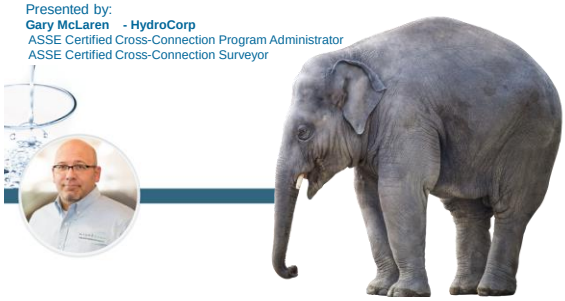
Backflow Alert on Smart Meter!

Now what to do

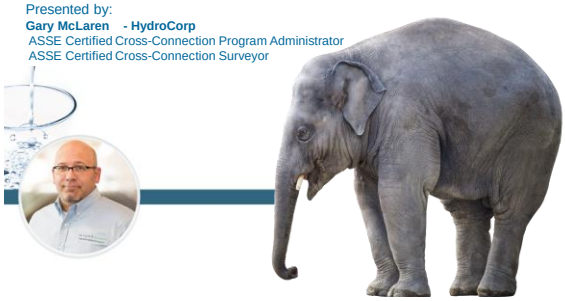
Presented by:
Gary McLaren - HydroCorp
ASSE Certified Cross-Connection Program Administrator
ASSE Certified Cross-Connection Surveyor



Backflow Alert on Smart Meter!

Now what to do

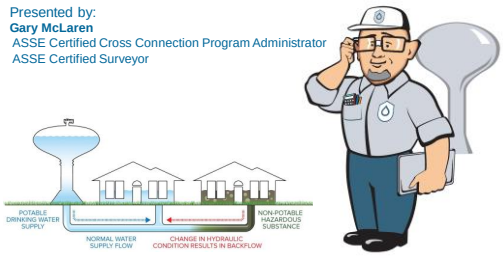
Presented by:
Gary McLaren - HydroCorp
ASSE Certified Cross-Connection Program Administrator
ASSE Certified Cross-Connection Surveyor



But you Guy's can call me..

the Backflow Nerd!

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

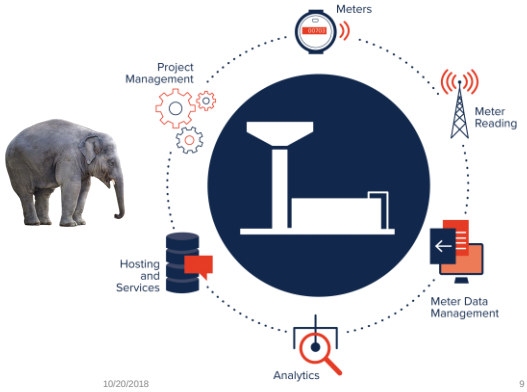


Weekend Plan:

"Should have stayed in FL"

Summary				
	2018	2017	2016	2015
Total Organizations	411	378	343	310
Total Facilities	451,449	327,657	303,486	180,302
Inspections Completed	68,867	67,689	58,560	44,419
Requirements	15,504	10,768	7,934	6,361
Requirements Resolved/Removed	44,300	50,212	52,351	37,343
Water Meters Installed	10,207	5,079	1,702	0
Inspection Notices Sent	114,887	105,710	95,022	67,792

QTY of Cross-Connections Found

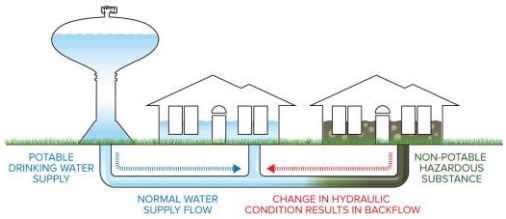


3 Key Points of this Session

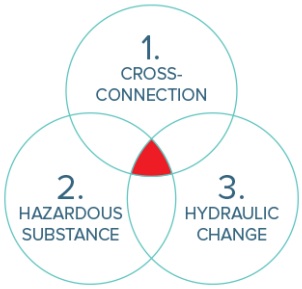
- Common Backflow Hazards
- Smart Meter Alert! Now What?
- Meter Detected Backflow Case Study
  Water Research Foundation

The Bigger Picture

Backflow; Inherent Problem

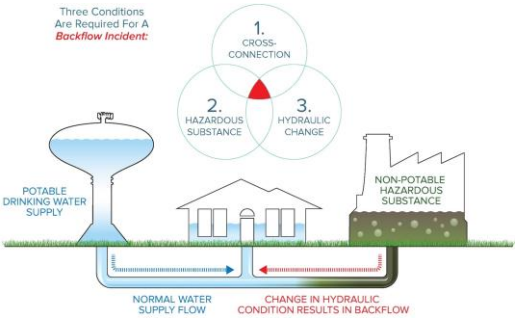


The Perfect Storm



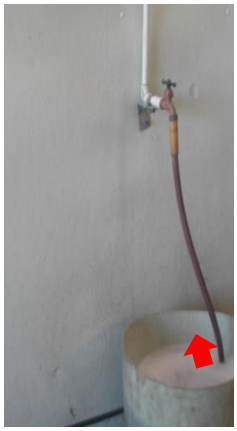
The Reverse Flow Data is There…

The Perfect Storm

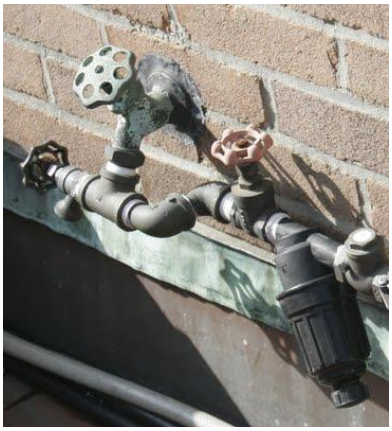


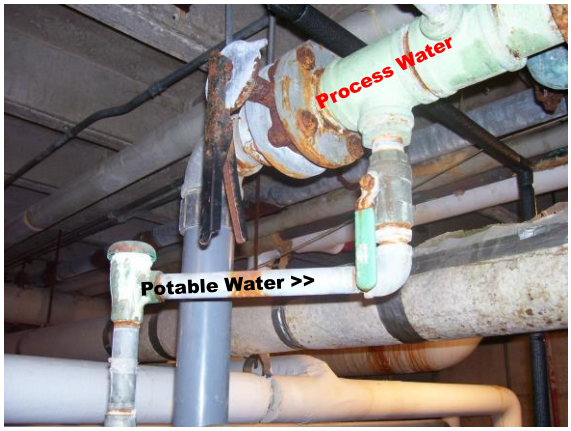
Back Pressure:

Back Siphonage:

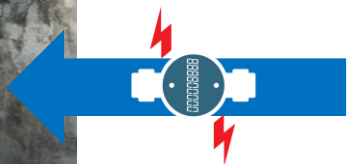


What Exactly is a Cross Connection?





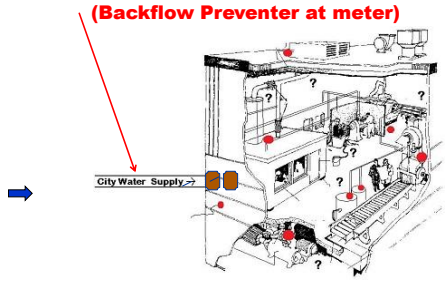
Most cross-connection hazards are found ***downstream*** of a meter/service connection (Internal Plumbing…)



Does one Backflow Preventer cover everything?

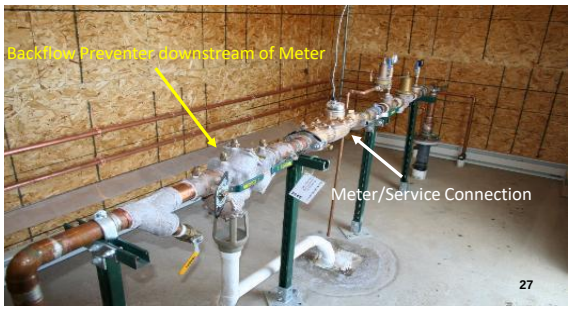
Answer: NO

Containment Approach



Containment

Protects public water supply from contamination from within facility

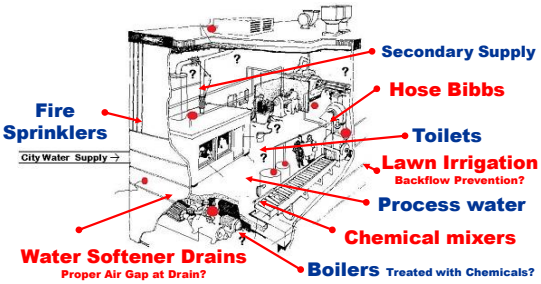


Containment

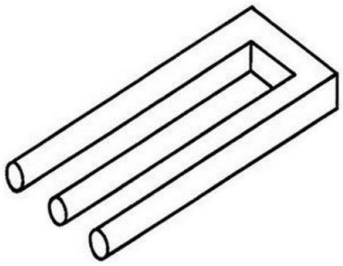
Protects public water supply from contamination from within facility

Isolation Approach

(Backflow Prevention at points of use)



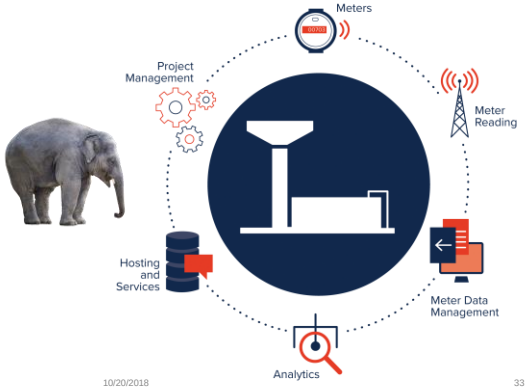
How many Pipes?



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

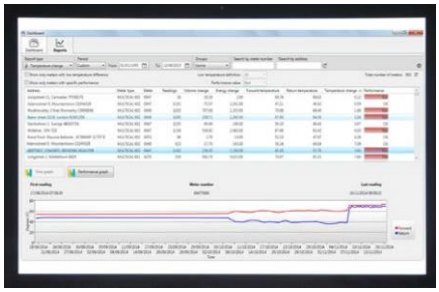
Reverse Flow Alert Plan

- Utilize Meter Flow Date in your CCC Program
- Identify high risk water customer facilities
- Budget for ongoing plan management/IT
- Who should be alerted?

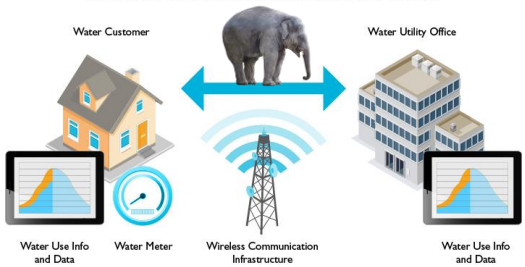
Early Warning Can Reduce Risk

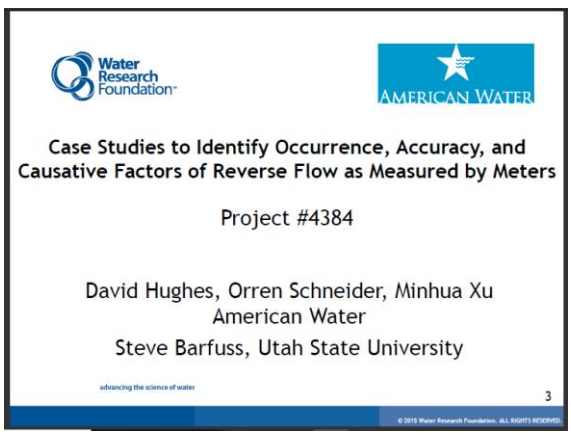
"..Alerts are a Hassle"

Backflow / Reverse Flow Alert!



Automated Meter Infrastructure and Smart Water Metering





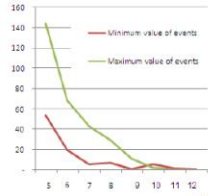
Meters Studied

- Included meters previously studied by Utah State
  - Positive displacement and flow meters
- Tested newer static meters
  - Electromagnetic meter (Sensus iPerl)
  - 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

5

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.



13

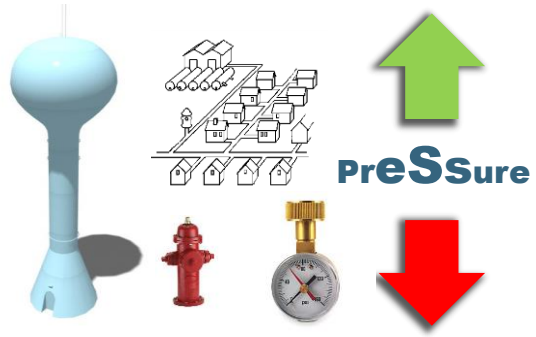
EPA

Exhibit 5.1 Reported Backflow Incidents for Which EPA Has Compiled Data

Source of Contamination	Documented Incidents	Examples of Incidents
Residential Sites		
Homes With Individual Connections	55	• In 1991, an atmospheric vacuum breaker valve intended to protect a cross-connection between an irrigation system and the potable supply malfunctioned, allowing backflow of irrigation water into the public water system. The water system, located in Michigan, was contaminated with nematodes, rust, and debris (AWWA PNWS, 1995). • In 1997, recycled water reached approximately 1,600 California homes and businesses from a residential connection after a property owner illegally tapped into a reclaimed water line (California HHS Agency, 2001).
Apartment Buildings or Condominiums	27	• In 1981, chlordane and heptachlor were backsiphoned through a garden hose submerged in a termite exterminator's tank truck in Pennsylvania. An undisclosed number of illnesses occurred, and 75 apartment units were affected (NAPHCC, 1996). • In 1985, hexavalent chromium backflowed from a Boston, Massachusetts condominium's cooling tower into the potable water system (NAPHCC, 1996).
Mobile Homes or Mobile Home Parks	1	• In 1984, a leak developed in a wall separating solar water heater heat transfer medium from a residential water supply. The water supply of a mobile home in Oregon was contaminated with dichlorofluoromethane (AWWA PNWS, 1995).
Neighborhood	3	• In 1995, a business tapped into an irrigation line containing untreated water in Yakima, Washington, without installing a backflow prevention device. This allowed Giardia to contaminate area reservoirs, resulting in 11 cases of giardiasis. (AWWA-PNWS, 1995). • In 1997, a fire truck pump created backpressure on a fire hydrant before the valve was closed, forcing over 60 gallons of aqueous fire-fighting foam into an estimated 40,000 neighborhood taps in

Common Hazards During Backflow

An Inherent Problem…



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 **(1,625)**
5. Soap dispenser mixers incorrectly connected to utility sinks **(1,370)**
6. Soda Fountain Carbonators with missing backflow prevention **(1,292)**
7. Residential style boilers with no backflow prevention **(909)**
8. Industrial use hose drops with wrong type of backflow prevention **(811)**
9. Various improper plumbing installations related to backflow hazards **(737)**
10. Toilet tanks with unapproved or incorrectly installed backflow prevention **(581)**

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

Drinking Water Fountain Contamination

Pink

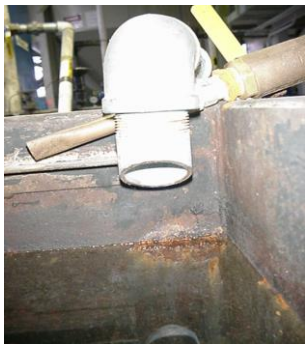
Colored Water…

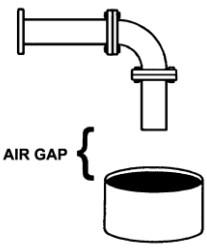
Common Hazard:

Process Use Systems – Boiler Systems – Chemically Treated and Non Chemical

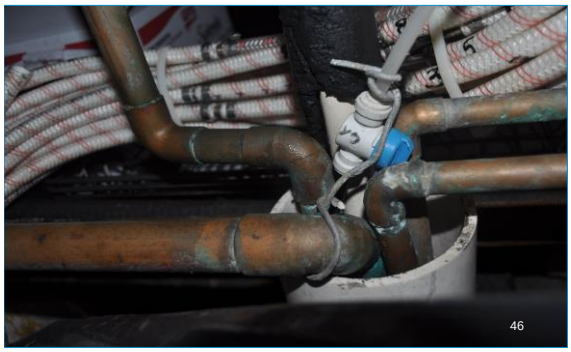
Common Hazard:

Air Gaps





Common Hazard:
Air Gaps



Common Hazard:
Air Gaps

Common Hazard:
Chemical Mixing Systems

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:
Incorrectly Installed Backflow Preventers

Common Hazard:
Incorrectly Installed Backflow Preventers

Common Hazard:
Commercial Kitchens

Commercial Kitchen

Commercial Kitchen

Common Hazard:

Unprotected Bypass

Common Hazard:

Unprotected Bypass

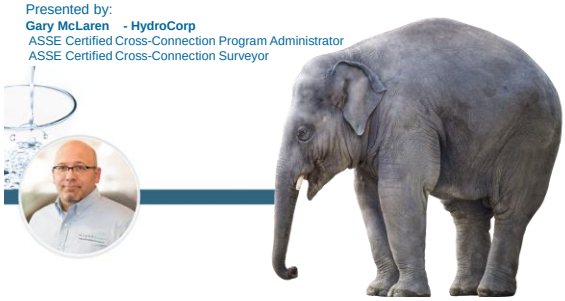
Common Hazard:

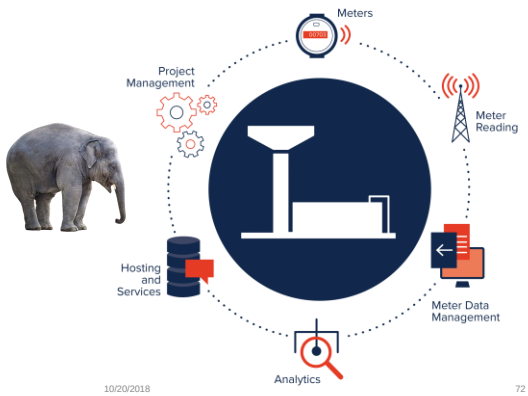
Dead Legs/Unused piping

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





3 Key Points of this Session

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

Thanks for attending!

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

Text/Call Anytime – 262.951.0059
Florida – Coastal States - Midwest

HydroCorpinc.com