

**2013 Annual Report**

Table 1. Drinking Water System Information

Drinking-Water System Number:	220003154
Drinking-Water System Name:	Britannia Water Purification Plant
Drinking-Water System Owner:	City of Ottawa
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1 <sup>st</sup> – December 31 <sup>st</sup> 2013

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

Does your Drinking-Water System serve more than 10,000 people? Yes

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

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

Britannia Water Purification Plant  
2731 Cassels St., Ottawa Ontario  
K2B 1A8

Telephone: 613-828-2727

Complete for all other Categories.

Number of Designated Facilities served:

N/A

Did you provide a copy of your annual report to all Designated Facilities you serve?

N/A

Number of Interested Authorities you report to:

N/A

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?

N/A

**Table 2 Drinking-Water systems that receive their drinking water from our system:**

Drinking Water System Name	Drinking Water System Number
Township of Russell	W260092014

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

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 \_\_\_\_\_

## Description of Drinking Water System

The City of Ottawa operates two treatment plants to supply drinking water – Lemieux Island Water Purification Plant (capacity: 400 ML/d; constructed 1931) and Britannia Water Purification Plant (capacity: 360 ML/d; constructed 1961). The source water for both plants is the Ottawa River. Both plants use identical water treatment processes and have undergone significant expansion and modernization over the years.

Raw water enters the treatment plants through large intake pipes that extend into the main flow of the river. The treatment process makes use of the “multiple barrier” principle. A series of treatment steps successively remove undesirable substances

such as colour, suspended particles, algae, bacteria, and viruses from the water. The purification process in Ottawa consists of the following steps:

- coagulation (alum and sulphuric acid)
- flocculation (activated silica as a coagulant aid)
- sedimentation
- filtration (sand/anthracite)
- primary disinfection (sodium hypochlorite)
- pH correction (sodium hydroxide)
- secondary disinfection (chloramine)
- fluoridation (HFS)

During the final treatment step, fluoride is added for prevention of dental cavities, and chloramine (mixture of chlorine and ammonia) is added to preserve water quality as it travels through the vast water distribution system. The pH level is adjusted in order to minimize corrosion effects in the distribution system.

After the treatment process, water is pumped through the distribution network of watermains (over 3000 km of watermain piping) to reach water customers over an area roughly 25 km by 50 km. Treated water from both the Britannia and Lemieux Island water plants is blended as it travels through the distribution system. Pressure and storage requirements are met through the operation of 25 pumping stations and reservoirs located throughout the system. The total volume of water stored in reservoirs is 270 Million Litres, which is nearly equivalent to the daily amount of water produced. All treatment, pumping, and storage systems are controlled by a dedicated SCADA computer system and monitored by MOE certified Water Treatment Operators 24 hours per day.

### **List all water treatment chemicals used over this reporting period**

- Aluminum Sulphate (liquid – 48.8%)
- Sulphuric Acid (liquid – 93%)
- Sodium Silicate (liquid – 29%)
- Sodium Hypochlorite (liquid – 12%)

- Hydrofluorosilicic Acid (liquid – 24%)
- Sodium Hydroxide (liquid – 50%)
- Aqueous Ammonia (liquid – 25%)
- Sodium Bisulphite (liquid – 38%)

**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**

**Filter Rebuild Project (\$22 million):** This 3 year project was started at Britannia in 2013. The project includes renewal and improvements to the water treatment process and operational flexibility at the Plant. Key elements of the project include rebuilding the original 12 filters with new under-drains, valves and filter media as well as implementing air scour backwashing for improved filter performance. As a water quality improvement initiative, individual filter ripening piping for all 18 filters is being incorporated into the project.

**SCADA System Upgrade Project (\$12 million):** This major project involving upgrades to the process control computer system continued through 2013. The project involves upgrades at both the Britannia and Lemieux Island Water Purification Plants as well as communication upgrades for the remote pumping stations and reservoirs. The project is expected to be completed in 2014.

Table 3 Adverse Water Quality events for the Britannia Water Purification Plant and the combined central distribution system served by the Britannia and Lemieux Island Water Purification Plants

Incident Date	Test Parameter and Location	Result	Unit of Measure	Corrective Action	Date of Resolution
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Incident Date	Test Parameter and Location	Result	Unit of Measure	Corrective Action	Date of Resolution
5- Jan-13 AWQI# 109690	Total Coliform bacteria >0 per 100mL Britannia WPP Treated	Positive	Presence/ Absence per 100mL	Flush and resample	8-Jan-13
29-Apr-13 AWQI# 110869	NDMA >9.0 ng/L Britannia WPP Treated	9.8	ng/L	resample	8-May-13
3-Jan-13 AWQI# 109674	Total Coliform bacteria >0 per 100mL Stittsville Fire Hall	Positive	Presence/ Absence	Flush and resample	4-Jan-13
5-May-13 AWQI# 110174	Total Coliform bacteria >0 per 100mL Watermain repair at 121 St. Cecile	Positive	Presence/ Absence	Flush and resample	5-Mar-13
12-Apr-13 AWQI# 110504	Lead > 10 µg/L in distribution system: hydrant at 774 Lonsdale	127	µg/L	review other samples taken from area	12-Apr-13
28-May-13 AWQI# 111218	Total Coliform bacteria >0 per 100mL Preston Fire Hall	Positive	Presence/ Absence	Flush and resample	29-May-13
11-July-13 AWQI# 112368	Total Coliform bacteria >0 per 100mL Petrie Island	Positive	Presence/ Absence	Flush and resample	12-July-13
16-Jul-13 AWQI# 112512	Total Coliform >0 per 100mL in multiple samples from temporary	Positive (6 out of 6 sample	Presence/ Absence	Flushed and resampled	17-July-13

Incident Date	Test Parameter and Location	Result	Unit of Measure	Corrective Action	Date of Resolution
	water service hose at Harmer St.	locations)			
22-Jul-13 AWQI# 112739	Total Coliform > 0 per 100mL and Ecoli > 0 per 100mL  Carlsbad trickle feed system during Boil Water Advisory: Ninth Line blow off sample point	Positive TC/EC	Presence/ Absence	Flushed and resampled	25-Jul-3
30-Jul-13 AWQI# 113002	Total Coliform bacteria >0 per 100mL  Orleans Fire Hall	Positive	Presence/ Absence	Flush and resample	31-Jul-13
6-Aug-13 AWQI# 1113175	Chloramine < 0.25 mg/L  Bridlewood Public School	0.10	mg/L	Flush and resample	06-Aug-13
20-Aug-13 AWQI# 113489	Total Coliform >0 per 100mL  King Edward Fire Hall	Positive	Presence/ Absence	Flush and resample	21-Aug-13
27-Aug-13 AWQI#113670	Chloramine < 0.25 mg/L  OC Transpo Albion Rd.	0 .0	mg/L	Flushed system	3-Sept-13
08-Oct-13 AWQI# 114484	Chloramine < 0.25 mg/L  OC Transpo Albion Rd.	0.20	mg/L	Flushed	09-Oct-13
22-Oct-13	Chloramine < 0.25 mg/L at 10 Cassidy (closed	0.02	mg/L	Flushed	22-Oct-13

Incident Date	Test Parameter and Location	Result	Unit of Measure	Corrective Action	Date of Resolution
AWQI#114683	valve)				
23-Oct-13 AWQI# 114692	Total Coliform bacteria >0 per 100mL Riverside South Pump Station	Positive	Presence/ Absence	Flush and resample	24-Oct-13
31-Dec-13 AWQI# 115583	Total Coliform bacteria >0 per 100mL King Edward Fire Hall	Positive	Presence/ Absence	Flush and resample	1-Jan-14

Table 4 Microbiological testing done under Schedule 10, 11 or 12 of regulation 170/03 during this reporting period.

	<b>Number of Ecoli &amp; Total Coliform samples</b>	<b>Range of E.Coli test results (cfu/100mL)</b>	<b>Range of Total Coliform test results (cfu/100mL)</b>	<b>Number of HPC samples</b>	<b>Range of HPC results (cfu/mL)</b>
Raw	365	0 – 614	8 – >2420	53	<10 – >3000
Treated	1427	0	0 – positive	212	<10 – >3000
Distribution	4989	0 – positive	0 – positive	2883	<10 – 2000

Table 5 Operational testing for treated water done under Schedule 7, 8 or 9 of Regulation 170/03 during this reporting period.

	<b>Number of Grab Samples</b>	<b>Results (min - max)</b>

Turbidity	728 + continuous	0.02 – 0.09 NTU
Chlorine	729 + continuous	1.54 – 2.53 mg/L
Fluoride (If the DWS provides fluoridation)	735 + continuous	0.58 – 0.79 mg/L

Table 6 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

Table 7 Summary of inorganic parameters tested in treated water during the reporting period.

Parameter	Sample Date	Result Value*	Unit of Measure	Exceedance**
Antimony	Jan – Dec 2013	ND	mg/L	No
Arsenic	Jan – Dec 2013	0.0003	mg/L	No
Barium	Jan – Dec 2013	0.0142	mg/L	No
Boron	Jan – Dec 2013	0.0069	mg/L	No
Cadmium	Jan – Dec 2013	ND	mg/L	No



<b>Parameter</b>	<b>Sample Date</b>	<b>Result Value*</b>	<b>Unit of Measure</b>	<b>Exceedance**</b>
Chromium	Jan – Dec 2013	0.0002	mg/L	No
Lead	Jan – Dec 2013	ND	mg/L	No
Mercury	Jan – Dec 2013	ND	mg/L	No
Selenium	Jan – Dec 2013	0.0002	mg/L	No
Sodium	Jan – Dec 2013	17.0	mg/L	No
Uranium	Jan – Dec 2013	ND	mg/L	No
Fluoride	Jan – Dec 2013	0.69	mg/L	No
Nitrate	Jan – Dec 2013	0.16	mg/L	No
Nitrite	Jan – Dec 2013	ND	mg/L	No

ND denotes non-detectable results

NOTE\*: Inorganic parameters are tested monthly with the exception of fluoride which is tested daily. The values in the table represent annual average values.

NOTE\*\*: The determination of exceedances are based on all results in the data set.

Table 8 Summary of lead testing under Schedule 15.1 during this reporting period.

Location Type	Number of Samples	Range of Lead Results (µg/L) or (ppb)	Number of Exceedances
Plumbing	123	<0.05 – 44.2	7
Distribution	20	<0.05 – 124.7	1

Table 9 Summary of Organic parameters in treated water sampled during this reporting period or the most recent sample results

Parameter	Sample Date*	Result Value	Unit of Measure	Exceedance**
Alachlor	Jan – Dec 2013	ND	mg/L	No
Aldicarb	Jan – Dec 2013	ND	mg/L	No
Aldrin + Dieldrin	Jan – Dec 2013	ND	mg/L	No
Atrazine + N-dealkylated metabolites	Jan – Dec 2013	ND	mg/L	No
Azinphos-methyl	Jan – Dec 2013	ND	mg/L	No
Bendiocarb	Jan – Dec 2013	ND	mg/L	No
Benzene	Jan – Dec 2013	ND	mg/L	No
Benzo(a)pyrene	Jan – Dec 2013	ND	mg/L	No
Bromoxynil	Jan – Dec 2013	ND	mg/L	No
Carbaryl	Jan – Dec 2013	ND	mg/L	No
Carbofuran	Jan – Dec 2013	ND	mg/L	No
Carbon Tetrachloride	Jan – Dec 2013	ND	mg/L	No

<b>Parameter</b>	<b>Sample Date*</b>	<b>Result Value</b>	<b>Unit of Measure</b>	<b>Exceedance**</b>
Chlordane (Total)	Jan – Dec 2013	ND	mg/L	No
Chlorpyrifos	Jan – Dec 2013	ND	mg/L	No
Cyanazine	Jan – Dec 2013	ND	mg/L	No
Diazinon	Jan – Dec 2013	ND	mg/L	No
Dicamba	Jan – Dec 2013	ND	mg/L	No
1,2-Dichlorobenzene	Jan – Dec 2013	ND	mg/L	No
1,4-Dichlorobenzene	Jan – Dec 2013	ND	mg/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	Jan – Dec 2013	ND	mg/L	No
1,2-Dichloroethane	Jan – Dec 2013	ND	mg/L	No
1,1-Dichloroethylene	Jan – Dec 2013	ND	mg/L	No
Dichloromethane	Jan – Dec 2013	ND	mg/L	No
2-4 Dichlorophenol	Jan – Dec 2013	ND	mg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	Jan – Dec 2013	ND	mg/L	No
Diclofop-methyl	Jan – Dec 2013	ND	mg/L	No
Dimethoate	Jan – Dec 2013	ND	mg/L	No
Dinoseb	Jan – Dec 2013	ND	mg/L	No
Diquat	Jan – Dec 2013	ND	mg/L	No
Diuron	Jan – Dec 2013	ND	mg/L	No

<b>Parameter</b>	<b>Sample Date*</b>	<b>Result Value</b>	<b>Unit of Measure</b>	<b>Exceedance**</b>
Glyphosate	Jan – Dec 2013	ND	mg/L	No
Heptachlor + Heptachlor Epoxide	Jan – Dec 2013	ND	mg/L	No
Lindane (Total)	Jan – Dec 2013	ND	mg/L	No
Malathion	Jan – Dec 2013	ND	mg/L	No
Methoxychlor	Jan – Dec 2013	ND	mg/L	No
Metolachlor	Jan – Dec 2013	ND	mg/L	No
Metribuzin	Jan – Dec 2013	ND	mg/L	No
Monochlorobenzene	Jan – Dec 2013	ND	mg/L	No
Paraquat	Jan – Dec 2013	ND	mg/L	No
Parathion	Jan – Dec 2013	ND	mg/L	No
Pentachlorophenol	Jan – Dec 2013	ND	mg/L	No
Phorate	Jan – Dec 2013	ND	mg/L	No
Picloram	Jan – Dec 2013	ND	mg/L	No
Polychlorinated Biphenyls(PCB)	Jan – Dec 2013	ND	mg/L	No
Prometryne	Jan – Dec 2013	ND	mg/L	No
Simazine	Jan – Dec 2013	ND	mg/L	No
Trihalomethanes***	Jan – Dec 2013	0.039	mg/L	No
Temephos	Jan – Dec 2013	ND	mg/L	No

Parameter	Sample Date*	Result Value	Unit of Measure	Exceedance**
Terbufos	Jan – Dec 2013	ND	mg/L	No
Tetrachloroethylene	Jan – Dec 2013	ND	mg/L	No
2,3,4,6-Tetrachlorophenol	Jan – Dec 2013	ND	mg/L	No
Triallate	Jan – Dec 2013	ND	mg/L	No
Trichloroethylene	Jan – Dec 2013	ND	mg/L	No
2,4,6-Trichlorophenol	Jan – Dec 2013	ND	mg/L	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	Jan – Dec 2013	ND	mg/L	No
Trifluralin	Jan – Dec 2013	ND	mg/L	No
Vinyl Chloride	Jan – Dec 2013	ND	mg/L	No

ND denotes non-detectable results

NOTE\*: Organic parameters are tested quarterly. The values in the table represent annual average values.

NOTE\*\*: The determination of exceedances are based on all results in the data set.

NOTE\*\*\*: The reported THM result is an annual average of the maximum value observed in each quarter in the distribution system.

Table 10 Inorganic or Organic parameters that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards

<b>Parameter</b>	<b>Result Value</b>	<b>Unit of Measure</b>	<b>Date of Sample</b>
Fluoride	0.75 – 0.78	mg/L	Jan – Dec 2013
Chloramine	1.54 – 2.59	mg/L	Jan – Dec 2013
N-Nitrosodimethyl amine (NDMA)	9.8	ng/L	April 15, 2013

NOTE: The values represented in the table above are based on individual grab samples. Although some of the results exceeded half the MAC (maximum acceptable concentration) value during 2013, fluoride and chloramine concentrations are tested daily and therefore do not require sampling frequency to be increased. NDMA is tested quarterly.

It is important to note that fluoride and chloramine are intentionally added to be present at greater than half the MAC in order to be operationally effective. The Maximum Acceptable Concentration (MAC) for fluoride in drinking water = 1.5 mg/L; MAC for chloramine = 3.0 mg/L