Overview

- What is backflow?
- History and Legislation
- Premise Isolation
- Compliance
- Communication and Outreach
- Existing condition
- Uniquely Hamilton
- Unexpected benefits
Backflow - What is it?

What is Backflow?
Backflow is the flowing back of water or reversal of the normal direction of flow. When the reversal of the normal direction of flow occurs in a water distribution system a condition is created whereby potable (drinking) water may become contaminated. There are two types of backflow: Back Pressure and Back Siphonage.

What is Back Pressure?
Back Pressure is a form of backflow caused by pressure that is greater than the water supply system pressure.

What is Back Siphonage?
Back Siphonage is a form of backflow caused by a negative or sub-atmospheric pressure in a water system.

What causes Backflow?
There are many reasons why backflow occurs. A common example is when a watermain break occurs, the pressure in the water distribution system drops to a point causing the reversal of flow of water back into the system. This is known as back siphonage and if cross connections exist, contaminants can be drawn back into the potable water system.

What is a Cross Connection?
A cross connection is any actual or potential connection between a potable water system and any source of pollution or contamination. A common example of a cross connection is a garden hose connected to a hose bib at one end and the other end of the hose lying in a pool, puddle or any other source of non-potable water.

Double Check Valve Assembly - Large
Reduced Pressure Principle - Large
Double Check Valve Assembly Large
Reduced Pressure Principle - Small
Halton Region was advised by the Halton District School Board that as a result of internal maintenance on the heating system at Iroquois Ridge High School, which was carried out on Wednesday, chemicals used in the cleaning process entered the potable water system of the school. As a result the School Board closed the school for Thursday, April 21 2011. The school's potable water system is being flushed and tested.

Halton Region has a Backflow Prevention Program in place that helps to prevent potential contaminants inside a building from entering the water distribution system," said Kiyoshi Oka, Halton Region's Director of Water Services. "In this case, the appropriate device was in place to protect the Region's water supply; however, staff are conducting localized water sampling as a precaution."
Hundreds line up for water after Dorval advisory

Possible contamination prompts water alert

Hundreds lined up for free water from the City of Dorval after the municipality issued an alert warning residents not to use tap water until further notice.

The city said because of an incident at an Air Canada facility at around noon on Friday, the municipality's water distribution network could be contaminated.

Residents of Dorval, which is in Montreal's West Island, are advised to use bottled water for consumption, for cleaning food or for brushing their teeth.

The mayor of Dorval said some stagnant water was accidentally fed into the drinking water supply by a contractor working on pipes at the Air Canada base.

MILTON JANUARY 23 2011...

- Chemical injector pump had malfunctioned injecting about 11 gallons of corrosion control additive into the internal plumbing system
- Two RP backflow prevention devices at water meter contained the contaminant from entering the public water supply.
History and Legislation

Safe Drinking Water Act - Prohibition (Section 20)

20. (1) No person shall cause or permit any thing to enter a drinking water system if it could result in,

(a) a drinking water health hazard;

(b) a contravention of a prescribed standard; or

(c) interference with the normal operation of the system.

2002, c.32, s.20(1).

MOE Recommendations

SUMMARY OF BEST PRACTICE ISSUES AND RECOMMENDATIONS

This section provides a summary of all best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. Best Management Practices are recommendations and not mandatory requirements, but may lead to safe drinking water for the consumer.

In the interest of continuous improvement, it is recommended that owners and operators develop an awareness of the following practices and consider measures to implement them so that all drinking water systems continuously improve their processes.

1. Backflow preventers were not installed at each service connection to industrial/commercial/institutional and agricultural processes that were considered high hazard facilities.

The City of Hamilton is in the final stages of developing their backflow prevention and cross-connection control programs. Staff and information management system components are in place and the City has implemented a public information program related to backflow prevention and cross-connections. They are completing the drafting of a by-law with the intent of presenting it to City council by the end of 2009.
The Walkerton Inquiry Report

Justice O'Connor's Recommendations

Part 2, Section 7 says in part:

"Distribution systems should have regularly tested backflow prevention valves that can prevent or at least isolate incursions."

"Infrastructure is also vulnerable to amateur cross-connections and their attendant risks of contamination."

OWWA
Ontario Pipeline Magazine

Volume 7, No 3, Fall 2011

- Every service connection should have premise isolation if the purveyor intends for the public system to be protected

- This is why, most if not all, bylaws require premise isolation as the minimum requirement for cross connection control.

- Cross connections could be made to the unprotected part of a system without anyone's knowledge.
Four Types of Backflow Protection

- **Premise Isolation** - installation of the backflow device at the point where the water service enters the building or property.

- **Area Protection** - all water downstream or after the backflow device may be potable and non-potable water.

- **Zone Protection** - all water downstream or after the device is non-potable water.

- **Fixture or Point of Use** - installation of the backflow device on an individual fixture or a piece of equipment.
Compliance Requirements

- Nov. 12, 2010 - compliance date for all self assessments and full surveys to be submitted to the City

- Nov 12, 2011 - compliance date for high hazard properties to install/test devices

- May 12, 2012 - compliance date for all affected properties to install/test devices

- Unique feature of by-law is the self assessment component for properties with 38 mm service or smaller

Compliance to date...

<table>
<thead>
<tr>
<th>Property Type</th>
<th>Survey Completed (Nov 12, 2010)</th>
<th>Device Required (HH Nov. 2011)</th>
<th>Device Installed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Survey</td>
<td>74%</td>
<td>26% (HH)</td>
<td>18%</td>
</tr>
<tr>
<td>(2271 Properties)</td>
<td></td>
<td>74% (MH)</td>
<td></td>
</tr>
<tr>
<td>Self Assessed</td>
<td>72%</td>
<td>7%</td>
<td>May-12</td>
</tr>
<tr>
<td>(4364 properties)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Compliance numbers based on service connections not properties as of January 2012
Community Outreach

2008

November
Two Public Consultation Sessions held

2010

May 12
Backflow Prevention By-law #10-103 was passed

May 25
Backflow Prevention By-law #10-103 letters sent to all ICI property owners

June 9
Two Public Information Sessions held

August 6
Backflow Prevention Program Letters sent to Property Owners informing them of the by-law and its requirements

October 12
Backflow Prevention Program reminder letter sent to all properties who had not submitted their Surveys (both Self-Assessed and Cross-Connection)

November 12
Due Date for submission of Self-Assessed and Cross-Connection Surveys

2011

February 7
Sent the 1st non-compliance letter to properties that had not submitted their Cross-Connection surveys.

February 18
Sent out invitations to all the companies on our Approved Contractors List inviting them to attend an information session detailing their roles and responsibilities with this program.

Members of the Building Department were in attendance to answer contractor's questions.

August 15
First non-compliance letter to properties who have not completed the "Self-Assessed" Surveys

Second non-compliance letter for properties who have not completed the "Cross Connection Control" surveys.

The first back flow prevention device installation reminder letter for high hazard properties

October 21
Final Notice letter sent to all properties who have not submitted their surveys

November 12, 2011 - Deadline

November 17
Post deadline notice letters for both cross connection control and self assessed surveys
Community Outreach

Further effort was made to reach out to larger companies/institutions with a presentation that explained our by-law and how it impacts them.

These included:
- Hamilton Port Authority
- Hamilton District School Board
- Hamilton Separate School Board
- Arcelor Mittal
- National Steel Car
- Effort Trust
- St Joseph Group of Hospitals
- Hamilton Health Science
- Nelson Steel
- Hamilton Specialty Bar
- McMaster University

Examples of Current Conditions...

The following picture was taken from a property in Hamilton that was discovered through the self assessed survey for small diameter services.
Examples of Current Conditions...

New construction that unknowingly went out of compliance shortly after construction was completed...
AREA PROTECTION

Community → People → Processes → Finance

(Backflow preventer has been altered (see pipe attached to #2 test port). Need to be modified and allows for high rate of recent maintenance or testing.)

ZONE PROTECTION

Community → People → Processes → Finance

A new installation, but missing a couple of the components under test. This is typical of the work being done here. This pump needs to be checked and tested, and the equipment needs to be maintained and cleaned in detail.

Hamilton Public Works
Hamiton's program

- Hamilton's program is unique in the Province in that some property owners can assess their own property and save costs

- Communication and Outreach
Step 6 & 7

Example from Hodzon Bilt

Copper is listed in orange on the top of the ruler

This Ruler Is Not To Scale

Listed in white on the bottom of the ruler

Directions for using the Water Service Tape Measure

1. Find your water service pipe where it enters your building or property
2. Hold "TABS" tight against the water service pipe
3. Use the measuring tape around the pipe
4. Line up "Tab Arrow" with the closest Copper or Iron MM arrow
5. Indicate this MM number and type of pipe above in Step 8
Backflow Prevention Program - How to complete the Self Assessed Survey

The City of Hamilton's Backflow Prevention Program. How to complete the Self Assessed Survey.
Unexpected Benefits

- To date it is estimated that the City has recovered approx $140,000 in unaccounted for consumption
- Property owner became aware of potential water quality concern from a 12" emergency supply line and as a result is abandoning it

Questions