Drinking Water Works Permit issued under Part V of the SDWA.**

Condition 16, Schedule B of the Licence requires the Port Sydney (Clarke Well) Drinking Water System operations and maintenance manual to include:

- an inspection schedule for all wells associated with the water treatment system, including all production wells, standby wells, test wells and monitoring wells;
- defined well inspection and maintenance procedures for the entire well structure of each well, including all above and below grade well components; and
- remedial action plans to be implemented where inspection indicates non-compliance with respect to regulatory requirements and/or risk to the raw water quality.

To satisfy these conditions, the Municipality has incorporated a Well Inspection and Maintenance Plan for the drinking water system within the operations and maintenance manual. The Plan includes bi-annual (every 6 months) inspections of the above ground components of the well. Below grade video inspections of the wells are also scheduled to be conducted by a licensed technician every ten years, or when water quality/quantity results warrant further investigation.

In May 2015, Lotowater Technical Services Inc. was retained to conduct a video inspection of the well casing and an evaluation of the well's performance and reported on those findings in a well inspection report on June 18, 2015. According to the Lotowater report, there were no structural deficiencies identified, however the well screen was found to be severely fouled near the top and lightly fouled near the bottom of the well, and although the well performance was found to be satisfactory, Lotowater, suggested that the screen fouling may be impacting on the well yield. In addition, the video inspection identified a significant amount of large encrustations on the well casing, and it was recommended that the casing and screen be mechanically cleaned to dislodge the build-up identified, to improve on well yield. It was further recommended that, following the cleaning, another video inspection and casing thickness evaluation be completed to again assess the structural integrity of the well casing below 7.5m. The Lotowater report indicated that this work would require the well to be taken off-line for two to three days and require the need for an alternate supply of water (hailed water) during the process. The Municipality, in response to the Lotowater Report, continues to monitor well yield and given the current trends do not anticipate having to perform the cleaning work until 2017, at the earliest.

The well pump, checkvalve and pitless adapter were reportedly last replaced in December 2012.

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 Municipality 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.

To comply with this condition, the Municipality has installed flow meters to measure the raw water flow and the treated water flow entering the distribution system.

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

Capacity Assessment

purposes.

All flow measuring devices were most recently calibrated on October 28, 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 Port Sydney (Clarke Well) drinking water treatment pumphouse to the distribution system shall not exceed 90.92 cubic metres per day (m³/day). Each of the cartridge filters and the UV disinfection units are also described as being capable of treating water at a rate of 204.5 Litres per minute (L/min.)

In 2015 the maximum day demand occurred on November 12, 2015 when a total daily flow of 53.2m³ or 58% of the rated capacity was noted to have occurred as a result of flushing in response to an adverse water quality incident. The average day demand for 2015 was reported to be approximately 32.4m³/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 June 19, 2016 when a total daily flow of 56.87m³ or 63% of the rated capacity was noted to have occurred. The average day demand for this same period is reported to be approximately 32.1m³/d or 35% of the plant rated capacity.

During water production, the rate of flow into the treatment system is governed by valving installed on the raw water well header upstream of the cartridge filters. The SCADA system is also configured to initiate an alarm if the raw water flow rate exceeds 204.5L/min or the daily volume exceeds 90.92m³, to ensure PTTW conditions are adhered to.

A review of records made during this inspection review period indicates that the Port Sydney (Clarke Well) drinking water system was not operated to exceed the plant rated capacity set out in the Licence. Similarly, records indicate that the filters and UV disinfection units were not operated in excess of their design capacities during the production of water.

Treatment Processes

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

A review of the equipment installed at the Port Sydney (Clarke Well) pumphouse was referenced and found to compare favourably to the equipment listed in the Permit issued for the Port Sydney (Clarke Well) Drinking Water System, and the Form 2 Records of Minor Modifications or Replacements which have been prepared for the drinking water system.

As discussed in the following section of this inspection report, the Municipality prepared two separate Form 2 Records of Modification or Replacement documents during this inspection review period, to support alterations which occurred to improve on operations at the plant. These minor alterations did not require the submission of a Directors Notification Form.

There were reportedly no watermain additions or modifications to necessitate the completion of any Form 1 documents nor were there reportedly any minor modifications undertaken or additions made which required the completion of any Form 3 documents, during this inspection review period.

- **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, the Municipality prepared Form 2 Records of Modification or Replacement forms, to support alterations which occurred to improve on operations at the plant. Specifically, Form 2 Records were prepared on April 22, 2016 following the replacement of the continuous treated water turbidimeter with a new HACH 1720E model; the addition of a new continuous free chlorine residual analyser at the head of, and submerged within the head of the chlorine contact clearwell; and, the replacement of the diaphragm metering pumps with two new peristaltic chemical metering pumps. The additional chlorine residual analyzer installed within the clearwell, is linked to SCADA for trending and alarming purposes, and allows operational staff to be alerted of,

Treatment Processes

and respond to, any chlorine dosage issues that may occur prior to those dosage issues impacting on the CT provisions. The replacement of the diaphragm chemical metering pumps with peristaltic metering pumps, which are likewise capable of dosing at a rate of 0.59L/hr, was intended to lessen the potential for chlorine dosage issues which had historically arisen from the diaphragm pumps becoming air-locked. The alterations were implemented in response to, and with the intent of preventing similar, adverse water quality incidents, which are discussed in more detail in later sections of this inspection report.

- **Records did not indicate 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.**

The Port Sydney (Clarke Well) drinking water system uses a combination of cartridge filtration, UV irradiation and chlorination. Although filtration is required for the GUDI water supply, the cartridge filtration process is not, according to the Licence, assigned any log removal/inactivation credits, and the credits are to be met through the combination of UV irradiation and chlorine disinfection.

UV irradiation is acceptable as a primary disinfection process, provided that a UV pass through dose of at least 40 J/cm² is maintained throughout the life time of the lamp, and the UV equipment is validated to meet ANSI/NSF Standard 55 Class A or an equivalent standard.

The Trojan UV Swift units installed have been bioassay validated (DVGW) to be capable of delivering a UV dose of 40mJ/cm², at a minimum 90% UVT and the plant rated capacity of 204.5 L/min. The UV units are each equipped with UV intensity sensors, cleaning systems, alarms and controls. The UV units operate in a duty/standby mode, and are configured to trigger an alarm and automatically switch over to the standby unit in the event UV intensity falls below 23.5W/m², the minimum UV intensity required to ensure the required UV pass through dose. Where a complete UV system failure occurs, the well pump is locked out and actuated valves are closed, preventing improperly disinfected water from being conveyed further into the treatment train.

Condition 1.6, Schedule C of the Licence, requires the Municipality to ensure the continuous monitoring (every 5 minutes) of the flow rate through the UV unit, the UV intensity and the UV lamp status. UVT is also required to be tested (grab sample) once each week. UV records are trended on SCADA, and records reviewed for this inspection period indicate that the UV units operated as designed when water was being produced. Operational staff measured the filtered water UVT once each week, and results were typically 90% or more.

The UV Disinfection process is credited with 2-log inactivation of Crypto, 2.5-log inactivation of Giardia and 2-log inactivation of viruses.

To achieve the remaining 0.5-log Giardia and 2-log Virus inactivation, a free available chlorine residual chemical disinfection system is utilized, through addition of sodium hypochlorite, and the CT disinfection concept is used to quantify the capability of the disinfection system for primary disinfection purposes. The effective chlorine contact time required for the CT concept is afforded by maintaining a minimum operating level (0.6m) in the baffled clearwell. The clearwell fill cycle is configured to begin filling at 1.35m and an alarm is initiated if the reservoir level falls below 1.15m. The high lift pumps will lockout if the reservoir level is below 0.7m. The system is operated to target a free chlorine residual of 1.20 to 1.30 mg/L. The post chlorine contact clearwell chlorine analyzer used for primary disinfection monitoring, is configured to trigger an alarm in the event the free chlorine residual falls below 1.15mg/L. Should the free chlorine residual fall below 0.85mg/L, the well pump will shut down, ceasing water production until operational staff respond to the site and resolve any issues. The analyzer installed within and at the head of the chlorine contact clearwell is configured to alarm if the chlorine residual in the water being directed into the clearwell is below 0.8mg/L and will shut down the well pump if the residual is below 0.6mg/L, alerting operational staff of a chlorine dosage issue prior to un-chlorinated water being directed to the clearwell.

With the exception of an incident which occurred on November 12, 2015, records reviewed indicate that the system was operated to achieve the necessary UV dosages and CT requirements for primary disinfection purposes during this inspection review period.

On November 12, 2015, operational staff responded to a low chlorine alarm. The chlorine residual, at that time, was only continuously monitored, after the provided chlorine contact time. The residual had dropped below 0.85mg/L and the well pump had shut down. A leak was identified in the chlorine injection line resulting in low

Treatment Processes

chlorine dosage. The injection line was repaired, and flushing commenced until the chlorine residuals were restored to 1.60mg/L in the clearwell and 1.0mg/L throughout the distribution system. During flushing, the chlorine residual dropped as low as 0.22mg/L for a short duration. Although this residual still provided the CT for 2-Log Virus inactivation, the residual may not have provided the CT necessary for 0.5-Log Giardia inactivation. Given that the filters continued to produce filtered water turbidity less than 0.1NTU and the UV disinfection system operated as designed, during the event, it is likely that a sufficient level of treatment continued to be provided. Nonetheless, as required, the Municipality made all of the required notifications regarding the event, and the Simcoe Muskoka District Health Unit was satisfied with the corrective actions undertaken. To prevent similar occurrences, the Municipality has also added a chlorine analyzer at the head of the clearwell to alert operators of any dosage issues in advance of any adverse conditions.

- **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, free available chlorine residual is maintained out and into the distribution system for secondary disinfection purposes to reduce the potential for microbial re-growth within the distribution system, and in accordance with section 1-5 of Schedule 1, O.Reg.170/03. The Port Sydney (Clarke Well) water treatment system is designed to target a free chlorine residual of approximately 1.20 to 1.30mg/L at the point of entry into the distribution system which should ensure a minimum free chlorine residual of 0.2mg/L is maintained throughout the distribution system as is recommended in the Ministry's Procedure for Disinfection. The free chlorine residual analyzer installed on the high lift pump discharge header is configured to initiate an alarm notification if the free available chlorine residual drops below 1.15mg/L, and the well pump will shut down if chlorine residual drops below 0.85mg/L. The free chlorine residual concentrations within the distribution system are measured at one location each day, Monday through Friday. In addition, chlorine residuals are also measured in conjunction with microbiological sampling and maintenance activities throughout the distribution system.

Records indicate that free chlorine residuals were maintained above the 0.2mg/L throughout the distribution system during this inspection review period; and, there were no records which indicated free chlorine residuals less than 0.05 mg/L at any time during the inspection review period. The recorded distribution system free chlorine residual concentrations ranged between 0.92mg/L and 2.14mg/L.

- **The primary disinfection equipment was equipped with alarms or shut-off mechanisms that satisfied the standards described in Section 1-6 (1) of Schedule 1 of Ontario Regulation 170/03.**

As previously discussed, the Municipality has installed two Trojan UVSwift irradiation units intended for primary disinfection purposes. Condition 1.6, Schedule C of the Licence requires the Municipality to operate the UV disinfection equipment such that a continuous pass-through UV dose of 40 mJ/cm² is maintained throughout the life time of the UV Lamps. The UV disinfection units have been bioassay validated, and are certified (DVGW) to be capable of delivering a UV dose of 40mJ/cm², at a minimum 90% UV transmittance (UVT) and the plant rated capacity of 204.5 L/min. The UV units are each equipped with UV intensity sensors, cleaning systems, alarms and controls. The UV units operate in a duty standby mode, and are configured to trigger an alarm and automatically switch over to the standby unit in the event there is a problem that results in an alarm condition on the duty UV unit. The system operation is managed by the Programmable Logic Controller(PLC). Water is not capable of passing through the alternate UV unit until a signal indicating that the required intensity of the lamp is reached. The system configuration is designed to also shut down the well pump operation and it remains inoperable until the UV unit returns to normal operation. The design is configured in this manner so as to help prevent any chance of having improperly disinfected water from entering the distribution system.

The alarms and automatic switchover mechanisms are tested in conjunction with the diesel generator tests every month.

Treatment Processes

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 monitoring point is located following the baffled clearwell, off of the high-lift pump distribution header, a location where the intended CT has been achieved. The chlorine analyser 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.**

Although filtration is required for the GUDI water supply, the cartridge filtration process is not, according to the Licence, assigned any log removal/inactivation credits. It is however acknowledged that the cartridge filtration process may still meet the criteria set out in the Procedure to be eligible for removal credits. Specifically, section 3.4.5 of the Procedure indicates that cartridge filtration may be eligible to claim removal credits if the process: uses filter elements that are ANSI/NSF Standard (NSF) 53 certified, or equivalent; ensures that differential pressures across the filter medium do not exceed NSF 61 or manufacturer's ratings; continuously monitors filtrate turbidity; and, meets the filtrate turbidity criterion of less than or equal to 0.2NTU.

With respect to the cartridge filtration process at Port Sydney, the Municipality continuously monitors filtrate turbidity and the results are trended on SCADA every ten seconds. An alarm notification occurs if filtrate turbidity exceeds 0.3NTU and the well pump will shut down if turbidity exceeds 0.90NTU. Pressure differential are also monitored through SCADA and SCADA is configured to initiate an alarm if pressure differential exceeds 25 psi, as per the manufacturer's recommendations. Only one filter is used at a time (duty/standby) and the filter units cannot change over automatically. Documentation is also available to suggest that the Harmsco (PP-HC-170-1) one micron absolute filters being used, have been certified to a NSF 53 equivalent.

Records reviewed, indicate that turbidity concentrations were consistently below 0.2NTU during this inspection review period. There was one proactive notification made regarding filtrate turbidity on December 17, 2015, when the continuous monitoring equipment indicated turbidity greater than 1.0NTU and the results were trended on SCADA. However, the issue was related to an analyzer malfunction, and the results were not indicative of the actual filtrate turbidity, which remained below 1.0 NTU. The analyzer issue was rectified and the analyzer was verified to a secondary standard. The Municipality made proactive notifications regarding the event (AWQI#127753) to the Ministry and the SMDHU, and the SMDHU was satisfied with the corrective actions taken.
- **The secondary disinfectant residual was measured as required for the distribution system.**

Subsection 7-2 (5) of Schedule 7, O.Reg.170/03 requires the Owner of a small municipal residential system that provides secondary disinfection to ensure that at least two distribution samples are collected each week, at least 48 hours apart, but within the same week, and those samples be tested immediately for free available chlorine residual.

Records provided for review indicate that the Municipality has ensured that at least two samples were collected each week, at least 48 hours apart, from within the distribution (plumbing) system and tested for free available chlorine residual. Typically, operational staff test the free chlorine residual for secondary disinfection monitoring purposes on Mondays and Thursdays of each week. Chlorine residual concentrations are also being assessed at the three distribution sample stations in conjunction with the weekly microbiological sample day, typically on Mondays.

During this inspection review period the recorded distribution system free chlorine residual concentrations ranged between 0.92mg/L and 2.14mg/L.
- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**

Treatment Process Monitoring

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

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

- **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 monitoring equipment is used to assess ultraviolet disinfection performance, turbidity, and chlorine residual concentrations. Primary disinfection is provided through a combination of ultraviolet irradiation(UV) and chlorination. With respect to ultraviolet irradiation, one unit operates as the duty unit at a given time. Should there be an inadequate UV dose or intensity detected, automatically, the unit shuts down and transfers to the standby unit. When this occurs, it also results in a shut-down of the well pump to help prevent any improperly disinfected water from potentially entering the distribution system.

The primary disinfection chlorine residual concentration is monitored on the discharge header, after the clearwell. The low alarm set point for this analyzer is set at 1.15mg/L, with a second low/low alarm set point of 0.85mg/L. The high alarm set point and the high/high set point are both set to alarm at 2.00mg/L. Should the analyzer reach the low/low set point, it will result in a shut-down of the production well.

A pre-chlorine contact analyzer installed within the head of the clearwell, monitors the chlorinated water entering the clearwell for operational purposes and to confirm sufficient chlorine dosage is occurring. The low alarm set point for this analyzer is set at 0.8mg/L, with a second low/low alarm set point of 0.60mg/L. Should the analyzer reach the low/low set point, it will result in a shut-down of the production well.

Filter turbidity is monitored continuously, post filter. At the time of inspection, a high alarm set point was set at 0.3 NTU with a second high/high alarm set point of 0.9 NTU. Should the turbidity reach the high/ high alarm set point, it will result in a shut-down of the production well.

The Licence sets out specific UV related monitoring requirements as well as Sensor Checks and Calibration requirements, which are discussed in more detail in a later section of this inspection report.

- **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 Ontario Regulation 170/03 outlines the recording frequency requirements for continuous on line analysers. It requires that the free chlorine for primary disinfection be tested and recorded with a minimum frequency of every five minutes. Turbidity monitoring must be performed with a minimum frequency of at least once every fifteen minutes.

The chlorine residual is being recorded in milligrams per litre(mg/L) and the turbidity is being recorded in Nephelometric Turbidity Units(NTU). Complying with the frequency requirements, continuous monitoring data is recorded and trended on the SCADA system at ten second intervals.

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

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.

Treatment Process Monitoring

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 occurs 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.

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.

Schedule E of the Licence also sets out UV Sensor Checks and Calibration requirements, which are discussed in more detail in a later section of this inspection report.

Operations Manuals

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

An operations and maintenance manual has been created and is available on-site for the utility operator's use at the water treatment plant. The manual and contingency plans were last reviewed in August 2015, and the contents of the manuals appear to be sufficient, enabling staff to safely operate the drinking water system. 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, and 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; and the validated operating conditions for UV disinfection equipment, including a copy of the validation certificate.
- 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.
- an inspection schedule for all wells associated with the drinking water system, including all production wells, standby wells, test wells and monitoring wells;
- Well inspection and maintenance procedures for the entire well structure of each well including all above and below grade well components; and
- remedial action plans for situations where an inspection indicates non-compliance with respect to regulatory requirements and/or risk to raw well water quality.

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

Operations Manuals

topics sufficiently, providing the utility operators enough information to effectively operate the drinking water system.

In review of the information contained in the Operations Manual and provided for this inspection, all of the information would appear to be available to satisfy this condition. A copy of the UV validation certificate is available in the manual as are directives regarding the UV Sensor checks and calibrations required by Schedule E of the Licence. 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.

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 at the Port Sydney (Clarke Well) drinking water system include locked access doors, security alarms, locked distribution sample hydrants. Security alarms have been linked to the SCADA system. There were no incidents of damage or vandalism to the Port Sydney (Clarke Well) drinking water system reported during the inspection review period.

Certification and Training

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

In accordance with Ontario Regulation 128/04 (Certification of Drinking Water System Operators and Water Quality Analysts) made under the SDWA, the "Port Sydney Clarke Crescent Water Treatment Plant" is classified as a Class 1 Water Treatment Subsystem (#3664, dated September 6, 2005), while the "Port Sydney Clarke Crescent Water Distribution System" is classified as a Class 1 Water Distribution Subsystem (#3287, dated September 6, 2005).

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

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

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

The Municipality has designated the operators who possess the appropriate level of certification to act as Operator-

Certification and Training

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 prescribed by legislation were being met.**

Subsection 11-2(1) of Schedule 11, O.Reg.170/03 requires the Owner and the operating authority of a small municipal residential drinking water system to ensure that at least one distribution sample is taken every two weeks, if the system provides treatment equipment in accordance with Schedule 2 and the equipment is operated in accordance with that Schedule, as is the case for the Port Sydney (Clarke Well) drinking water system. Subsection 11-2(2) further stipulates that each of the distribution samples collected are tested for E.Coli, total coliforms and general bacteria population expressed as colony counts on a heterotrophic plate count, if subsection 2-5 (1) of Schedule 2 applies to the system.

Records provided and reviewed in the course of this inspection indicate that the Municipality has complied and exceeded these sampling requirements, generally collecting three samples from within the distribution system on a weekly basis, above and beyond the bi-weekly requirement. Each of those samples were tested for E.Coli, total coliform, and approximately one third of the samples were tested for general bacteria populations expressed as colony counts on a heterotrophic plate count.

In addition to their distribution sampling requirements, the Municipality regularly conducts microbiological sampling of the treated water being conveyed to the distribution system, and includes results of this sampling within the Annual reports prepared for the drinking water system. Each of the treated drinking water samples are typically tested for E.Coli, total coliforms and general bacteria population expressed as colony counts on a heterotrophic plate count.

Although there were no samples collected within the distribution system, during this inspection review period, which indicated adverse microbiological water quality, a treated water sample collected on June 1, 2016 did indicate the presence of total coliform bacteria. The Municipality made the appropriate notifications in response to the test result, and resamples collected from the treated water sample location and two additional locations within the distribution system on June 3, 2016, showed no further indication of adverse water quality.

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

Section 13-2 of Schedule 13, O.Reg.170/03 requires the Owner and the operating authority to ensure that at least one water sample is taken every 60 months and tested for every inorganic parameter set out in Schedule 23, O.Reg.170/03.

Complying with these requirements, the Municipality last conducted this sampling on May 9, 2016. Prior to that, samples had last been collected 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 60 months and tested for every organic parameter set out in Schedule 24, O.Reg.170/03.

Complying with these requirements, the Municipality last conducted this sampling on May 9, 2016. Prior to that, samples had last been collected on April 13, 2015. There were no concerns identified with the results obtained.

Water Quality Monitoring

- **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 Municipality conducted this sampling on October 13, 2015; February 8, 2016; May 9, 2016; and August 8, 2016. THM sampling is typically conducted from the Timber Trail sampling station installed at a location of significant distance from the treatment facility likely to have an elevated potential for the formation of THMs. The running annual average of the four most recent results is 2.8ug/L, below the Ontario Drinking Water Quality Standard of 100ug/L.

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

Section 13-7 of Schedule 13, O.Reg.170/03 requires the Owner and the operating authority to ensure that at least one water sample is taken every three months and tested for nitrates and nitrites. Section 6-1.1 of Schedule 6, O.Reg.170/03 requires that these samples be taken at least 60 days, and not more than 120 days, after a sample was taken for that purpose in the previous three month period.

Complying with these requirements, the Municipality conducted this sampling 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 that the owner of a municipal residential drinking-water system ensure that a treated water sample is taken every 60 months and is tested for sodium.

Records reviewed during the course of this inspection, indicate that the Municipality conducted sampling for sodium on May 9, 2016. Prior to that, sampling for sodium had been undertaken April 13, 2015; April 14, 2014; April 08, 2013; April 17, 2012 and April 26, 2012.

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. The Municipality last conducted Fluoride sampling on May 9, 2016, and typically conducts this sampling on an annual basis. The May 9, 2016 result obtained was 0.06 mg/L, which complied with the Ontario Drinking Water Quality Standard of 1.5 mg/L.

- **All water quality monitoring requirements imposed by the Municipal Drinking Water Licence and Drinking Water Works Permit were being met.**

Condition 1.6, Schedule C of the Licence, requires the Owner to ensure that the flow rate of water through the UV unit, the UV intensity and the UV lamp status be monitored every five minutes and recorded at a minimum frequency of every four hours. In addition, the Municipality is required to measure and record the UVT in the filtered water on a weekly basis. UV intensity and flow rate are trended on SCADA every 10 seconds and Operational staff measure and record the UVT of the filtered water once each week. UVT results typically indicate a UVT of 90% or more. The owner possesses a Real Tech calibration unit used for assessing UVT and UVA performance.

The UV disinfection equipment is required to be operated such that a continuous pass-through UV dose of 40 mJ/cm² is maintained throughout the life time of the UV lamp(s). The Trojan UV disinfection units installed are equipped with UV sensors which measure UV intensity in W/m² on a continuous basis, the UV units are factory

Water Quality Monitoring

calibrated to initiate an alarm condition should UV intensity drop below the 23.5W/m², the minimum intensity required to achieve the necessary 40mJ/cm² UV dosage at the maximum design flow rate (204.5L/min) and a UVT 90%.

Schedule E of the Licence, requires that the duty UV sensors be checked on at least a monthly basis against a reference UV sensor, and that the duty UV sensor be replaced should the UV Sensor to Reference sensor calibration ratio be greater than 1.2. The Schedule E sensor check requirements was a new condition of the Licence issued October 6, 2015, and was discussed with the Municipality at the time of the October 8, 2015 inspection. In recognition of this new condition, the Municipality obtained a reference sensor for the Port Sydney (Clarke Well) drinking water system, and commenced with the monthly sensor checks in January 2016. Records reviewed, indicate that the monthly UV reference sensor checks conducted since January 2016 and the date of this inspection, September 23, 2015 confirmed calibration ratios between 0.82 and 1.15, below the trigger of 1.2.

- **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 Municipality 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 three 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 (#129652) was reported on June 3, 2016, when a treated water sample collected June 1, 2016 indicated the presence of total coliform bacteria (47CFU/100ml). The Municipality made all appropriate notifications in response to the AWQI, and re-samples collected June 3, 2016, showed no further indication of adverse water quality at the time of collection.

The two other AWQIs reported pertained to those test results and observations made within the treatment process that have previously been discussed within this inspection report, and are discussed again 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 inspection review period met the microbiological and chemical requirements of O.Reg.169/03.

It is, however, noted that samples collected from the Port Sydney (Clarke Well) drinking water system have, historically indicated elevated levels of Sodium in the treated water. 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 Municipality last made the required notifications in April 2012 when a sample collected April 17, 2012 rendered a sodium result of 25.7mg/L, and a resample collected April 26, 2012 confirmed the elevated sodium levels with a result of 23.8mg/L being reported. In accordance with Schedule 16, O.Reg.170/03 requirements, the results were reported to the Simcoe Muskoka District Health Unit (SMDHU), and under direction from the SMDHU, users of the system have

Water Quality Assessment

been advised of the elevated sodium levels. Results of sodium sampling undertaken April 8, 2013; April 14, 2014; April 13, 2015 and May 9, 2016 continue to indicate elevated levels of sodium in the treated water with respective results of 34.7, 35.3, 34.5 and 38.3mg/L. Raw water results have also typically indicated sodium levels in excess of 20mg/L.

The aesthetic objective for sodium in drinking water is 200 mg/L at which it can be detected by a salty taste. Consumption of sodium in excess of 10 grams per day by normal adults does not result in any apparent adverse health effects. In addition, the average intake of sodium from water is only a small fraction of that consumed in a normal diet. A maximum acceptable concentration for sodium in drinking water has, therefore, not been specified. Persons suffering from hypertension or congestive heart disease may require a sodium-restricted diet, in which case, the intake of sodium from drinking water could become significant. The local Medical Officer of Health is required to be notified when the sodium concentration exceeds 20 mg/L, so that this information may be passed on to local physicians.

Reporting & Corrective Actions

- **Corrective actions (as per Schedule 18) 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 three occasions during this inspection review period.

AWQI (#127351) was reported on November 12, 2015, when operational staff responded to a low chlorine event which occurred and it was determined that the CT provisions required for Giardia inactivation may not have occurred. The chlorine residual, at that time, was only continuously monitored, after the provided chlorine contact time. The residual had dropped below 0.85mg/L and the well pump had shut down. A leak was identified in the chlorine injection line resulting in low chlorine dosage. The injection line was repaired, and flushing commenced until the chlorine residuals were restored to 1.60mg/L in the clearwell and 1.0mg/L throughout the distribution system. During flushing, the chlorine residual dropped as low as 0.22mg/L for a short duration. Although this residual still provided the CT for 2-Log Virus inactivation, the residual may not have provided the CT necessary for 0.5-Log Giardia inactivation. Given that the filters continued to produce filtered water turbidity less than 0.1NTU and the UV disinfection system operated as designed, during the event, it is likely that a sufficient level of treatment continued to be provided. Nonetheless, as required, the Municipality made all of the required notifications regarding the event, and the Simcoe Muskoka District Health Unit was satisfied with the corrective actions undertaken. To prevent similar occurrences, the Municipality has also added a chlorine analyzer at the head of the clearwell to alert operators of any dosage issues in advance of any adverse conditions.

AWQI (#127753) was reported on December 17, 2015, when operational staff responded to a filter turbidity alarm and the continuous monitoring equipment indicated turbidity greater than 1.0NTU. Confirmation was made that the results related to an analyzer malfunction, and the results were not indicative of the actual filtrate turbidity, which remained below 1.0 NTU. The analyzer issue was rectified and the analyzer was verified to a secondary standard. The Municipality made proactive notifications regarding the event to the Ministry and the SMDHU, and the SMDHU was satisfied with the corrective actions taken.

AWQI (#129652) was reported on June 3, 2016, when a treated water sample collected June 1, 2016 indicated the presence of total coliform bacteria (47CFU/100ml). The Municipality made all appropriate notifications in response to the AWQI, and re-samples collected June 3, 2016, showed no further indication of adverse water quality at the time of collection.

- **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.**

Reporting & Corrective Actions

Following a review of the SCADA and 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, process operation alarm calls, and any communication errors that triggered alarms. Any after hours alarm calls appear to have been responded to in a timely fashion by the utility operators and notes have been entered in the log book of their actions taken for each instance.

- **When the primary disinfection equipment, other than that used for chlorination or chloramination, has failed causing an alarm to sound or an automatic shut-off to occur, a certified operator responded in a timely manner and took appropriate actions.**

Should an alarm condition occur that is related to the U/V disinfection performance, the duty unit will automatically shut down and will transfer to the standby U/V unit, preventing improperly disinfected water from entering further into the treatment train or distribution system. The UV disinfection performance is tracked using SCADA. Should an alarm condition occur, the on call operator must acknowledge the alarm, and determine the appropriate level of response for each situation. Entries are completed in the log book at the treatment plant of any responses relating to U/V performance by the system operators. There were no concerns identified in the information provided during the inspection review period.

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.

- 1 Records did not indicate 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.**

The UV Disinfection process is credited with 2-log inactivation of Crypto, 2.5-log inactivation of Giardia and 2-log inactivation of viruses. To achieve the remaining 0.5-log Giardia and 2-log Virus inactivation, a chlorine chemical disinfection system is utilized. Although filtration is required for the GUDI water supply, the cartridge filtration process is not assigned removal credits.

With the exception of a November 12, 2015 event, records indicate that the system was operated to achieve the necessary UV dosages and CT requirements for primary disinfection purposes during this inspection review period. On November 12, 2015, operational staff responded to a low chlorine alarm. The chlorine residual had dropped below 0.85mg/L and the well pump had shut down, as designed. A leak was identified in the chlorine injection line resulting in low chlorine dosage. The injection line was repaired, and flushing commenced until the chlorine residuals were restored to 1.60mg/L in the clearwell and 1.0mg/L throughout the distribution system. During flushing, the chlorine residual dropped as low as 0.22mg/L for a short duration. Although this residual still provided the CT for 2-Log Virus inactivation, the residual may not have provided the CT necessary for 0.5-Log Giardia inactivation.

Given that the filters continued to produce filtered water turbidity less than 0.1NTU and the UV disinfection system operated as designed, during the event, it is likely that a sufficient level of treatment continued to be provided. Nonetheless, as required, the Municipality made all of the required notifications regarding the event, and the Simcoe Muskoka District Health Unit was satisfied with the corrective actions undertaken. To prevent similar occurrences, the Municipality has also added a chlorine analyzer at the head of the clearwell to alert operators of any dosage issues in advance of any adverse conditions.

Action(s) Required:

Until such time that the treatment requirements and treatment provisions for the Port Sydney (Clarke Well) Drinking Water System are re-assessed and approved within the Licence, the Municipality shall continue in their efforts of ensuring that:

1. The water treatment equipment is in operation whenever water is being supplied;
2. The water treatment equipment is operated in accordance with the Ministry's Procedure for Disinfection of Drinking Water in Ontario;
3. The water treatment equipment required by section 2-4, Schedule 2, O.Reg.170/03 is operated in a manner that achieves the design capabilities it is required to have under that section; and,
4. The water treatment equipment required by section 2-5, Schedule 2, O.Reg.170/03 is operated so that, at all times and at all locations within the distribution system, the free chlorine residual is never less than 0.05 milligrams per litre.

SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES

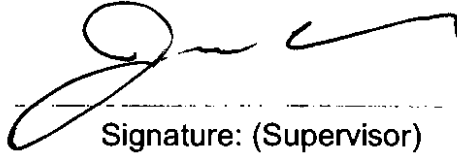
This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators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

Not Applicable

SIGNATURES

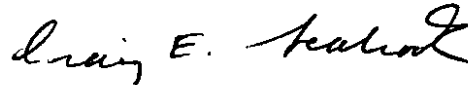
Inspected By:
James Crumbie

Signature: (Provincial Officer)



Reviewed & Approved By:
Craig Seabrook

Signature: (Supervisor)



Review & Approval Date:

2016-10-03

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.



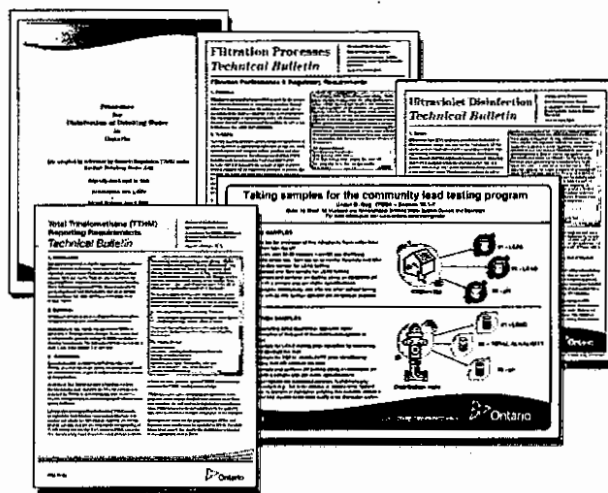
Stakeholder Appendix

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.



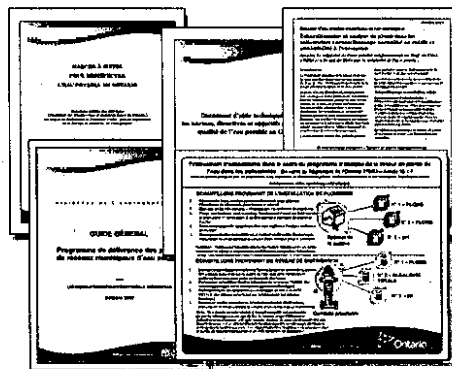
PUBLICATION TITLE	PUBLICATION NUMBER
Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils	7889e01
FORMS: Drinking Water System Profile Information, Laboratory Services Notification, Adverse Test Result Notification Form	7419e, 5387e, 4444e
Procedure for Disinfection of Drinking 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

ontario.ca/drinkingwater

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 Trihalomethanes 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
Guidé 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

ontario.ca/eaupotable

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:	PORT SYDNEY (CLARKE WELL) DRINKING WATER SYSTEM
DWS Number:	220005688
DWS Owner:	Muskoka, The Corporation Of The District Municipality Of
Municipal Location:	Huntsville.
Regulation:	O.REG 170/03
Category:	Small Municipal Residential System
Type Of Inspection:	Focused
Inspection Date:	September 23, 2016
Ministry Office:	Barrie District

Maximum Question Rating: 524

Inspection Module	Non-Compliance Rating
Source	0 / 28
Capacity Assessment	0 / 30
Treatment Processes	21 / 81
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 28
Water Quality Monitoring	0 / 95
Reporting & Corrective Actions	0 / 87
Treatment Process Monitoring	0 / 133
TOTAL	21 / 524

Inspection Risk Rating 4.01%

FINAL INSPECTION RATING: 95.99%

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

DWS Name: PORT SYDNEY (CLARKE WELL) DRINKING WATER SYSTEM
DWS Number: 220005688
DWS Owner: Muskoka, The Corporation Of The District Municipality Of
Municipal Location: Huntsville

Regulation: O.REG 170/03
Category: Small Municipal Residential System
Type Of Inspection: Focused
Inspection Date: September 23, 2016
Ministry Office: Barrie District

Non-compliant Question(s)	Question Rating
Treatment Processes	
Do records indicate that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a DWWP and/or MDWL issued under Part V of the SDWA at all times that water was being supplied to consumers?	21
TOTAL QUESTION RATING	21

Maximum Question Rating: 524

Inspection Risk Rating	4.01%
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FINAL INSPECTION RATING:	95.99%
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