Backflow Alert on Smart Meter!

Now what to do

Presented by:
Gary McLaren - HydroCorp
ASSE Certified Cross-Connection Program Administrator
ASSE Certified Cross-Connection Surveyor

But you Guy’s can call me..
the Backflow Nerd!

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Weekend Plan:
“Should have stayed in FL”
### Summary

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
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<tbody>
<tr>
<td>Total Organizations</td>
<td>411</td>
<td>378</td>
<td>343</td>
<td>310</td>
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<tr>
<td>Total Facilities</td>
<td>451,449</td>
<td>327,657</td>
<td>303,486</td>
<td>180,302</td>
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<td>Inspections Completed</td>
<td>68,867</td>
<td>67,689</td>
<td>58,560</td>
<td>44,419</td>
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<td>Requirements</td>
<td>15,509</td>
<td>10,768</td>
<td>7,934</td>
<td>6,361</td>
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<td>Requirements Resolved/Removed</td>
<td>44,300</td>
<td>50,212</td>
<td>52,351</td>
<td>37,343</td>
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<td>Water Meters Installed</td>
<td>10,207</td>
<td>5,079</td>
<td>1,702</td>
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<td>Inspection Notices Sent</td>
<td>114,887</td>
<td>105,710</td>
<td>95,022</td>
<td>67,792</td>
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</tbody>
</table>

**QTY of Cross-Connections Found**

### 3 Key Points of this Session

- Common Backflow Hazards
- Smart Meter Alert! Now What?
- Meter Detected Backflow Case Study
  
  Water Research Foundation

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**The Bigger Picture**
Backflow; Inherent Problem

The Perfect Storm

The Reverse Flow Data is There...

The Perfect Storm

Back Pressure:

Flow reverses due to system pressure greater than line pressure

Back Siphonage:

Flow reverses due to decrease or loss of supply line pressure
What Exactly is a Cross Connection?

Most cross-connection hazards are found downstream of a meter/service connection (Internal Plumbing...).
Does one Backflow Preventer cover everything?  
Answer: NO

**Containment**  
Protects public water supply from contamination from within facility

**Containment**  
Protects public water supply from contamination from within facility

**Isolation Approach**  
(Backflow Prevention at points of use)

**How many Pipes?**
Isolation Approach
Backflow Prevention at each point of use within facility

Backflow Alert? Now What!?

Facility/Service Connection Info?
• Is the Facility High Hazard or Low Hazard?
• Is the Facility properly contained?
• Has the Facility ever been surveyed for CC?
• Is there a pattern in the Reverse Flow Alerts?

Alert Trigger Criteria?
• Does the Water Purveyor have a CCC Plan?
• Identify what false alerts look like
• Determine Reverse Flow Alert Response Plan
• Set alert lower for Residential VS Comm/IND

Reverse Flow Alert Plan
• Utilize Meter Flow Date in your CCC Program
• Identify high risk water customer facilities
• Budget for ongoing plan management/IT
• Who should be alerted?
Early Warning Can Reduce Risk

Backflow / Reverse Flow Alert!

Case Studies to Identify Occurrence, Accuracy, and Causative Factors of Reverse Flow as Measured by Meters

David Hughes, Orren Schneider, Minhua Xu
American Water
Steve Barfuss, Utah State University
Meters Studied

- Included meters previously studied by Utah State
  - Positive displacement and flow meters
- Tested newer static meters
  - Electromagnetic meter (Sensus iPerf)
  - Ultrasonic meter (Badger e series)
  - Fluidic Oscillating meter
    - Previously tested by Utah State University but suspected register would not go backwards
- Tested meters as new and at 500,000 gallon flow intervals up to 2,000,000 gallons

Reverse Flow Data Issue

- One dilemma is overlapping alarms. Alarms active in system for 35 days but read intervals shorter - 1 backflow = 2 alarms?
- The more frequent the alarms at a location, the less probable that the overlap is sustained
- 3 consecutive months of backflow means at least 2 alarms.

Case Studies to Identify Occurrence, Accuracy, and Causative Factors of Reverse Flow as Measured by Meters

Project #4364

David Hughes, Glenn Schroeder, Matthew Xu
American Water
Steve Bartus, Utah State University

Process Water

Potable Water >>

EPA
Common Hazards During Backflow

Top 10 Cross-Connection Hazards *Found:

1. Missing Vacuum Breaker on Hose Bibb (5,557)
2. Missing Air Gaps on ice machines and water softener discharges (2,691)
3. Chemically Treated Boilers with no backflow preventer (2,008)
4. Incorrectly installed backflow preventers (1,623)
5. Soap dispenser mixers incorrectly connected to utility sinks (1,370)
6. Soda Fountain Carbonators with missing backflow preventor (1,292)
7. Residential style boilers with no backflow preventor (909)
8. Industrial use hose drops with wrong type of backflow preventor (811)
9. Various improper plumbing installations related to backflow hazards (737)
10. Toilet tanks with unapproved or incorrectly installed backflow preventor (581)

*Found during HydroCorp CCC Surveys of client public water systems 2016-2017

Common Hazard:
Process Use Systems – Boiler Systems – Chemically Treated and Non Chemical

An Inherent Problem...

Drinking Water Fountain Contamination

Pink Colored Water...

Common Hazard:
Air Gaps
Common Hazard:
Air Gaps

Common Hazard:
Chemical Mixing Systems

Common Hazard:
Chemical Mixing Systems

• ASSE 1055B
Common Hazard: Incorrectly Installed Backflow Preventers

• All Piping Downstream must be lower than the backflow preventer
Common Hazard:
Unprotected Bypass

Common Hazard:
Dead Legs/Unused piping

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Thanks for attending!

Presented by:
Gary McLaren
Cross-Connection Control Programs and Meter Install Services

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