Annual Report

For the 2016 Operating Year

Whitechurch Drinking Water System

2016 Operation and Maintenance

Annual Report

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1.0 INTRODUCTION AND BACKGROUND

The purpose of the 2016 Annual Report is to document the operation and maintenance data for the Whitechurch Drinking Water System for review by the Ministry of the Environment in accordance with O. Reg. 170/03. This report covers January 1, 2016 to December 31, 2016. A copy of this report will be submitted to the owner to be displayed to the residents.

2.0 DESCRIPTION OF WATER SYSTEM

The Whitechurch Drinking Water System (DWS # **2200008863**) is comprised of two (2) wells located within the Municipality of Huron-Kinloss in the Hamlet of Whitechurch. The system serves an originally estimated population of approximately 96 people and 37 connections. Both wells are located on the property of the Whitechurch well house at 9A Whitechurch Street. The well house is equipped with an on-line chlorine analyzer and is monitored through a SCADA system based out of the Ripley Municipal office. As a redundancy, the well house is also equipped with an auto-dialer that is independent of the SCADA system, to call out alarms in the event of communications/SCADA failure.

The Whitechurch Drinking Water System is a "secure groundwater system", categorized as a Limited System. It is classified as a Small Municipal Residential drinking water system as per O.Reg 170/03. The system has a daily maximum capacity to deliver 260 cubic metres of potable water to the Hamlet of Whitechurch.

The two (2) wells are described as follows:

Well # 1 is a 152 mm diameter, 73.2 m deep drilled groundwater production well located approximately 15 m south of Well # 2. Well # 1 was drilled in 2003. The well pump and associated piping in Well #1 was installed in August 2007.

Well # 2 is a 152 mm diameter, 54.9 m deep drilled groundwater production well located approximately 10 m west of the pumphouse and 15 m north of Well # 1. Well # 2 was drilled in 2003. The well pump and associated piping in Well # 2 were brought on-line in March 2008.

From the well pump discharge header, the water is pumped to the chlorine contact watermain (10 m x 466 mm ID = 1,708.8 L).

Both Whitechurch wells are secure deep bedrock wells, not under the influence of surface water. The wells penetrate limestone aquifers. Due to the depth and structure of the aquifers, the water temperature is relatively constant (<10°), turbidity is low, and the water is relatively hard. Both wells contain barium concentrations that exceed the Half-MAC (maximum allowable concentration) of 500 µg/L, requiring samples to be collected quarterly. All samples collected in 2016 were below the MAC of 1,000 µg/L. The raw water is also relatively high in sodium and fluoride, but the lead content of the raw water is well below the half-MAC (Maximum Allowable Concentration). Those who are supplied water from the Whitechurch Drinking Water System are made aware of the various concentrations in their drinking water by numerous means of communication with the Township of Huron-Kinloss.

The Whitechurch Drinking Water System is equipped with a Supervisory Control and Data Acquisition system (SCADA) allowing for remote control, monitoring and record keeping of the system. This provides the operator with the current operating status of the supply and treatment equipment throughout the system at any given time via remote access by computer or iPhone.

A 15 kW diesel generator and fuel system has been installed outside adjacent to the well house in a sound attenuated, weather-proof enclosure. There is a fence around the generator to prevent unwarranted entry. The diesel generator provides emergency backup power for the water system in the event of a power failure. A stand-by propane generator is also located at the Ripley Municipal office for back-up power requirements for the Municipal office and SCADA systems.
The raw water is disinfected using sodium hypochlorite (12%) and serves primarily as a measure to prevent microbiological growth within the raw water pipeline, pressure tanks, and distribution system. The Whitechurch Drinking Water System achieves a minimum of 2-log removal or inactivation of viruses as outlined in the MOECC *Procedure for Disinfection of Drinking Water in Ontario* with a chlorine contact watermain.

3.0 SUMMARY OF WATER QUALITY MONITORING

3.1 Water Treatment Equipment Operation and Monitoring

3.1.1 Point of Entry Chlorine Residual

In 2016, a total of 366 samples were collected from January 1, 2016 – December 31, 2016, and analyzed for Free Chlorine Residual at the Point of Entry (POE) for treated water using a HACH pocket chlorine colorimeter. **Table 1** shows the monthly average of free chlorine residual grab sample values.

3.1.2 Distribution Chlorine Residual

In 2016, a Total of 366 samples were collected in the Whitechurch Distribution System. Refer to **Table 1**.

Table 1 - Treated and Distribution Grab Sample Chlorine Residuals for Whitechurch Drinking Water System

Month	Whitechurch Treated Water (mg/L)	Whitechurch Distribution (mg/L)
Jan	1.57	1.38
Feb	1.72	1.47
Mar	1.57	1.37
Apr	1.67	1.40
May	1.59	1.33
Jun	1.64	1.28
Jul	1.67	1.37
Aug	1.55	1.23
Sep	1.57	1.27
Oct	1.57	1.31
Nov	1.64	1.41
Dec	1.73	1.53
Annual Min	1.36	0.94
Annual Max	2.12	1.81
Annual Avg	1.62	1.36
# Samples	366	366

3.1.3 Turbidity

Drinking water turbidity was measured by a portable turbidity analyzer. The raw and treated water grab samples were collected monthly from January 1, 2016 – December 31, 2016, and analyzed for turbidity. **Table 2** provides a summary of raw and treated turbidity results. The maximum turbidity measured in the raw water was 0.21 NTU and the maximum turbidity measured in the treated water was 0.34 NTU.

Table 2 – Raw and Treated Water Turbidities for Whitechurch Drinking Water System

Month	Whitechurch Well 1 (NTU)	Whitechurch Well 2 (NTU)	Whitechurch Treated (NTU)
Jan	0.12	0.20	0.16
Feb	0.17	0.18	0.32
Mar	0.09	0.13	0.13
Apr	0.13	0.09	0.22
May	0.13	0.16	0.26
Jun	0.13	0.16	0.19
Jul	0.19	0.17	0.19
Aug	0.13	0.17	0.25
Sep	0.21	0.16	0.15
Oct	0.16	0.12	0.16
Nov	0.16	0.17	0.15
Dec	0.17	0.19	0.18
Annual Min	0.07	0.07	0.11
Annual Max	0.21	0.21	0.34
Annual Avg	0.14	0.15	0.20
# Samples	22	22	22

3.2 Microbiological Sampling

3.2.1 Raw Water Samples

Raw water samples are taken every week. In 2016, a total of 104 samples were collected from January 1, 2016 – December 31, 2016, and analyzed for E. Coli and Total Coliform. All of the E. Coli results obtained were 0 cfu/100 mL. There was 1 Total Coliform result of 1 cfu/100 mL. **Table 3** provides a summary of bacteriological results performed on the raw water.

Table 3 – Microbiological Results for Raw Water at Whitechurch Drinking Water System

Whitechurch Well 1

Month	E. Coli (cfu/100 mL)			Total Coliform (cfu/100 mL)		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	4	4	0	4	4	0
Feb	4	4	0	4	4	0
Mar	5	5	0	5	4	1
Apr	4	4	0	4	4	0
May	5	5	0	5	5	0
Jun	4	4	0	4	4	0
Jul	4	4	0	4	4	0
Aug	5	5	0	5	5	0
Sep	4	4	0	4	4	0
Oct	4	4	0	4	4	0
Nov	5	5	0	5	5	0
Dec	4	4	0	4	4	0
Total	52	52	0	52	52	1

Whitechurch Well 2

Month	E. Coli (cfu/100 mL)			Total Coliform (cfu/100 mL)		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	4	4	0	4	4	0
Feb	4	4	0	4	4	0
Mar	5	5	0	5	5	0
Apr	4	4	0	4	4	0
May	5	5	0	5	5	0
Jun	4	4	0	4	4	0
Jul	4	4	0	4	4	0
Aug	5	5	0	5	5	0
Sep	4	4	0	4	4	0
Oct	4	4	0	4	4	0
Nov	5	5	0	5	5	0
Dec	4	4	0	4	4	0
Total	52	52	0	52	52	0

3.2.2 Treated Water (Point of Entry) Samples

One (1) treated water sample is taken every week and analyzed for E. Coli, Total Coliform, and for Heterotrophic Plate Count (HPC). A total of 53 treated water samples were collected from January 1, 2016 – December 31, 2016, and analyzed for the above parameters. All samples were found to be safe. Each E. Coli and Total Coliform result from the treated water was 0 cfu/100 mL. The range of HPC results were 0 – 3 cfu/100 mL. **Table 4** provides a summary of all bacteriological results performed on treated water.

Table 4 – Microbiological Results for Treated Water (Point of Entry) at Whitechurch Drinking Water System

Month	E. Coli (cfu/100 mL)			Total Coliform (cfu/100 mL)			HPC (cfu/100 mL)		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	4	4	0	4	4	0	4	3	1
Feb	4	4	0	4	4	0	4	3	1
Mar	5	5	0	5	5	0	5	4	1
Apr	4	4	0	4	4	0	4	4	0
May	5	5	0	5	5	0	5	2	3
Jun	4	4	0	4	4	0	4	4	0
Jul	4	4	0	4	4	0	4	2	2
Aug	5	5	0	5	5	0	5	4	1
Sep	5	5	0	5	5	0	4	2	2
Oct	4	4	0	4	4	0	4	4	0
Nov	5	5	0	5	5	0	5	5	0
Dec	4	4	0	4	4	0	4	4	0
Total	52	52	0	53	53	0	52	41	11

3.2.3 Distribution System

Typically, two (2) distribution samples are collected every week and tested for E. Coli, Total Coliform, and for Heterotrophic Plate Count (HPC). In 2016, a total of 104 distribution samples were collected from January 1, 2016 – December 31, 2016, and analyzed for the above parameters and all sampled were found to be safe. Each E. Coli result and Total Coliform result from the distribution samples was 0 cfu/100 mL. The range of HPC results were 0 – 7 cfu/100 mL. **Table 5** provides a summary of all bacteriological samples taken in the distribution system.

Table 5 – Microbiological Results for Whitechurch Drinking Water Distribution System

Month	E. Coli (cfu/100 mL)			Total Coliform (cfu/100 mL)			HPC (cfu/100 mL)		
	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1	# Samples	# Samples "0"	# Samples ≥1
Jan	4	4	0	4	4	0	4	3	1
Feb	4	4	0	4	4	0	4	2	2
Mar	5	5	0	5	5	0	5	1	4
Apr	4	4	0	4	4	0	4	4	0
May	5	5	0	5	5	0	5	4	1
Jun	4	4	0	4	4	0	4	3	1
Jul	4	4	0	4	4	0	4	3	1
Aug	5	5	0	5	5	0	5	2	3
Sep	4	4	0	4	4	0	4	1	3
Oct	4	4	0	4	4	0	4	1	3
Nov	5	5	0	5	5	0	5	5	0
Dec	4	4	0	4	4	0	4	3	1
Total	52	52	0	52	52	0	52	32	20

3.3 Chemical Sampling & Testing as per Schedule 13, O. Reg.170/03

3.3.1 Inorganics

Treated water samples are collected every 36 months and tested for inorganics. The most recent samples for the Whitechurch Drinking Water System were collected on June 5, 2015 and submitted to the laboratory for analysis of inorganics as listed in Schedule 23. All parameters were found to be within compliance. Inorganics will be sampled and analyzed again on or before June 10, 2018. Results from the June 5, 2015 samples can be found in **Table 6.**

Table 6 – Inorganics (Schedule 23) Results for Whitechurch Drinking Water System

Parameter	Whitechurch Treated Water (µg/L)	Maximum Allowable Concentration (µg/L)
Antimony	<0.2	6
Arsenic	0.2<MDL	25
Barium	834	1000
Boron	15	5000
Cadmium	0.012	5
Chromium	<0.5	50
Mercury	<0.02	1
Selenium	1<MDL	10
Uranium	0.095	20

3.3.2 Lead

Schedule 15.1 of Ontario Regulation 170/03 requires that samples be taken during two seasons: once between December 15 and April 15 and once between June 15 and October 15. The Whitechurch Drinking Water System is currently under a reduced sampling program for lead where lead, pH and alkalinity are sampled in each season every 3 years. In the interim, pH and alkalinity are tested during each sampling season. Two pH and alkalinity samples were collected on March 21, 2016, and again on September 27, 2016. These parameters are required to be sampled and analyzed again between the months of December 2016 and April 2017 and again between June and October 2017. Lead samples are also required in the 2017 sampling season. 2016 results can be found in **Table 7**.

Table 7 – Lead Sampling Program Results for Whitechurch Drinking Water System

Sampling Season	pH	Alkalinity (mg/L)
Dec – Apr	7.37	267
Jun - Oct	7.49	265

3.3.3 Organics

Treated water samples are collected every 36 months and tested for schedule 24 organic parameters. The most recent samples were collected on June 10, 2015. All parameters were found to be within compliance. Organics will be sampled and analyzed again on or before June 10, 2018. June 10, 2015 sample results can be found in **Table 8.**

Table 8 – Organics (Schedule 24) Results for Whitechurch Drinking Water System

Parameter	Whitechurch Treated Water (µg/L)	Maximum Allowable Concentration (µg/L)
Benzene	0.32 <MDL	5
Carbon Tetrachloride	0.16 <MDL	5
1,2-Dichlorobenzene	0.41 <MDL	200
1,4-Dichlorobenzene	0.36 <MDL	5
1,1-Dichloroethylene	0.33 <MDL	14
1,2-Dichloroethane	0.35 <MDL	5
Dichloromethane	0.35 <MDL	50
Monochlorobenzene	0.3 <MDL	80
Tetrachloroethylene	0.35 <MDL	30
Trichloroethylene	0.44 <MDL	50
Vinyl Chloride	0.17 <MDL	2
Diquat	1 <MDL	70
Paraquat	1 <MDL	10
Glyphosate	1 <MDL	280
Polychlorinated Biphenyls	0.04 <MDL	3
Benzo(a)pyrene	0.004 <MDL	0.01
2,4-dichlorophenol	0.15 <MDL	900
2,4,6-trichlorophenol	0.25 <MDL	5
2,3,4,5-tetrachlorophenol	0.20 <MDL	100
Pentachlorophenol	0.15 <MDL	60
Alachlor	0.02 <MDL	5
Aldicarb	0.01 <MDL	9
Aldrin+Dieldrin	0.01 <MDL	0.7
Aldrin	0.01 <MDL	-

Parameter	Whitechurch Treated Water (µg/L)	Maximum Allowable Concentration (µg/L)
Dieldrin	0.01 <MDL	-
Atrazine+N-dealkylated metabolites	0.01 <MDL	5
Atrazine	0.01 <MDL	-
De-ethylated atrazine	0.01 <MDL	-
Azinphos-methyl	0.05 <MDL	20
Bendiocarb	0.01 <MDL	40
Carbaryl	0.05 <MDL	90
Carbofuran	0.01 <MDL	90
Chlordane	0.01 <MDL	7
a-chlordane	0.01 <MDL	-
g-chlordane	0.01 <MDL	-
Oxychlordane	0.01 <MDL	-
Chlorpyrifos	0.02 <MDL	90
Cyanazine	0.03 <MDL	10
Diazinon	0.02 <MDL	20
(DDT)+Metabolites	0.01 <MDL	30
op-DDT	0.01 <MDL	-
pp-DDD	0.01 <MDL	-
pp-DDE	0.01 <MDL	-
pp-DDT	0.01 <MDL	-
Dimethoate	0.03 <MDL	20
Diuron	0.03 <MDL	150
Heptachlor-Heptachlor Epoxide	0.01 <MDL	3
Heptachlor	0.01 <MDL	-
Heptachlor epoxide	0.01 <MDL	-
Lindane	0.01 <MDL	4
Malathion	0.02 <MDL	190
Metolachlor	0.01 <MDL	900
Metribuzin	0.02 <MDL	50
Parathion	0.02 <MDL	80
Phorate	0.01 <MDL	50
Prometryne	0.03 <MDL	2
Simazine	0.01 <MDL	1
Temephos	0.01 <MDL	10
Terbufos	0.01 <MDL	280
Triallate	0.01 <MDL	1
Trifluralin	0.02 <MDL	230
2,4-dichlorophenoxyacetic acid	0.19 <MDL	45
2,4,5-trichlorophenoxyacetic acid	0.22 <MDL	100
Bromoxynil	0.33 <MDL	280
Dicamba	0.20 <MDL	5
Diclofop-methyl	0.40 <MDL	120
Dinoseb	0.36 <MDL	9
Picloram	1 <MDL	10

3.3.4 Trihalomethanes

Distribution samples are taken every three months from representative points in the distribution system and tested for Trihalomethanes (THMs). In 2016, samples were collected during the months of February, May, August, and November. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and it is expressed as a running annual average. In 2016, the average THM was found to be 13.3 µg/L, which is within compliance. Refer to **Table 9** for the summary of trihalomethane results. In 2017, samples will be collected in February, May, August, and November.

3.3.5 Nitrate & Nitrite

Four treated water samples are taken every three months and tested for nitrate and nitrite. In 2016, samples were collected during the months of February, May, August, and November. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 1 mg/L for nitrites and 10 mg/L for nitrates. The analytical results were found to be within compliance. Refer to **Table 9.** In 2017, samples will be collected in February, May, August, and November.

Table 9 – Nitrate, Nitrite and THM Results at Whitechurch Drinking Water System

Date	Nitrite (mg/L)		Nitrate (mg/L)		THM (µg/L)	
	# Samples	Result	# Samples	Result	# Samples	Result
Feb	1	<0.003	1	<0.006	1	10.0
May	1	<0.003	1	<0.006	1	12.0
Aug	1	<0.003	1	<0.006	1	18.0
Nov	1	<0.003	1	<0.006	1	13.0
Total	4		4		4	
Avg		<0.003		<0.006		13.3
Max		<0.003		<0.006		18.0

3.3.6 Sodium

One water sample is collected from point of entry every 60 months and tested for Sodium. The Ontario Drinking Water Standards (ODWQS) have set a Maximum Acceptable concentration (MAC) of 200 mg/L for Sodium and requires the Medical Office of Health be notified if the concentration exceeds 20 mg/L. These samples were last collected on December 27, 2012. Refer to **Table 10**. The next water sample for Sodium will be collected and analyzed on or before December 27, 2017.

3.3.7 Fluoride

One water sample is collected from point of entry at least once in every 60 months and tested for Fluoride. The Ontario Drinking Water Quality Standards (ODWQS) have set a MAC of 1.5 mg/L. On May 7, 2015, a sample was collected for this analysis. The sample collected exceeded the Maximum Allowable Concentration (MAC). This is due to naturally occurring fluoride in the aquifer. The next water samples for Fluoride will be collected and analyzed on or before May 12, 2020. Refer to **Table 10**.

Table 10 – Sodium and Fluoride Results at Whitechurch Drinking Water System

Location	Sodium (mg/L)	Fluoride (mg/L)
Whitechurch Treated Water	17.6	1.00
Max Allowable Concentration (mg/L)	20.0	1.50

3.3.8 Non-Regulatory Testing – Aesthetic Objectives and Operational Guidelines

Samples were collected on November 21, 2016 and tested for parameters listed in the MOECC Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, June 2006, PIBS 4449e01. Refer to **Table 11** for Aesthetic Objective/Operational Guideline results.

Table 11 - Aesthetic Objectives and Operational Guidelines

Parameter	AO/OG	Whitechurch Treated Water
pH	6.5 – 8.5	7.96
Alkalinity (mg/L as $CaCO_3$)	30 – 500	271
Colour (TCU)	5	5
Total Dissolved Solids (mg/L)	500	354
Organic Nitrogen (mg/L)	0.15	0.05<MDL
Total Kjeldahl Nitrogen (mg/L)	---	0.05<MDL
Ammonia + Ammonium (mg/L)	---	0.05
Hydrogen Sulphide (mg/L)	0.05	0.006<MDL
Sulphide (mg/L)	0.05	0.006<MDL
Chloride (mg/L)	250	30
Sulphate (mg/L)	500	23
Hardness (mg/L as $CaCO_3$)	80 – 100	**292**
Aluminum (µg/L)	100	2.9
Copper (µg/L)	1000	1.0
Iron (µg/L)	300	**744**
Manganese (µg/L)	50	11..0
Zinc (µg/L)	5000	2
Dissolved Organic Carbon (mg/L)	5	1
Methane (L/m^3)	3	0.09
Ethylbenzene (µg/L)	2.4	0.33<MDL
Toluene (µg/L)	24	0.36<MDL
Xylene (µg/L)	300	0.43<MDL
m/p-xylene (µg/L)	---	0.43<MDL
o-xylene (µg/L)	---	0.17<MDL

AO/OG – Aesthetic Objective / Operational Guideline
MDL – Laboratory Method Detection Limit

4.0 WATER AND CHEMICAL USAGE

4.1 Chemical Usage

From January 1, 2016 to December 31, 2016, 50.58 kg of sodium hypochlorite (NaOCl) was used to treat the water that was provided to the distribution system with an average dosage of 5.43 mg/L. During the same time period, 235.23 kg of sodium silicate (Na_2SiO_3) was used for iron sequestering. Refer to **Table 12** for sodium hypochlorite usage and **Table 13** for sodium silicate usage.

Table 12 – Sodium Hypochlorite Usage at Whitechurch Drinking Water System

Month	Usage (kg)	Avg Dosage (mg/L)
Jan	3.64	5.29
Feb	4.12	5.45
Mar	3.83	5.03
Apr	3.81	5.29
May	4.08	5.18
Jun	4.31	5.54
Jul	4.67	5.29
Aug	4.89	5.41
Sep	4.60	5.72
Oct	4.49	5.78
Nov	4.14	5.65
Dec	4.27	5.54
Total	50.85	
Avg		5.43

Table 13 – Sodium Silicate Usage at Whitechurch Drinking Water System

Month	Usage (kg)	Avg Dosage (mg/L)
Jan	17.04	17.37
Feb	18.61	17.11
Mar	19.45	17.95
Apr	18.61	17.94
May	20.35	17.85
Jun	21.01	18.50
Jul	18.09	14.39
Aug	17.04	13.58
Sep	21.75	18.89
Oct	21.43	19.20
Nov	19.79	18.88
Dec	22.06	20.34
Total	235.23	
Avg		17.67

4.2 Annual Volumes

A summary of the water supplied to the distribution system in 2016 is provided in **Table 14.** This Table provides a breakdown of the daily demand and total monthly volume provided to the distribution system. Flow meters were calibrated by Coulter Water Meter Services and were found to be acceptable. The water meters will be calibrated again in June 2017.

Table 14 – Treated Water Volumes for Whitechurch Drinking Water System [a]

Month	Avg Daily Volume (m^3)	Max Daily Volume (m^3)	Total Monthly Volume (m^3)
Jan	22.32	29.28	692.07
Feb	26.47	30.65	767.59
Mar	25.63	31.44	794.62
Apr	24.94	31.46	748.17
May	25.95	43.76	804.50
Jun	26.55	33.86	796.60
Jul	29.50	38.78	914.49
Aug	29.68	54.92	919.98
Sep	27.72	43.29	831.55
Oct	25.81	32.00	799.99
Nov	25.04	32.113	751.25
Dec	26.21	40.89	812.50
Avg	26.32		
Max		54.92	
Total			9,633.31

5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

The following summarizes water system improvements and routine and preventative maintenance for the Whitechurch Drinking Water System Supply:

- Jan. 14/16 - Pre-chlorine contact on-line analyzer installed to give early warning to chlorine system failures.
- Jan. 21/16 – Lang Well Drilling replaced well cap on well # 1.
- Mar. 21/16 – Connected pre-chlorine contact analyzer to Sensaphone Autodialer with 4-20mA signal.
- Jun. 2/16 – Sommers Motor Generator Sales Ltd. conducted annual diesel generator service.
- Sep. 14/16 – Connected chlorine contact mixing tanks in to treatment system. A Precautionary Boil Water Notice was issued since supply was shut down to facilitate the tank installation. Tanks were isolated from the system until bacteriological samples were all clear.
- Oct. 19/16 – Ferguson Plumbing on-site to perform backflow preventer testing.
- Oct. 25/16 – Replaced well pump control box for Well # 1.
- Dec. 13/16 – Eramosa Engineering on-site to make programming changes related to the chlorine system, silicate pumps, and pre-contact chlorine analyzer.

6.0 MINISTRY OF THE ENVIRONMENT INSPECTIONS AND REGULATORY ISSUES

- Jan. 6/17 - AWQI # 127940 – Low chlorine residual of 0.05 mg/L at well house due to chlorine pump in ‘off’ position.
- Jun. 28/16 – ERTH Corp. on-site to calibrate flow meters.
- Aug. 16/16 – AWQI # 130799 – Low chlorine residual of 0.05 mg/L due to on-line chlorine analyzer malfunction.
- Sep. 1/16 - Ministry of the Environment and Climate Change conducted an inspection on Whitechurch Drinking Water System Supply between Sep. 1, 2016 and Nov.10, 2016. The Operating Authority achieved a rating of 94.92% on the 2016 Whitechurch Inspection Report – an improvement from the 2015 Whitechurch Inspection Report (83.96%).
- DWQMS Audit was conducted on November 24, 2016.

7.0 EMERGENT ISSUES

It should be noted that there will be some upcoming changes to Ontario Regulation 170/03 and Ontario Regulation 169/03 that strengthen standards and clarify testing requirements as follows:

- Strengthen standards for Arsenic, Carbon Tetrachloride, Benzene, and Vinyl Chloride;
- Adopt new standards for Chlorate, Chlorite, 1-Methyl-4-Chlorophenoxyacetic acid (MCPA) and Haloacetic Acids (HAAs); (NOTE: Chlorate and Chlorite testing is only required for Municipal Drinking Water Systems using Chlorine Dioxide treatment equipment.)
- Clarify/optimize testing, sampling and reporting requirements for Trihalomethanes (THMs) and HAAs; and
- Remove 13 pesticides from testing requirements.

The aforementioned amendments will be phased in over the next four years to allow system owners and/or operators the opportunity to collect baseline information and complete required system upgrades. Currently, the new sampling, testing, reporting and re-sampling requirements, and the removal of 13 pesticides came into effect January 1, 2016. Refer to **Table 14** for the new Regulatory Requirements. Subsequent phase-in dates are:

- January 1, 2017: Testing requirements for HAAs and updates to standards for Carbon Tetrachloride, Benzene, Vinyl Chloride, Chlorate, Chlorite, and MCPA come into effect / require reporting
- January 1, 2018: Updates to standards for Arsenic come into effect / require reporting
- January 1, 2020: New standards for HAAs and HAAs testing optimization rule for smaller systems will come into effect / require reporting.

Table 15 – Regulatory Requirements

Parameter	Current Requirement		Amended Requirement	
	MAC	½ MAC	MAC	½ MAC
Arsenic	25 µg/L	12.5 µg/L	10 µg/L	5 µg/L
Benzene	5 µg/L	2.5 µg/L	1 µg/L	0.5 µg/L
Carbon Tetrachloride	5 µg/L	2.5 µg/L	2 µg/L	1 µg/L
Vinyl Chloride	2 µg/L	1 µg/L	1 µg/L	0.5 µg/L

EMERGENT ISSUES SUMMARY:

A review of the historic sample results between 2003 and 2015 indicates that none of these parameters would be in exceedance of the amended ½ MAC requirements in Whitechurch.