



City of Niagara Falls
Water Distribution System
Annual Summary Report
Period: January 1, 2009 to December 31, 2009

Waterworks Number: 260002304

Created March 2010

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City of Niagara Falls Water Distribution Annual Summary Report

Introduction

In accordance with the *Safe Drinking Water Act* this report provides members of Niagara Falls Municipal Council, the legal Owners of the water distribution system with an annual summary report of actions that took place from January 1, 2009 to December 31, 2009.

In accordance with the *Act*, this report must list any time the City failed to meet the conditions and requirements of the Acts, Regulations, Approvals, Drinking Water Works Permits, Municipal Drinking Water Licences and Orders issued by the Ministry of the Environment. For each requirement not met, the report must specify the duration of the failure and the measures taken to correct the failure.

Additionally, the report must list the summary of the quantities and flows of the water supplied.

Waterworks Description

The City of Niagara Falls is a class 2 water distribution system, which receives all treated water from the Regional Municipality of Niagara via the Niagara Falls Water Treatment Plant. The raw water source is surface water supplied from the Niagara River, via the Welland River.

The distribution system consists of approximately 440 km of watermain owned and operated by the City of Niagara Falls, 45 km of water owned and operated by the Regional Municipality of Niagara, 2,950 fire hydrants and 4,600 valves.

The size of watermains owned by the City of Niagara Falls range from 25mm to 450 mm in size.

Additional information regarding the Niagara Falls Water Treatment Plant can be found on the Regional Municipality of Niagara website.

Website <http://www.niagararegion.ca/home.aspx>

Compliance

Municipal Drinking Water Licensing Program

As part of a recommendation made by Justice O' Connor during the Walkerton Inquiry, the Ministry of the Environment has introduced a new program, the Municipal Drinking Water Licensing Program. This program requires the Drinking Water System Owner (City of Niagara Falls) to obtain a licence to operate their drinking water system.

There are four components to each licence; the Drinking Water Works Permit, Implementation of a Drinking Water Quality Management System, Accreditation of the Quality Management System and preparation of a Financial Plan.

- Drinking Water Work Permit allows the Municipality to alter, add, replace, modify and extend the drinking water based on a series of predefined conditions.
- Drinking Water Quality Management System (DWQMS) is a series of 21 elements that address all aspects of a water system. The overall goal of the DWQMS is continuous improvement with respect to planning, operating and reviewing the drinking water system. Through the creation of an operational plan the drinking water system Owner demonstrates the ability to operate a safe and effective drinking water system, while continuously monitoring performance and compliance via internal and external audits.
- Accreditation of the Quality Management System is achieved through internal and external audits, the goal of these audits are to ensure that the Owner is following the processes and procedures laid out in the operational plan. The Ministry of the Environment has engaged in an agreement with the Canadian General Standards Board (CGSB) to act as the Quality Management System accreditation body.
- *Ontario Regulation 453/07, Safe Drinking Water Act* requires that each Owner prepare a Financial Plan for the drinking water system. The City has retained a consultant to aid in the preparation of the Financial Plan. This plan must be submitted to the Ministry of Municipal Affairs and Housing by July 1, 2010.

The City received its Municipal Drinking Water Licence and Drinking Water Works Permit on September 9, 2009. In order to receive these documents, the City submitted the City of Niagara Falls Operational Plan to the CGSB for a Systems Level Audit.

This audit reviewed the City's Operational Plan and associated documentation to ensure all requirements of the DWQMS were met. The next phase of this auditing process is an on-site verification audit performed by the CGSB. This must be scheduled by September 2010, followed by two annual systems level audits and an on-site verification audit every three years.

Safe Drinking Water Act

To remain compliant with the *Safe Drinking Water Act*, the City performs a minimum of 88 microbiological samples a month. Each of these samples is taken from a different location, providing a diverse profile of the water distribution system. Disinfection levels showing a free chlorine residual are also taken at the time of each sample; ensuring proper disinfection levels are maintained. The City takes additional free chlorine residuals throughout the week, again to ensure proper disinfection levels are maintained.

The City also takes water samples testing for elevated levels of trihalomethanes (THM), a chlorine disinfection by-product. The City takes these water samples from areas where the formation of THM would most likely occur.

The Ministry of the Environment has also provincially mandated a Community Lead Testing Program. This program involves enlisting 80 residential volunteers, 8 non-residential volunteers and 16 samples taken directly from the distribution system. This must be done once between December 15 and April 15 and again June 15 to October 15th, on an on going cycle.

All of the aforementioned samples, in accordance with the *Act* must be taken by an individual with a Water Operators licence or a Water Quality Analyst licence. These licences are distributed by the Ontario Water Wastewater Certification Office, in accordance with *Ontario Regulation 128/04, Safe Drinking Water Act*.

Samples are then taken to a Ministry of the Environment approved laboratory. Laboratories must meet quality standards determined by the Ministry of the Environment and are audited by the Canadian Association for Laboratories Accreditation. In the event an incident occurs where water samples do not meet Provincial water quality standards, this is deemed an Adverse Water Quality Incident (AWQI). This is detailed further in the chart following entitled *Adverse Water Quality Incidents and Actions*

An Annual Drinking Water Report has been completed and is available free of charge to the public through the City website and at the Municipal Service Centre. Members of the public may also view water sample results at the Municipal Service Centre.

Niagara Falls Water Quality Test Results

| Parameter | MAC | Number of Samples | Range | Comments | |
|--|------------------|-------------------|---------------|--|--|
| Microbiological Analysis | | | | | |
| Escherichia Coli (E. Coli) CFU/ 100mL | 0 | 1366 | 0 | Indicates presence of fecal matter | |
| Total Coliforms CFU/ 100 mL | 0 | 1366 | 0 – 25 | Indicates the possible presence of fecal contamination | |
| Fecal Coliforms CFU/ 100 mL | 0 | 1366 | 0 – 9 | Indicates the possible presence of fecal contamination | |
| Heterotrophic Plate Count (HPC) CFU/mL | N/A | 1366 | 0 - >500 | Indication of overall water quality | |
| Chemical Analysis | | | | | |
| Trihalomethanes mg/L | 0.10 mg/L | 4 | 0.016 – 0.034 | Average of Samples taken quarterly | |
| Lead mg/L | Residential | 0.010 mg/L | 176 | <0.00002 - 0.0227 | Lead services were used in construction prior to 1955. |
| | Non- Residential | 0.010 mg/L | 16 | <0.00002 - 0.00148 | |
| | Distribution | 0.010 mg/L | 32 | <0.00002 - 0.00543 | City does not have lead watermain |
| Disinfection | | | | | |
| Free Chlorine Residual mg/L | 0.05 to 4.0 mg/L | 855 | 0.05 - 1.24 | Level of disinfectant | |

Adverse Water Quality Incidents and Actions

| Date | Location | Parameter | Result | Actions | Date of Resolution |
|------------|-------------------|---------------------------------|-----------------------------|----------------------------------|--------------------|
| 2009/1/6 | 5009 Homewood Ave | Tot. Coliform Fecal Coliform | 25 CFU/100mL 9 CFU/100mL | Flushed, resampled | 2009/1/9 |
| 2009/2/24 | 6699 Corwin Cr | Tot. Coliform | 15 CFU/100mL | Flushed, resampled | 2009/3/2 |
| 2009/10/14 | 6873 McLeod Rd | Tot. Coliform | 1 CFU/100mL | Flushed, resampled | 2009/10/19 |
| 2009/1/21 | 5849 Hennipen Cr | Lead * | 0.0143 mg/L 0.0227 mg/L | Followed direction of Heath Unit | N/A |
| 2009/7/3 | 4129 Martin Ave | Lead * | 0.0129 mg/L 0.0145 mg/L | Followed direction of Heath Unit | N/A |

* In both cases the occupant service line was the source of lead

In the event of an adverse water quality incident (AWQI), the City receives immediate notification from the laboratory. The City is then required as per Ministry of the Environment regulations to verbal notify the Regional Public Health Unit and the Ministry of the Environment Spills Action Centre.

Additionally, the City has chosen to contact our local Ministry of the Environment Inspector to share this information. These individuals are then faxed the same information that was shared verbally.

To ensure water safety, the City immediately sends a member of staff to flush the nearest fire hydrant, and take additional water samples at the source of the AWQI, as well as upstream and downstream of the AWQI. This occurs for two consecutive days at minimum until the City receives verbal notification from the laboratory that the water samples are all clear.

In the above table, the column “Date of Resolution” indicates the date in which the City has received copies of the laboratory results and submits the “Notice of Resolution” to the Ministry of the Environment and Public Health Unit.

It should be noted that an Adverse Water Quality Incident does not indicate that the drinking water is unsafe; rather it indicates that with respect to that specific sample, the Provincial water quality objective was exceeded.

In the event a lead result exceeds the Provincial standard, this result does not indicate system wide lead levels, rather the sample is site specific. Possible sources of lead include; lead solder, leaded brass fixtures and lead service lines. Prior to 1955 it was common to use lead water service lines as opposed to copper due to the malleability of lead. Properties that have lead results that exceed the Provincial standard are given an information package on ways to best reduce lead in their drinking water.

Operational Activities

In 2009, the City of Niagara Falls experienced 66 water main breaks. The City follows a standard operating procedure, detailing the steps taken to repair the water main, while ensure water quality. Following the water main break, microbiological samples are taken upstream and downstream of the break; ensuring the break was repaired in such a way that water quality levels were not affected.

Flow Rates

2009 Monthly Water Flow Rates (Mega Litres)

| Month | Quantity (ML) |
|-----------------|---------------|
| January | 1,932.282 |
| February | 1,083.752 |
| March | 1,187.347 |
| April | 1,183.020 |
| May | 1,395.977 |
| June | 1,392.846 |
| July | 1,499.533 |
| August | 1,562.425 |
| September | 1,395.219 |
| October | 1,220.624 |
| November | 1,147.192 |
| December | 1,192.365 |
| Total | 16,192.582 |
| Monthly Average | 1,349.381 |
| Daily Average | 44.36 |

1 Mega Litre = 1,000,000 Litres

Definitions

MAC - Maximum Acceptable Concentration

This is a health-related standard established for parameters which when present above a certain concentration, have known or suspected adverse health effects. The length of time the MAC can be exceeded without injury to health will depend on the nature and concentration of the parameter. (Ontario Drinking Water Standards. Ministry of the Environment. Revised January 2001. PIBS #4065e. Page 2.)

mg/L - milligrams per litre (parts per million)

cfu/100 mL - Colony Forming Units per 100 millilitres of sample

ug/l - micrograms per litre (parts per million)

< - Less than

> - Greater than

Microbiological parameters (ie. bacteria) - the source of bacteria may come from wastewater treatment plants, livestock operations, septic systems and wildlife. Microbiological analysis is the most important aspect of drinking water quality due to its association with dangerous waterborne diseases. (Paraphrased from Ontario Drinking Water Standards. Ministry of the Environment.)

Total Coliform - the group of bacteria most commonly used as an indicator of water quality. The presence of these bacteria in a water sample indicates inadequate filtration and / or disinfection. (Ontario Drinking Water Standards. Ministry of the Environment.)

Escherichia coli (E. coli) - a sub-group of coliform bacteria. It is most frequently associated with recent fecal pollution. The presence of E. coli or fecal coliforms in drinking water is an indications of sewage contamination. (Ontario Drinking Water Standards. Ministry of the Environment)

Heterotrophic Plate Count (HPC) - an estimate of the number of background bacteria present in the distribution system. It is not an indicator of fecal contamination, but more a general indicator of disinfection effectiveness and distribution system status with respect to biofilm presence and the influence of bacterial re-growth in the distribution system.

Trihalomethanes (THM's) - The maximum acceptable concentration (MAC) for Trihalomethanes (THMs) in drinking water is 0.10 mg/L based on a four quarter moving annual average of test results. Trihalomethanes are the most widely occurring synthetic organics found in chlorinated drinking water.

The four most commonly detected Trihalomethanes in drinking water are chloroform, bromodichloromethane, chlorodibromomethane and bromoform. The principal source of Trihalomethanes in drinking water is the action of chlorine with naturally occurring organics (precursors) left in the water after filtration.

Lead - Metals, for the most part, are naturally present in source water, or are the result of industrial activity. Some, such as Lead, may enter the drinking water from plumbing in the distribution system.

Lead can occur in the source water as a result of erosion of natural deposits. The most common source of lead is corrosion of the household plumbing. The MAC for lead levels is 0.010 mg/L.