

2012 Annual Report

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 1st – December 31st 2012

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 1 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 _____

Describe your 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 2700 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, about 90% of average daily production. 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 – 30%)
- 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

1. **SCADA System Upgrade Project (\$12 million):** This major project involving upgrades to the process control computer system continued through 2012. 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.
2. **Mechanical Upgrades (\$1.3 million):** This 2 year project was completed at Britannia during 2012 but continues at Lemieux Island into 2013. The project includes the renewal and modifications of various mechanical systems at the WPPs. At Britannia, this work included new inlet valves for the mixing chambers, actuators on clearwell outlet valves, an actuated gate valve in the final mixing tank, service water piping modifications, new plant effluent sample lines and modifications to facilitate decanting of settling basins 4 and 5. At Lemieux, the work includes new mixing chamber flush and gate valves, new high lift building sump pumps and service water extensions and modifications.

Table 2 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
10-Jan-12 AWQI# 104660	Total Coliform bacteria >0 Britannia WPP Treated	Positive	Presence/ Absence	Flush and resample	16-Jan-12
12-Sep-12 AWQI# 108395	Total Coliform bacteria >0 Britannia WPP Treated	Positive	Presence/ Absence	Flush and resample	12-Sep-12
19-Sep-12 AWQI# 108506	Total Coliform bacteria >0 Britannia WPP Treated	Positive	Presence/ Absence	Flush and resample	24-Sep-12
22-Sep-12 AWQI# 108566	Total Coliform bacteria >0 Britannia WPP Treated	Positive	Presence/ Absence	Flush and resample	23-Sep-12
28-Sep-12 AWQI# 108656	Total Coliform bacteria >0 Britannia 1W Header	1	MPN/100 mL	Flush and resample	01-Oct-12
29-Sep-12 AWQI# 108656	Total Coliform bacteria >0 Britannia WPP Treated	Positive	Presence/ Absence	Flush and resample	02-Oct-12
01-Oct-12 AWQI# 108688	Total Coliform bacteria >0 Britannia WPP Treated	Positive	Presence/ Absence	Disinfect pipe, flush, resample	04-Oct-12
01-Oct-12 AWQI# 108688	Total Coliform bacteria >0 Britannia 2W Header	5	MPN/100 mL	Disinfect pipe, flush, resample	04-Oct-12
09-Oct-12 AWQI# 108806	Total Coliform bacteria >0 Britannia 1W Header	2	MPN/100 mL	Flush and resample	11-Oct-12
12-Oct-12 AWQI# 108896	Total Coliform bacteria >0 Britannia 2W Header	4	MPN/100 mL	Flush and resample	17-Oct-12
12-Oct-12 AWQI# 108896	Total Coliform bacteria >0 Britannia 2W Header	1	MPN/100 mL	Flush and resample	17-Oct-12
14-Oct-12 AWQI# 108924	Total Coliform bacteria >0 Britannia 2W Header	1	MPN/100 mL	Flush and resample	17-Oct-12
16-Oct-12 AWQI# 108944	Total Coliform bacteria >0 Britannia 1W Header	2	MPN/100 mL	Flush and resample	22-Oct-12
18-Jan-12 AWQI# 104742	Total Coliform bacteria >0 Hydrant at 4 Largo Cr.	Positive	Presence/ Absence	Flush and resample	19-Jan-12
16-Feb-12 AWQI# 105085	Lead > 10 µg/L in distribution system: hydrant at 43 Bower St.	20	µg/L	Review history of fire hydrant	16-Feb-12
28-Feb-12 AWQI# 105181	Lead > 10 µg/L in distribution system: hydrants at 44 Ella & 53 Anna Streets	Ella: 26.6 Anna: 10.0	µg/L	Review history of fire hydrant	28-Feb-12

Incident Date	Test Parameter and Location	Result	Unit of Measure	Corrective Action	Date of Resolution
05-Mar-12 AWQI# 105241	Chloramine < 0.25 mg/L S. Gloucester P.S.	0.23	mg/L	Flush and resample	05-Mar-12
15-May-12 AWQI# 105952	Total Coliform bacteria >0 Temp service at 361 Mariposa	Positive	Presence/ Absence	Flush and resample	22-May-12
16-May-12 AWQI# 105952	Total Coliform > 0 and Ecoli bacteria > 0 Temp service at 371 Mariposa	Total Coliform= 6 / E.coli=6	MPN/100 mL	Replaced Temp Service Hose, disinfect, flush and resample	22-May-12
07-Jun-12 AWQI#106321	Total Coliform >0 in multiple samples from Temp service on DeLong St.	Positive (4 of 5 samples)	Presence/ Absence	Change Temp Service Hose, disinfect and resample	08-Jun-12
20-Jun-12 AWQI# 106554	Total Coliform >0 Watermain re- commissioning at 1925 Falaise St.	Positive	Presence/ Absence	Flush and resample	22-Jun-12
17-Jul-12 AWQI#107210	Total Coliform bacteria >0 Temp service at 130 Williams Walk	Positive	Presence/ Absence	Flush and resample	19-Jul-12
19-Jul-12 AWQI# 107307	Total Coliform bacteria >0 In multiple samples from Temp service at Arundel & Merriman Dr.	Positive (16 of 16 samples)	Presence/ Absence	Disinfect temp service, flush and resample	23-Jul-12
3-Aug-12 AWQI# 107684	Total Coliform bacteria >0 Temp service at 753 Lonsdale	Positive	Presence/ Absence	Flush and resample	7-Aug-12
10-Aug-12 AWQI# 107801	Total Coliform bacteria >0 Temp service at 34 Arundel	Positive	Presence/ Absence	Flush and resample	11-Aug-12
12-Aug-12 AWQI# 107840	Total Coliform bacteria >0 Watermain connection at Rideau & Dalhousie West Stub	Positive	Presence/ Absence	Flush and resample	14-Aug-12

30-Aug-12 AWQI# 108247	Total Coliform bacteria >0 Customer inquiry at 316 Valade Crt	Positive	Presence/ Absence	Resample multiple taps in home	4-Sept-12
6-Sept-12 AWQI# 108321	Total Coliform bacteria >0 at Greenboro Community Center & Industrial Fire Hall	Positive (2 samples)	Presence/ Absence	Flush and resample	9-Sept-12
18-Sept-12 AWQI# 108481	Total Coliform bacteria >0 at Greenboro Community Center	Positive	Presence/ Absence	Flush and resample	19-Sept-12
3-Oct-12 AWQI# 108744	Total Coliform bacteria >0 Temp service at 1512 Lapperiere	Positive	Presence/ Absence	Flush and resample	4-Oct-12
4-Nov-12 AWQI# 109212	Chloramine < 0.25 mg/L Customer Inquiry at 332 Hamilton Rd.	0.22	mg/L	Flush and resample	05-Nov-12
6-Dec-12 AWQI# 109494	Chromium > 0.05 mg/L St. Clare Public School	0.069	mg/L	Resample multiple taps within school	10-Dec-12

Table 3 Microbiological testing done under Schedule 10, 11 or 12 of regulation 170/03 during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min - max)	Range of Total Coliform Results (min - max)	Number of HPC Samples	Range of HPC Results (min - max)
Raw	362	0 - 867	9 - 2420	51	<10 - 2000
Treated	1765	0	0 - positive	202	<10 - 600
Distribution	6790	0 - positive	0 - positive	2723	<10 - 2500

Table 4 Operational testing for treated water done under Schedule 7, 8 or 9 of Regulation 170/03 during this reporting period.

	Number of Grab Samples	Results (min - max)
Turbidity	728 + continuous	0.03 – 0.10 NTU
Chlorine	813 + continuous	1.54 – 2.59 mg/L
Fluoride (If the DWS provides fluoridation)	743 + continuous	0.61 – 0.78 mg/L

Table 5 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 6 Summary of inorganic parameters tested in treated water during the reporting period.

Parameter	Sample Date*	Result Value	Unit of Measure	Exceedance**
Antimony	Jan – Dec 2012	0.0004	mg/L	No
Arsenic	Jan – Dec 2012	0.0003	mg/L	No
Barium	Jan – Dec 2012	0.0137	mg/L	No
Boron	Jan – Dec 2012	0.0077	mg/L	No
Cadmium	Jan – Dec 2012	ND	mg/L	No
Chromium	Jan – Dec 2012	0.0002	mg/L	No
Lead	Jan – Dec 2012	0.0001	mg/L	No
Mercury	Jan – Dec 2012	ND	mg/L	No
Selenium	Jan – Dec 2012	ND	mg/L	No
Sodium	Jan – Dec 2012	15.2	mg/L	No
Uranium	Jan – Dec 2012	ND	mg/L	No
Fluoride	Jan – Dec 2012	0.70	mg/L	No
Nitrate	Jan – Dec 2012	0.11	mg/L	No
Nitrite	Jan – Dec 2012	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 7 Summary of lead testing under Schedule 15.1 during this reporting period.

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	119	0.05 - 16.0 ppb	2
Distribution	22	0.05 - 10.0 ppb	2

Table 8 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 2012	ND	mg/L	No
Aldicarb	Jan – Dec 2012	ND	mg/L	No
Aldrin + Dieldrin	Jan – Dec 2012	ND	mg/L	No
Atrazine + N-dealkylated metabolites	Jan – Dec 2012	ND	mg/L	No
Azinphos-methyl	Jan – Dec 2012	ND	mg/L	No
Bendiocarb	Jan – Dec 2012	ND	mg/L	No
Benzene	Jan – Dec 2012	ND	mg/L	No
Benzo(a)pyrene	Jan – Dec 2012	ND	mg/L	No
Bromoxynil	Jan – Dec 2012	ND	mg/L	No
Carbaryl	Jan – Dec 2012	ND	mg/L	No
Carbofuran	Jan – Dec 2012	ND	mg/L	No
Carbon Tetrachloride	Jan – Dec 2012	ND	mg/L	No
Chlordane (Total)	Jan – Dec 2012	ND	mg/L	No
Chlorpyrifos	Jan – Dec 2012	ND	mg/L	No
Cyanazine	Jan – Dec 2012	ND	mg/L	No
Diazinon	Jan – Dec 2012	ND	mg/L	No
Dicamba	Jan – Dec 2012	ND	mg/L	No
1,2-Dichlorobenzene	Jan – Dec 2012	ND	mg/L	No
1,4-Dichlorobenzene	Jan – Dec 2012	ND	mg/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	Jan – Dec 2012	ND	mg/L	No
1,2-Dichloroethane	Jan – Dec 2012	ND	mg/L	No
1,1-Dichloroethylene	Jan – Dec 2012	ND	mg/L	No
Dichloromethane	Jan – Dec 2012	ND	mg/L	No
2,4-Dichlorophenol	Jan – Dec 2012	ND	mg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	Jan – Dec 2012	ND	mg/L	No
Diclofop-methyl	Jan – Dec 2012	ND	mg/L	No
Dimethoate	Jan – Dec 2012	ND	mg/L	No
Dinoseb	Jan – Dec 2012	ND	mg/L	No
Diquat	Jan – Dec 2012	ND	mg/L	No
Diuron	Jan – Dec 2012	ND	mg/L	No
Glyphosate	Jan – Dec 2012	ND	mg/L	No
Heptachlor + Heptachlor Epoxide	Jan – Dec 2012	ND	mg/L	No
Lindane (Total)	Jan – Dec 2012	ND	mg/L	No
Malathion	Jan – Dec 2012	ND	mg/L	No
Methoxychlor	Jan – Dec 2012	ND	mg/L	No
Metolachlor	Jan – Dec 2012	ND	mg/L	No

Parameter	Sample Date*	Result Value	Unit of Measure	Exceedance**
Metribuzin	Jan – Dec 2012	ND	mg/L	No
Monochlorobenzene	Jan – Dec 2012	ND	mg/L	No
Paraquat	Jan – Dec 2012	ND	mg/L	No
Parathion	Jan – Dec 2012	ND	mg/L	No
Pentachlorophenol	Jan – Dec 2012	ND	mg/L	No
Phorate	Jan – Dec 2012	ND	mg/L	No
Picloram	Jan – Dec 2012	ND	mg/L	No
Polychlorinated Biphenyls(PCB)	Jan – Dec 2012	ND	mg/L	No
Prometryne	Jan – Dec 2012	ND	mg/L	No
Simazine	Jan – Dec 2012	ND	mg/L	No
Trihalomethanes***	Jan – Dec 2012	0.031	mg/L	No
Temephos	Jan – Dec 2012	ND	mg/L	No
Terbufos	Jan – Dec 2012	ND	mg/L	No
Tetrachloroethylene	Jan – Dec 2012	ND	mg/L	No
2,3,4,6-Tetrachlorophenol	Jan – Dec 2012	ND	mg/L	No
Triallate	Jan – Dec 2012	ND	mg/L	No
Trichloroethylene	Jan – Dec 2012	ND	mg/L	No
2,4,6-Trichlorophenol	Jan – Dec 2012	ND	mg/L	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	Jan – Dec 2012	ND	mg/L	No
Trifluralin	Jan – Dec 2012	ND	mg/L	No
Vinyl Chloride	Jan – Dec 2012	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.

Table 9 Inorganic or Organic parameters that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards

Parameter	Result Value	Unit of Measure	Date of Sample
Fluoride	0.75 – 0.78	mg/L	Jan – Dec 2012
Chloramines	1.54 – 2.59	mg/L	Jan – Dec 2012

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 2012, fluoride and chloramine concentrations are tested daily and therefore do not require sampling frequency to be increased.

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. MAC for fluoride = 1.5 mg/L; MAC for chloramine = 3.0 mg/L