

1.0 INTRODUCTION

The Municipality of Brighton is pleased to present the Annual Compliance Report for the period of January 1st to December 31st, 2004. The Annual Compliance Report on drinking water is prepared for and available to the public at the municipal offices listed below; notification to the public of its availability is made in local newspapers and on our website at www.town.brighton.on.ca.

2.0 CONTACT INFORMATION

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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

During the period of this report, the Brighton Water Supply System was operating under Certificate of Approval Number 4570-5PRNE9 dated the 18th day of November 2003. The Municipality has a valid Permit to Take Water for water taking from the reservoirs and wells for raw water supply to the treatment facility.

Brighton Water Supply Works identification number is W220000807.

5.0 REGULATIONS

THE SAFE DRINKING WATER ACT, 2002 / O.Reg. 170/03

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.

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 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 **G**roundwater **U**nder **D**irect **I**nfluence 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.

Total Trihalomethanes (THM) – are the most widely occurring synthetic organics found in chlorinated drinking water. The principal source of Trihalomethanes is the action of chlorine with naturally occurring organics (material that comes from plant or animal sources). The maximum acceptable concentration for THM is 0.10 mg/L based on four quarter moving annual average test results, tested at a remote point site in the distribution system.

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.

7.0 PLANT DESCRIPTION & TREATMENT PROCESS

7.1 Raw Water Source

Water sources at the Brighton Water Supply System consists of two spring fed reservoirs and three drilled wells. The surface water source consists of spring flows from a shallow aquifer which enter the two reservoirs, referred to as the Upper and Lower Reservoir. 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 drilled wells located adjacent to the Upper Reservoir site. There are three wells that draw water from the aquifer under the reservoir area: Well No.1 is a duty well, Well No.2 has been operating as a stand-by well, but was out of service from January to September 2004 until pump repairs were completed. Well #3 was

developed in October/November 2002 and is to be incorporated to the new groundwater supply system at which time the reservoirs are to be decommissioned.

In 2004, the Upper Reservoir has been the main source of raw water supply, with Well #1 and the Lower Reservoir being utilized as supplementary sources, mainly during summer months. Due to the frequency of elevated levels of turbidity from the Lower Reservoir, its use was discontinued as a supplementary source. Provincial Officer's Order No. 8454-5VUKPU was issued to Brighton on February 11, 2004 due to elevated turbidity levels at the treatment plant. As part of Brighton's Turbidity Report-Action Plan and Implementation Schedule, mitigation measures included that the use of the Lower Reservoir be used only in emergency situations, pumping to waste until turbidity levels were below 1.0 NTU.

Current drinking water regulations state 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 a secure groundwater source. The deadline to complete upgrades to the drinking water system have been extended and the new water works will be commissioned and operational in accordance with O.Reg.170/03 by August 31, 2005.

7.2 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 equipment at the point of entry and by operators in the distribution system. 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. Elevated turbidity levels have occurred on occasion, mainly associated with the starting up of the lower reservoir pump, surges to the system due to fires or flushing, or rainfall events that allows runoff into the reservoirs.

7.3 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.

7.4 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 2,400 residential and 200 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 least five separate sites. Operators also test chlorine residuals on a daily basis in the distribution system as per O. Reg. 170/03.

Upgrades to the distribution system in 2004 include water and sewer service extensions to Presqu'ile Park which was requested and funded by Ontario Parks. This upgrade includes a new chlorination booster station on Presqu'ile Parkway which provides secondary disinfection to ensure chlorine residuals are maintained along this area of the distribution system. Water main replacement projects took place on Young and Prince Edward Streets between Chapel and Sanford Streets; also, new water service extensions were replaced to residents on Dundas St. between Daniel's Drive and Georgina Street.

Water meter supply and installation was tendered in 2003 with a project completion date extended to the fall of 2004. New municipal water and sewer rates were established based on cost-recovery of water and sewer services as per Ministry regulations; the new metered rates are being implemented as of January 1, 2005.

8.0 UPGRADING SUMMARY

1. Well No. 3 constructed and developed in summer and fall of 2002. Well #2 has been equipped with a new submersible pump rated at 24.9 L/s. The new submersible pumps for Well #1 and #3 have not been installed, but Well #1 is operational. All wells to be linked to the raw water transmission line at the new Water Treatment Plant.
2. Replacement of existing open spring fed water reservoirs with a 7,600 m³ concrete reservoir consisting of two baffled cells. This will provide the 15 minute contact time prior to first usage currently not being met. Ministry requirements state that all existing and future potable water storage structures shall be completely covered to prevent contamination of the stored water. The building is still in construction phase, with electrical work still outstanding.
3. Obtain new dataloggers and monitoring equipment will replace penrecorders and will have capability to monitor daily peak flows, and max., min., and mean for continuous monitoring of turbidity and chlorine residuals as per regulations.
4. Chlorine Rooms must have a Chlorine Detector Alarm System – included in the plans at the new plant.
5. Commissioning date of the new Brighton Water Treatment Plant has been extended to August 31, 2005.

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

9.0 COMPLIANCE WITH TERMS AND CONDITIONS OF THE C OF A

9.1 Flow Rates/Quantity of Water Supplied

In 2004, a total of 938,004 m³ of water was treated and supplied at the Brighton Water Treatment Plant. With a approximate population of 5,000 residents on the distribution system, the per capita for water consumption was 188 m³/ person/year or 0.5 m³ (500 Litres)/person/day. Based on 2004 consumption, the average daily demand was 2,562 m³/day; the average daily demand represents the average quantity of water treated at the water treatment plant. Peak day demand represents the highest volume of water treated over a given 24-hour period, usually the hottest day of the year; this occurred on August 25 at 3,733 m³/day. The Brighton Water Treatment Plant is operated to treat water at a rate not exceeding the maximum flow rate of 4,600 m³/day.

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 at least 5 distribution samples weekly or approximately 20 samples monthly. These samples are tested for Escherichia coli and total coliforms, and 25% of the samples are tested for general bacteria populations expressed 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 reservoir & lower reservoir and from Well #1 and Well #2 when in service.

Microbiological Sampling & Testing-Large Municipal Residential

Source	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Upper Reservoir	4	4	5	4	4	5	4	5	4	4	5	4	52
Lower Reservoir	4	4	5	4	4	5	4	5	4	4	5	4	52
Well #1	0	4	5	4	4	5	4	5	4	4	5	4	48
Well #2 (out of service)	0	0	0	0	0	0	0	0	0	4	5	4	13
Total Raw Samples	8	12	15	12	12	15	12	15	12	16	20	16	165

POE (Point of Entry)	4	4	5	5	5	4	5	4	4	4	5	4	53
Distribution System	20	20	20	25	20	20	28	23	28	19	19	25	271
Total Treated Samples	24	24	31	24	27	30	24	30	24	24	34	28	324

Microbiological Results	Number of Samples	Range of E.Coli Results	Range of Total Coliform Results	Number of HPC Samples	Range of HPC Results
Raw	165	<1 - 238	<1 - >400	0	
POE-Chlorine Station	53	Absent	Absent	14	<10 - 20
Distribution	271	<1	<1	90	<10 - 40

- 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 sampling for organic/ inorganic parameters can be reduced to 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. 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 I – Part III Form 2 for Brighton's Annual Report electronic submission to MOE; there were no exceedances of organic or inorganic parameters tested during this period.

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.
- Reporting - Annual reports are prepared in accordance with O.Reg.170/03. Drinking water reports are available at both municipal offices and the public is informed via newspaper when it is available.
- As part of the Municipality of Brighton's water conservation policy, the Water Conservation By-law No. 029-2001, is enforced annually from June 1st to September 15th. 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.

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 are performed annually.

In 2004, there were 54 water leaks in the distribution system of which 3 were repairs to watermain. In 2003, there were a total of 46 water leaks. All repairs are carried out under the direction of Mike Ryckman, Operator-in-Charge.

Upgrades to the distribution system in 2004 include water and sewer service extensions to Presqu'ile Park which was requested and funded by Ontario Parks. This upgrade includes a new chlorination booster station on Presqu'ile Parkway which provides secondary disinfection to ensure chlorine residuals are maintained along this area of the distribution system. Water main replacement projects took place on Young and Prince Edward Streets between Chapel and Sanford Streets; also, new water service extensions were replaced to residents on Dundas St. between Daniel's Drive and Georgina Street.

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.

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

Elevated turbidity levels that resulted in adverse water quality from the Brighton Water Treatment Plant occurred on April 30 and May 1, 2004. The initial turbidity alarm occurred due to a disturbance to the aquifer from construction of a monitoring well that feeds into the upper reservoir stirring the sediment and causing increased turbidity. The Operator in Charge responded and the raw water source was transferred to the lower reservoir. Flushing commenced at the first hydrant in the distribution system until the turbidity levels were below 1.0 NTU. The high turbidity alarm occurred again on May 1 and the operator switched the source water from the Lower Reservoir back to the Upper Reservoir. Flushing commenced at the first hydrant along the distribution system until turbidity levels were below 1 NTU. The incident was reported to the MOE Spills Action Centre and Belleville District Office on May 3, 2004.

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 May 27, 3,049,193 L/day (2,117 L/min.) was utilized and on August 25, 3,733,000 L/day or 2,592 L/min. was used from the upper reservoir. Operators responded by utilizing supplementary sources the following day. Both incidents were reported the MOE District office.

10.0 CONCLUSION

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; also, all existing and future potable water storage structures must be completely covered to prevent contamination of stored water. The transition to a secure groundwater supply to meet O.Reg.170/03 and the Procedure for Disinfection of Drinking Water in Ontario included construction of the third well and a new storage facility. The majority of this project is complete and is due to be commissioned by August 31, 2005.

Our goal is to provide a safe and dependable supply of drinking water and maintaining compliance with provincial drinking water regulations. This summary of the quality of the water provided to you is a requirement of the Safe Drinking Water Act. Should you have any questions about this report, please call the Brighton Public Works & Environmental Services department at (613) 475-1162.