

## **1.0 INTRODUCTION**

The Municipality of Brighton is pleased to present the Annual Compliance Report for the period of January 1<sup>st</sup> to December 31<sup>st</sup>, 2003. The Annual Compliance Report on drinking water is available at the municipal offices listed below; notification to the public of its availability is made in local newspapers.

## **2.0 CONTACT INFORMATION**

Municipal Offices:

Municipality of Brighton  
Don O'Neill, C.A.O.  
35 Alice Street  
Brighton, ON K0K 1H0  
Telephone: (613) 475-0670

Municipality of Brighton  
Jim Phillips, P.Eng., Director  
Public Works & Environmental Services  
67 Sharp Road, Brighton K0K 1H0  
Telephone: (613) 475-1162

Operators:

Mike Ryckman, WDII Operator in Charge  
Supervisor – Water Treatment & Distribution  
67 Sharp Road, Brighton  
Telephone: (613) 475-1162 ext. 108  
Fax: (613) 475-2599

Mark Alexander, WDI Operator  
Public Works & Environmental Services

Susan I. Hall, WDI Operator  
Environmental Services Co-ordinator  
Public Works & Environmental Services  
Telephone: (613) 475-1162 ext. 107

Keith Lee, WDI Operator  
Public Works & Environmental Services

## **3.0 CLASSIFICATION**

The Ontario Environmental Training Consortium classifies Brighton's drinking water-system as a Class II Water Distribution system.

## **4.0 CONTROL DOCUMENT INFORMATION**

Certificate of Approval Number 4570-5PRNE9 dated the 18<sup>th</sup> day of November 2003 revokes and replaces Certificate of Approval Number 0351-5MWSC6 issued on May 29, 2003. An amended completion date of December 31, 2004 was approved for upgrades of the drinking-water system to comply with O.Reg. 170/03 and Procedure for Disinfection of Drinking Water in Ontario.

Brighton Water Supply Works identification number is W220000807.

Permit to Take Water No. 92-P-3067 authorizes the municipality to withdraw water from the wells and reservoirs; this permit expires December 31, 2004. Operation and

flow limits for Well No. 3 are subject to valid PTTW, currently in the application process with the MOE.

## **5.0 REGULATIONS**

### **THE SAFE DRINKING WATER ACT, 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, to protect human health through the control and regulation of drinking-water systems and drinking –water testing.

The Ontario government has enacted a new drinking water regulation under the Safe Drinking Water Act, 2002 to replace the Drinking Water Protection Regulation for Larger Waterworks (O.Reg. 459/00). Effective June 1, 2003, the Drinking-Water Systems Regulation (O.Reg. 170/03) replaced the Drinking Water Protection Regulation for larger Waterworks (O.Reg. 459/00). In addition, a number of supporting regulations have been enacted, including the Drinking –Water Quality Standards Regulation (O.Reg. 169/03) which prescribes standards for 161 physical/chemical, microbiological and radiological parameters. The new Drinking Water Systems Regulation (O.Reg. 170/03) maintains regular sampling and testing of water, bacteria and chemical testing by accredited laboratories, minimum standards for treatment, approval and licensing/training requirements, immediate notification of any adverse water quality, public reporting and tough penalties for non-compliance. The new Drinking Water Systems Regulation and its supporting regulations can be found at [www.ene.gov.on.ca](http://www.ene.gov.on.ca).

New drinking water regulations stipulate that owners of a water treatment or distribution system that obtains water from a surface water source shall ensure provision of a minimum level of treatment consisting of *chemically assisted filtration and disinfection* or other treatment capable of producing water of equal or better quality. As a result, Brighton’s water source supply will shift from surface water source to groundwater source, not under the influence of surface water. Deadline to complete upgrades to the drinking water system is December 31, 2004.

### **SUSTAINABLE WATER AND SEWAGE SYSTEMS ACT, 2002**

Helps ensure clean, safe drinking water for Ontario residents by making it mandatory for municipalities to assess and cost-recover the full amount of water and sewer services. A report on the full cost of water services, a cost recovery plan approved and submitted to the Ministry.

## **6.0 UPGRADING SUMMARY**

1. Well No. 3 constructed and developed in summer and fall of 2002, operation and maximum flow rates of this well are subject to a valid Permit to Take Water (PTTW) presently in the application process. Well No. 2 tested and developed. All wells to be equipped with a submersible pump rated at 24.9 L/s and linked to the raw water transmission line to the new Water Treatment Plant.

2. Replacement of existing open spring fed water reservoirs with a 3,800 m<sup>3</sup> concrete reservoir consisting of two baffled cells. Ministry requirements state that all existing and future potable water storage structures shall be completely covered to prevent contamination of the stored water.
3. Obtain new dataloggers/equipment, to replace penrecorders, with capability to monitor daily peak flows, and max., min., and mean for continuous monitoring of turbidity and chlorine residuals.
4. Chlorine Rooms must have a Chlorine Detector Alarm System – included in plans at the new plant.
5. Upgrades to the water treatment plant must be completed by December 31, 2004.

Funding for a portion of project costs has been confirmed under the Canada-Ontario Infrastructure Program.

## 7.0 DEFINITIONS

**Accredited Lab**, all laboratories that test drinking water must be accredited for the tests they perform by the Standards Council of Canada or its equivalent. Accreditation involves performance testing and auditing to ensure that laboratories follow appropriate procedures using acceptable methods.

**Chlorine Residual** – chlorine residual in water is a component of chlorine after the initial disinfection or chlorine demand has been satisfied. The maintenance of a chlorine residual in the distribution system is intended to keep a persistent disinfectant residual to protect the water from microbiological re-contamination and serve as an indicator of distribution system integrity.

**GUDI** Groundwater Under Direct Influence of Surface Water – in some groundwater supplies, situations may exist where contaminants typically found on the ground or in surface water, such as a lake or river, find their way into the groundwater and can be pumped from the well into the water distribution system. Such a system is referred to as Groundwater Under Direct Influence of Surface Water or GUDI. This can be caused by a number of different factors including the geology surrounding a well, insufficient travel time between the well intake and surface water or a defect in the well. A true groundwater supply would normally be free of harmful microbiological contaminants and reflect only disinfection be provided as a minimum level of treatment along with a minimum chlorine residual after 15 minutes contact time.

**MAC** Maximum Acceptable Concentration – This is a health-related Ontario drinking water standard established for contaminants that have known or suspected adverse health effects when above a certain concentration. The length of time the MAC can be exceeded without injury to health will depend of the nature and concentration of the parameter.

**IMAC** Interim Maximum Acceptable Concentration – This is a health related Ontario drinking water standard established for contaminants when there are insufficient

toxicological data to establish a MAC with reasonable certainty, or when it is not practical to establish a MAC at the desired level.

**Inorganic parameters** – substances such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production mining, farming, or domestic plumbing.

**OG Operational Guidelines** are established for parameters that need to be controlled to ensure efficient and effective treatment and distribution of water.

**mg/L** milligrams per litre is a measure of concentration of a parameter in water, sometimes called parts per million (ppm).

**µg/L** micrograms per litre is a measure of concentration of a parameter in water, sometimes called parts per billion (ppb).

**Parameter** is a substance that is sampled and analyzed in the water.

**Potable Water** is water from ground or surface sources that is supplied for human consumption.

**Raw Water** – water entering the treatment plant prior to any chemical addition. Raw water sampling and analysis provides a measure of source water quality which allows assessment and adjustment of treatment process; information on the source of any contaminants; and long term trends in source water quality.

**Turbidity** – turbidity in water is caused by the presence of suspended matter such as clay, silt and microscopic organisms and is commonly present in the source water as a result of soil runoff. The substances and particles that cause turbidity can be responsible for interference with disinfection, can be a source of disease-causing organisms, and can shield pathogenic organisms from the disinfection process.

**Treated Water** is source water that has been altered in order to disinfect and ensure treatment has producing water of equal or better quality.

## **8.0 PLANT DESCRIPTION & TREATMENT PROCESS**

### **8.1 Raw Water Source**

The surface water source consists of spring flows from a shallow aquifer which enter the two reservoirs. The reservoirs serve as collection galleries and settling basins for the springs. The second source of raw water is ground water which is captured from a deep aquifer by two drilled wells located adjacent to the Upper Reservoir site. Two wells draw water from the aquifer under the reservoir area, Well No. 1 is a duty well, and Well No. 2 is operated as a stand-by well. The Upper Reservoir has been the main source of raw water supply, with the Lower Reservoir and the Wells being utilized as supplementary sources, mainly during summer months. The Brighton Water Supply Plant has been fortunate in having an excellent source of natural spring water as its main source of water supply. However, the reservoirs are regarded as a surface water source and new regulations require surface water be treated utilizing methods of

filtration. The transition to a secure groundwater supply includes construction of a third well, developed in October/November 2002; a Permit to Take Water has been submitted to the MOE for approval to implement Well No. 3 as part of Brighton's new groundwater supply system.

### **8.2 Treatment Process**

Disinfection of water to eliminate disease-causing organisms is the most important step in the drinking water treatment process. Chlorine gas is added to the water as it enters the distribution system. Chlorine residuals are measured continuously by online instrumentation at the point of entry, as well as in the distribution system by operators.

### **8.3 Stand-by-Equipment**

Stand-by chlorinator and generator are in place to provide back-up service in case of power or equipment failure. An alarm system notifies operators if the water leaving the plant has a chlorine concentration less than 0.5 mg/L, Turbidity levels greater than 1 NTU, or if the automated equipment malfunctions or loses power. A licensed operator is on-call 24 hours/day, seven days/week.

### **8.4 Distribution System**

The Municipality of Brighton's distribution system provides drinking water to approximately 5,000 residents through a network of approximately 55 km. of piping and 2,600 residential and commercial accounts. Fire hydrants are maintained by the Water Department, which includes a flushing program to clear out dead-ends; this practice maintains the water quality in the distribution system and assures the hydrants are in good repair. Chlorine residuals, as well as microbiological sampling and testing, in the distribution system are checked on a weekly basis at five separate sites. The recommended optimum target for free chlorine residual concentration in a water distribution system is 0.2 mg/L at a pH 8.5 or less. The range for free chlorine concentration in the distribution system in 2003 was 0.22-0.95 mg/L. Operators test chlorine residuals on a daily basis in the distribution system as per O. Reg. 170/03.

Upgrades to the distribution system in 2003 include new water and sewer service extensions to Presqu'ile Park as per Ontario Parks request. This upgrade includes a new chlorination booster station at Presqu'ile Parkway which will provide secondary disinfection to ensure chlorine residuals are maintained along this area of the distribution system. Water main replacement projects took place on Butler and Chapel Streets; extension to the distribution system took place on Edgewater Drive, Cove Crescent, Butler St. W. and Iroquois Ave.

Water meter supply and installation was tendered in 2003 with a project completion date extended to June 2004. A consultant is preparing a study for new municipal water and sewer rates based on cost-recovery of water and sewer services as per Ministry regulations.

## 9.0 COMPLIANCE WITH TERMS AND CONDITIONS OF THE C OF A

### 9.1 Flow Rates/Quantity of Water Supplied

A Permit to Take Water No. 92-P-3067 which expires December 31, 2004, authorizes and approves the municipality to withdraw water from the wells and/or reservoirs at the following maximum flow rates:

Well # PW1	1,591 L/min. or 2,151,360 L/day
Well No. 2	1,591 L/min. or 2,291,040 L/day
*Well No. 3	24.9 L/sec. Pending PTTW
Upper Reservoir	2,100 L/min. or 3,024,000 L/day-(to be abandoned)
Lower Reservoir	1,800 L/min. or 2,592,000 L/day-(to be abandoned)

The water treatment plant is operated to treat water at a rate not exceeding the maximum flow rate of 6,445 m<sup>3</sup> /day. The total maximum flow rate is based on a combined flow rate of 3,024 m<sup>3</sup> from the Upper Reservoir, supplemented by the wells or lower reservoir.

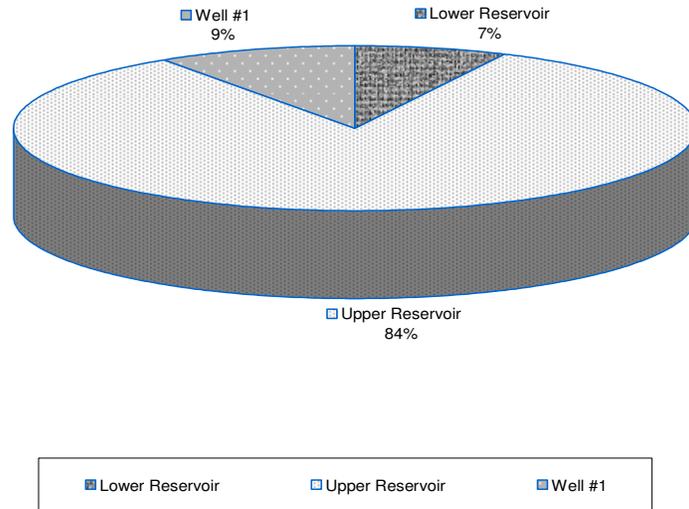
The maximum flow rate in 2003 occurred on Saturday July 5, 2003 with 4,656 m<sup>3</sup> of water being drawn from a combination of the upper and lower reservoirs; this represents 72% of the maximum day rated capacity of 6,445 m<sup>3</sup> /day. Brighton Waterworks supplied a total of 965,781 m<sup>3</sup> of treated water in 2003, with an average daily flow of 2,645 m<sup>3</sup>/day. The Upper Reservoir supplied 84% of the water supply with supplementary supplies utilized from Well PW1-90 and the Lower Reservoir. Well flow is diverted directly to the Upper Reservoir, then to the distribution system. TABLE 1 summarizes the quantity and source of Brighton's water supply during the period of this report.

See Appendix II-Monthly Summary Report

TABLE 1

Source	Quantity	Percentage
Upper Reservoir	807,245 m <sup>3</sup>	84%
Lower Reservoir	68,453 m <sup>3</sup>	7%
Well 1	90,083 m <sup>3</sup>	9%
Total	965,781m <sup>3</sup>	100%

### Brighton Water Supply Source 2003



## **9.2 Sampling & Analysis Requirements**

**Sample & test** drinking water in a frequency designed to reflect the type and user of the system. Specific requirements for each category differ depending on the size and population served.

- **Category of System** - Brighton Water Supply System is categorized as **Large Municipal Residential**, which is defined as a municipal drinking water system that serves a major residential development of more than 100 private residences.
- **Sampling & Testing** requirements for a Large Municipal Residential drinking water system state that the owner of the drinking-water system and the operating authority for the system shall ensure samples be tested for the following:
  - Microbiological – O.Reg. 170/03 Schedule 10 requires at least eight distribution samples, plus one additional distribution sample for every 1,000 people served by the system, are taken every month, with at least one of the samples being taken each week. With this, 13 treated distribution samples would be required monthly. Brighton currently samples 5 distribution samples weekly or approximately 20 samples monthly. These samples are tested for Escherichia coli or fecal coliforms and total coliforms, and 25% of the samples are tested for general bacteria populations expressed as background colony counts on the total coliform membrane filter or as colony counts on a heterotrophic plate count. Raw water samples are required to be tested at least once every week from the drinking-water system’s raw water before any treatment is applied to the water. Raw water was sampled weekly from the upper and lower reservoirs and Well #1 when in use.

<b>Source</b>	<b>Jan.</b>	<b>Feb.</b>	<b>Mar.</b>	<b>Apr.</b>	<b>May</b>	<b>Jun.</b>	<b>Jul.</b>	<b>Aug.</b>	<b>Sep.</b>	<b>Oct.</b>	<b>Nov.</b>	<b>Dec.</b>	<b>Total</b>
Upper Reservoir	4	4	4	5	4	4	5	4	5	4	4	5	52
Lower Reservoir	4	4	4	5	4	4	5	4	5	4	4	5	52
Well #1	0	0	2	1	0	3	5	4	5	2	2	0	24
Well #2 (out of service)	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Raw Samples</b>	<b>8</b>	<b>8</b>	<b>10</b>	<b>11</b>	<b>8</b>	<b>11</b>	<b>15</b>	<b>12</b>	<b>15</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>128</b>

POE (Point of Entry)	4	4	4	5	4	4	5	4	5	4	4	5	52
Distribution System	20	20	20	25	20	20	28	23	28	19	19	25	267
<b>Total Treated Samples</b>	<b>24</b>	<b>24</b>	<b>24</b>	<b>30</b>	<b>24</b>	<b>24</b>	<b>33</b>	<b>27</b>	<b>33</b>	<b>23</b>	<b>23</b>	<b>30</b>	<b>319</b>

- Chemical Sampling & Testing – O.Reg. 170/03 Schedule 13 requires Large Municipal Residential Systems be tested for the following:
  - (i) Inorganics (Schedule 23) be tested at least every 12 months if the system obtains water from a raw water supply that is surface water. Note that once the water system switches to groundwater (wells) then a sample must be tested every 36 months.
  - (ii) Lead - at least one sample in the distribution system is taken every 12 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 concentration of lead.
  - (iii) Organics – if the system obtains water from a raw water supply that is surface water, at least one water sample is taken ever 12 months. Note that when the raw water source is groundwater (wells) then at least one water sample must be taken every 36 months.
  - (iv) Trihalomethanes – at least one distribution sample is taken every three months from a point in the drinking-water system that is likely to have an elevated potential for the formation of trihalomethanes.
  - (v) Nitrate and Nitrite, one water sample taken every three months.
  - (vi) Sodium, one water sample taken every 60 months.
  - (vii) Fluoride, one water sample taken every 60 months.
  
- See Appendix 1-O.Reg 170/03 Part III Annual Report for results. There were no exceedences of organic or inorganic parameters tested.

DWSP - Drinking Water Surveillance Program (DWSP) samples were submitted in April and November; lab results are available at the Public Works Municipal Office. Participation of operating authorities in DWSP is voluntary. The DWSP samples are analyzed at the Ministry of Environment Central Lab.

### **9.3 Monitoring and Reporting**

- On-Site Monitoring - Certified operators make daily checks at the water treatment plant to monitor and record operational parameters and perform site inspections, see Appendix II.
- Reporting - Annual and quarterly reports were prepared in accordance with O.Reg.459/00 up until O.Reg.170/03 came into effect. In May of 2003, the Ontario government enacted a new drinking water regulation under the Safe Drinking Water Act, 2002 to replace the Drinking Water Protection Regulation for Larger Waterworks (O.Reg.459/00). Quarterly reports were no longer required under the O.Reg. 170/03; however, annual reports must be submitted and made available to the public. Drinking water reports are available at both municipal offices and the public is informed via newspaper when it is available.

### **9.4 Operations and Maintenance**

Operators make daily inspections at the Water Treatment Plant including visual inspection of the grounds, equipment and on-site water quality testing and monitoring. The Contingency Plan and Operating and Maintenance Manuals are in place at the reservoirs as well as the Public Works office. Instrument calibration as per the manufacturer's instructions, including four flow meters, turbidity and chlorine analyzers, pen recorder, and chlorine controller, was completed in April 2003.

In 2003, there were a total of 46 water leaks in the distribution system; all repairs were carried out under the direction of Mike Ryckman, Operator-in-Charge. Watermain and service replacement projects took place on Butler and Chapel Streets during this reporting period.

The Municipality of Brighton encourages and supports safety and continuing education at the workplace. Staff operators participate in training programs regarding health and safety and water distribution and treatment courses.

As part of the Municipality of Brighton's water conservation policy, the Water Conservation By-law No. 029-2001, is enforced annually from June 1<sup>st</sup> to September 15<sup>th</sup>. This by-law is maintained to regulate and restrict the unnecessary use of water for outdoor purposes within the serviced area. Staff monitor and enforce compliance to this by-law during the period that it is in effect.

## **10.0 NON-COMPLIANCE WITH TERMS AND CONDITIONS OF THE C OF A**

- There were three adverse water quality notifications by Caduceon Lab to Brighton Water Supply System during the period of this report which were negative when resampled. On July 8, August 19, and September 23, positive microbiological results for Total Coliform were reported to the municipality by the lab. Operators immediately notified the Medical Officer of Health (Brighton Health Unit) and the Ministry's Spills Action Centre (MOE-SAC), providing oral and written notice. Corrective action included measuring chlorine residuals, resampling and testing upstream, downstream and at the site. Resamples were reported as negative. Notice of Issue Resolution was completed as required by Schedule 16-9 O.Reg. 170/03.

- Occasional elevated turbidity levels have occurred in the water supply mainly associated with lower reservoir pump starts or fire hydrant usage causing sudden surges of the water supply. Turbidity is monitored continuously by online equipment at the treatment plant. The turbidity meter was replaced in April and hooked up to the alarm system to notify operators when levels exceed 1 NTU. MOE Drinking-water inspectors conducted their annual inspection on September 24, 2003 and noted several incidents of elevated turbidity levels that were over the Drinking-Water Regulation concentration limit. The MOE requested that the municipality prepare a report of these incidences to explain time, duration and reason that turbidity levels were elevated. The inspector requested that operational plan be updated to include minimizing the use of the lower reservoir to emergency use only and reporting turbidity levels exceeding 1 NTU over 15 minutes to the Medical Officer of Health (Brighton Health Unit) and MOE Spills Action Centre. A Provincial Officer's Order was received on February 11, 2004, regarding a work order for the municipality to submit an action plan and implementation schedule acceptable to the Ministry outlining notification and corrective actions that will take place with regards to an event where Turbidity exceeds 1 NTU in treated water leaving the Brighton Water Treatment Plant. The MOE Site Inspection Report dated February 23, 2004 was received at the Public Works Office on February 27, 2004. The Provincial Officer determined that it was necessary to issue an Order as under O.Reg.170/03 16-3 Duty to Report turbidity is required for drinking-water systems that provide filtration; since Brighton does not have filtration, the Officer felt that Brighton may be exempt from reporting this parameter. It is in the best interest of public safety that Brighton report elevated Turbidity levels so that appropriate notification and corrective action can be made. The plan will cover the interim period until such time as the existing surface water source is abandoned and replaced with a groundwater source.
- There were two incidents of water taking from the upper reservoir that exceeded the maximum amount of taking of 3,024,000 during a 24-hour period (2,100 L/min.). On June 3, 3,142,604 L/day (2,182L/min.) was utilized and on November 9 3,280,389 L/day or 2,278 L/min. was used from the upper reservoir. Operators responded by utilizing supplementary sources the following day. November exceedence occurred due to a water leak in the distribution system. Both incidents were reported the MOE District office.

## 11.0 CONCLUSION

The Brighton Water Supply Plant is fortunate in having an excellent source of natural spring water as it's main source of water supply. However, the reservoirs are regarded as a surface water source and new regulations require the water be treated utilizing methods of filtration. There are presently 2 wells available and providing an additional well and a contained storage reservoir would provide the protection and water quality that would meet the new M.O.E. standards and regulations and meet the future demands of the Municipality. The next phase includes installing a storage reservoir and treatment facility. An extension of the deadline of December 31<sup>st</sup>, 2004 has been approved for implementation of the physical improvement to the water system.