Why Backflow Prevention Assemblies Require Installation and Regular Testing

2018 Advanced Cross Connection Seminar
Lansing and Gaylord Michigan

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Mid-West® Instrument


WITX
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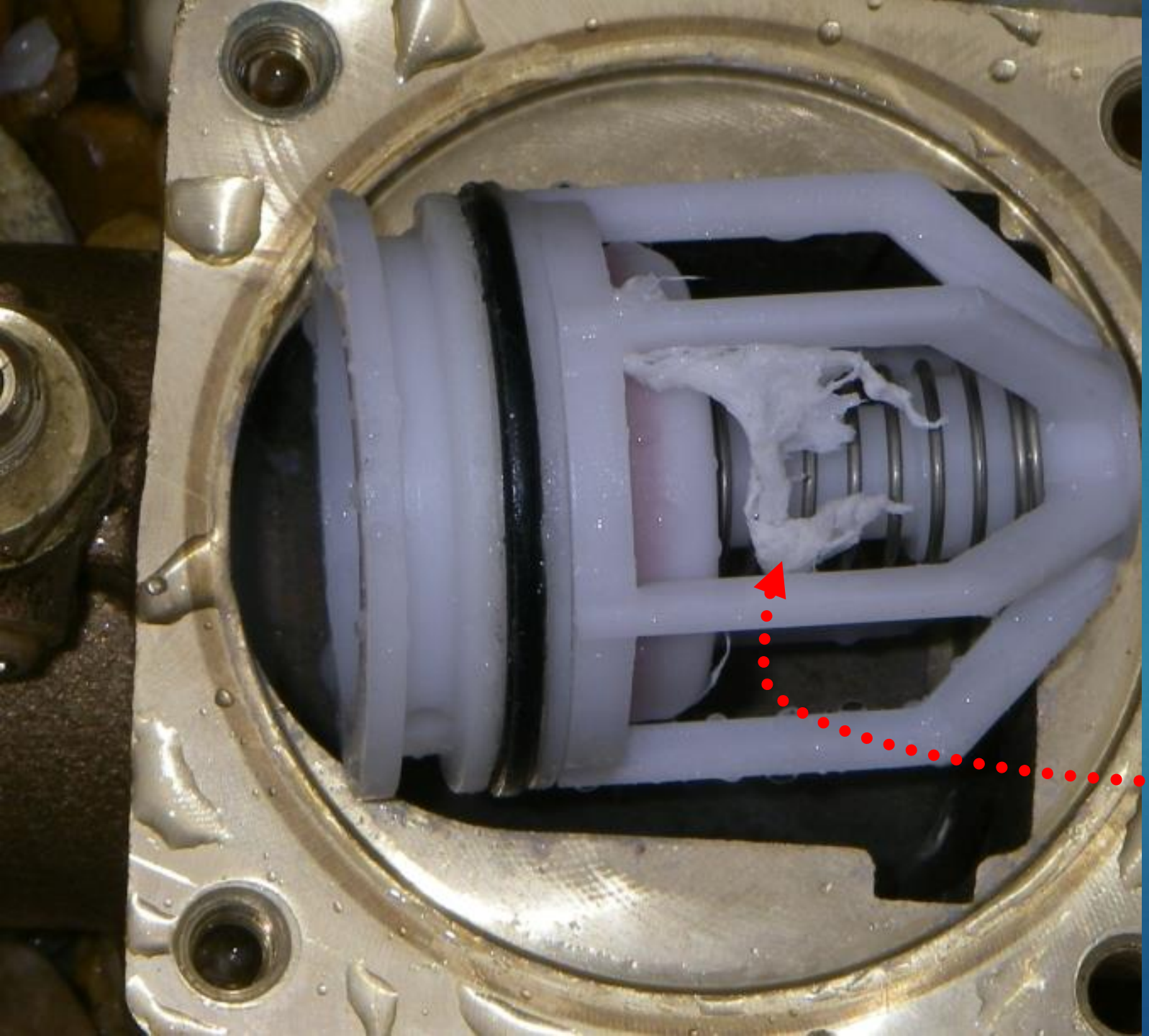
Why Ongoing Assembly Testing is Necessary

- "Foamy" water was reported at a concrete plant in Oregon
- Lab tests of water samples showed the presence of a foaming agent which was not used at the concrete plant.
- Officials suspected a nearby dairy because a foaming agent backflowed from the dairy a number of years earlier, after which 2 RP Assemblies were installed.
- Both assemblies failed testing, one completely
- After both were repaired the contamination of the public water system stopped.

Why Ongoing Assembly Testing is Necessary

Rock



Why Ongoing Assembly Testing is Necessary

Unknown Crud

Why Ongoing Assembly Testing is Necessary

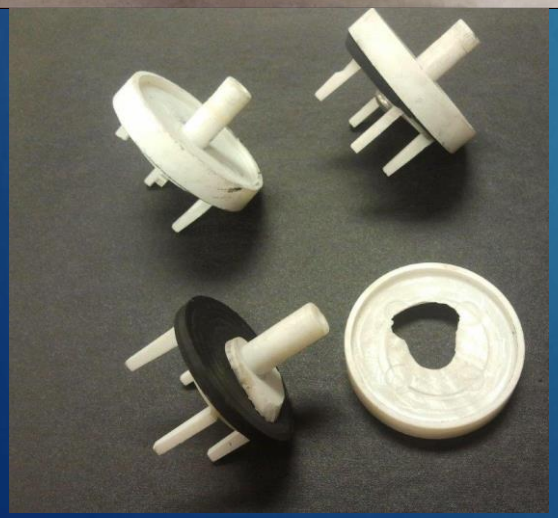
LEVEL!

Why Ongoing Assembly Testing is Necessary

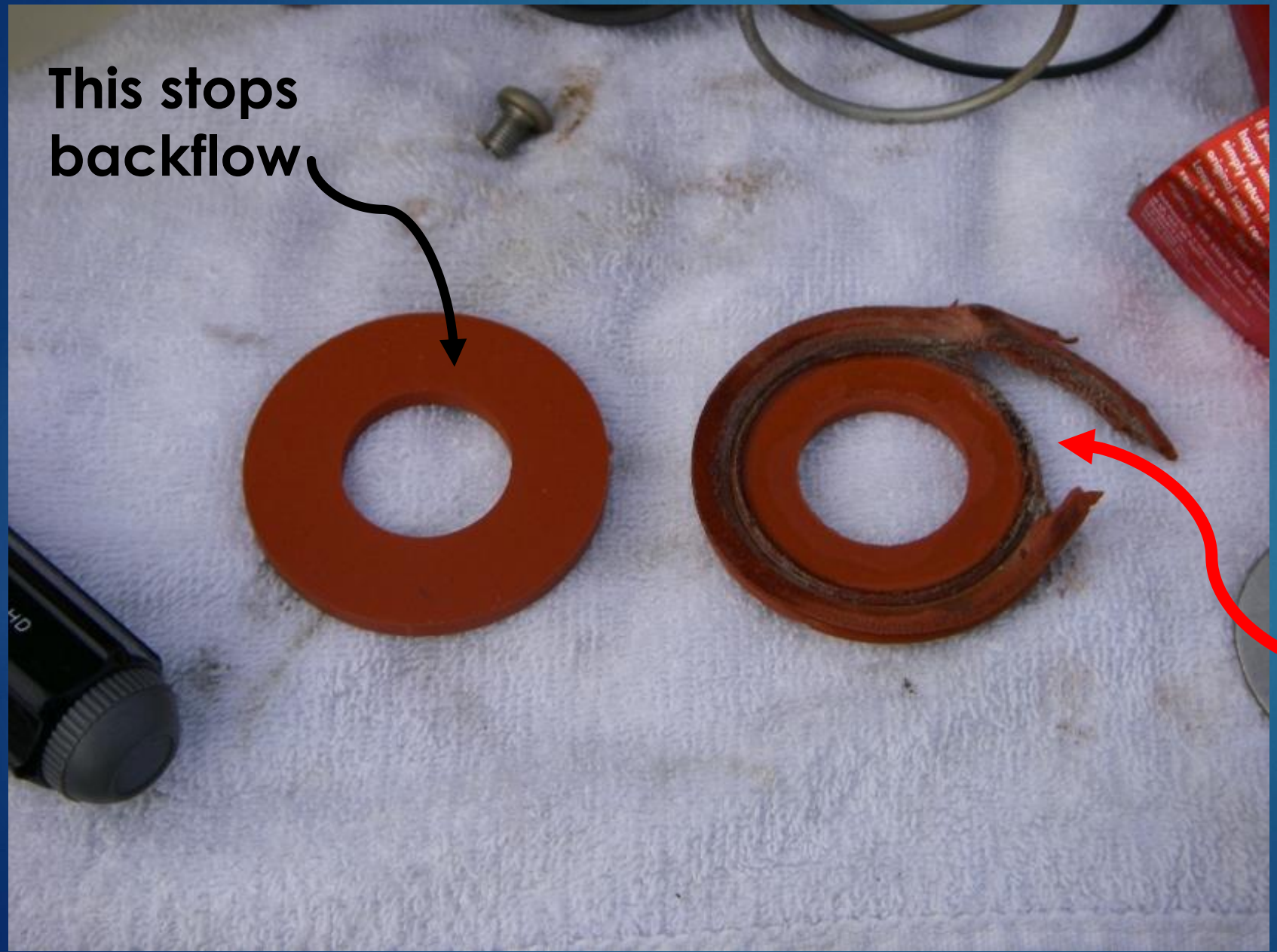
Chinese Take Out Box!!!

Why Ongoing Assembly Testing is Necessary

Parts Break



Why Ongoing Assembly Testing is Necessary



Parts Break

Why Ongoing Assembly Testing is Necessary

Parts Break?

Why Ongoing Assembly Testing is Necessary

Corrosion

Why Ongoing Assembly Testing is Necessary

- A fast food chain in Virginia complained that all their fountain drinks were rejected for tasting salty. Adjacent customers had the same issue. No cross-connections found.
- A neighboring shipyard made the same complaint. (served by the same water main.)
- The shipyard had a high pressure fire protection system supplied by seawater. The high pressure pumps were primed with potable water.
- The backflow prevention assembly on the priming line froze and was replaced with a spool piece.
- The high pressure pumps backflowed seawater into the city's public water through the priming line.
- The potable priming line was removed and a containment RP was installed.

Are Backflow Prevention Assemblies Altered After Install?

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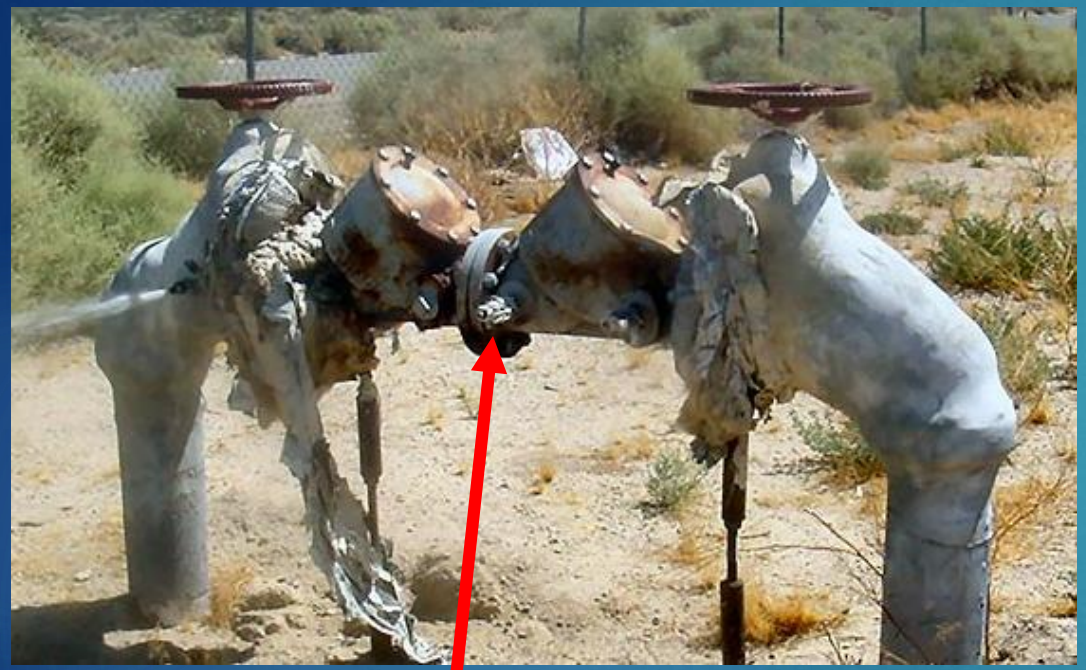
Chemical injector added altering the hazard level

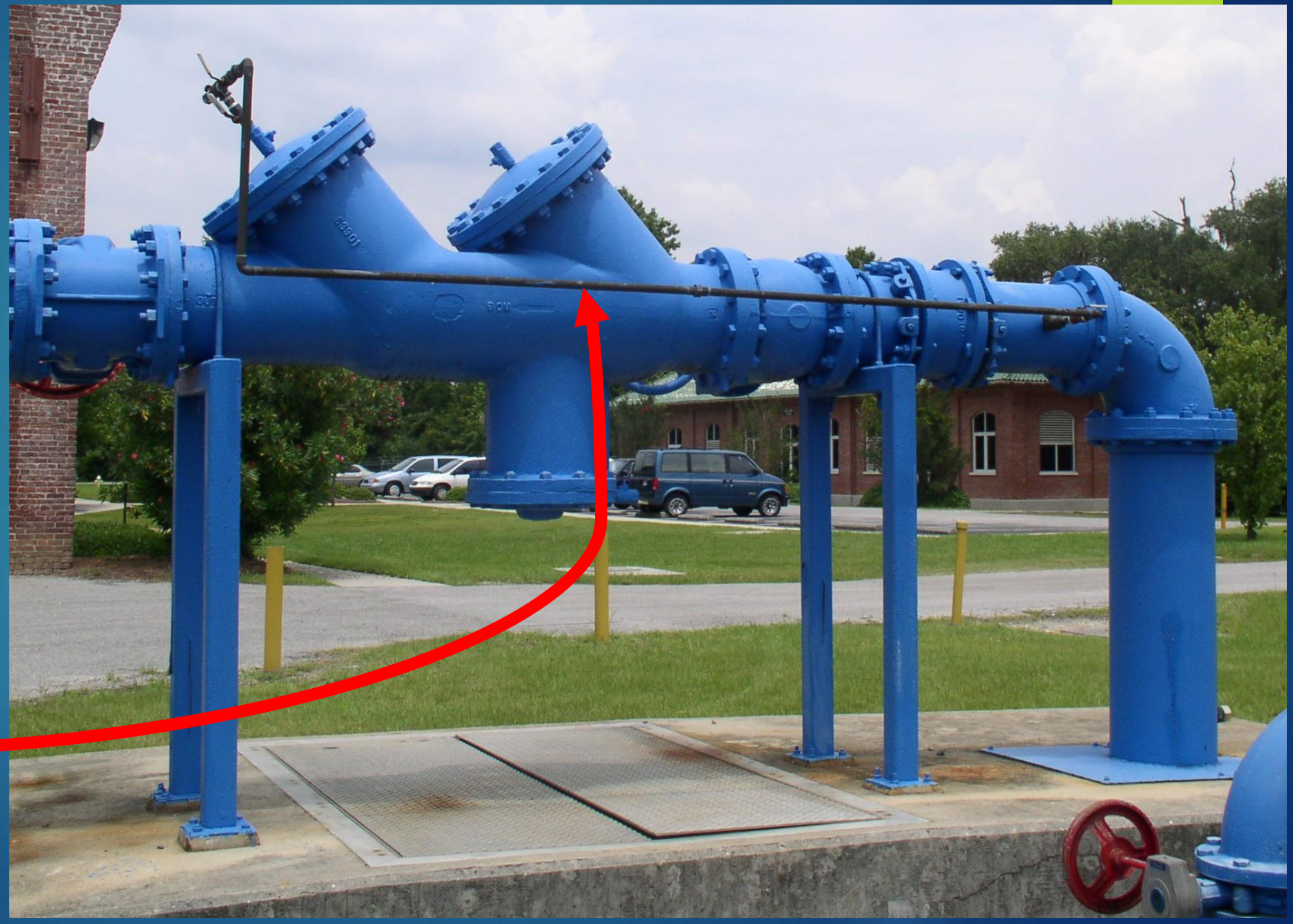
Are Backflow Prevention Assemblies Altered After Install?



PLUG

Ball Valve

Are Backflow Prevention Assemblies Altered After Install?



Are Backflow Prevention Assemblies Altered After Install?

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Garden hose connected to test cock #1

Are Backflow Prevention Assemblies Altered After Install?

Are Backflow Prevention Assemblies Altered After Install?

Are Backflow Prevention Assemblies Altered After Install?

Mother Nature can alter backflow prevention assemblies too!!!!

How long since this assembly was tested?

Are Backflow Prevention Assemblies Altered After Install?

More Man Made Improper Alterations

"Bootleg" Repair Parts- Not to Factory Tolerances

More Man Made Improper Alterations

Peanut Butter Lid for an Air Inlet Canopy

More Man Made Improper Alterations

Copper Pipe Cap Soldered Into the Air Inlet Port Rendering this PVB Useless.

Why Ongoing Assembly Testing is Necessary

- Two home owners in Southgate MI find parasitic worms, nematodes in their water.
- One found them swimming around in his bathtub when filling to bathe his child.
- A water main break caused a vacuum in the public water system.
- The air inlet valve on the vacuum breaker was stuck not breaking the vacuum and the parasites were back syphoned into homes and public water system .
- Crews flushed all water mains in a 3 square block area until no worms or detectable coliform bacteria were present in water samples.

Why Ongoing Assembly Testing is Necessary

It can and does happen!

What Other Animals Might We Find?

ANTS

What Other Animals Might We Find?

BEES

What Other Animals Might We Find?

Spiders

What Other Animals Might We Find?

Earwigs

What Other Animals Might We Find?

Not just insects!

Lizard

When was this last tested?

What Other Animals Might We Find?

What Other Animals Might We Find?

More Horror Stories

- E-Coli found in Corpus Christie Water
- Source was a failed backflow prevention assembly
- **Failure rates when tested annually -20%**
- **Failure rates when tested every 3 years -30 - 40%**
- Are your customers exposed to risks and potential health problems if you don't require regular testing?

More Horror Stories

- A failed backflow preventer allowed irrigation water to contaminate 380 homes in Idaho.
- Dozens of people became ill
- **Four residents were confirmed to have Campylobacter**
- **Campylobacter is an infections disease from bacteria**
- Symptoms include bloody diarrhea, fever, abdominal cramps, nausea and vomiting **& can be life threatening to people with compromised immune systems.**

Technical Assistance for Public Water Systems

The Idaho Drinking Water Newsletter

Department of Environmental Quality Idaho Drinking Water Program

www.deq.idaho.gov/water/prog_issues.cfm

September 2009, Issue 53

Water system owner responds quickly to contamination event

Cross-connection incident in southwest Idaho sickens 5 residents

In June of this year an alert water system, in a southwestern Idaho community, hand-delivered boil water advisory notices to about 120 customers after water testing indicated the presence of coliform bacteria in the drinking water of two subdivisions.

An unprotected cross-connection

The bacterial contamination of the system's drinking water was caused by an unprotected "cross-connection." The cross-connection in this particular situation was a physical connection (piping) between the drinking water system and a pressure irrigation system interconnection.

The standard practice in such a situation is to install a backflow assembly, which prevents the backflow (or reversal) of contaminated water back into a drinking water system through the cross-connection. In this case, the landscape contractor for the irrigation system *did* install a backflow prevention assembly, but it was installed improperly and the untreated water was mixed into the system's treated drinking water.

Although the tests detected *E. coli* bacteria, the irrigation water may have exposed residents of the subdivisions to multiple contaminants beyond the original test results. Consequently, the local district health department advised physicians to test ill residents for *Campylobacter, Giardia,* and *Cryptosporidium* in addition to *E. coli*.

Boil water advisory lifted

With the source of the contamination (i.e., the improperly

Lawn irrigation systems are one of the common causes of cross-connections.

According to district health department officials, five people became ill as a result of the cross-connection incident: 4 cases of *Campylobacter* infection and 1 case of *Giardia* were reported.

Cross-connection event serves as a reminder

Fortunately, the water system owner already had a plan of action in place in case of a potential contamination event. The system's quick response was carried out systematically; DEQ was promptly notified; there was open communication with the public; and the owner's actions prevented more customers from becoming ill.

This incident serves as a reminder to owners of all public

More Horror Stories

More Horror Stories

- Water is commonly used to clean propane tanks prior to being repaired
- Propane has been documented backflowing into public water systems in Connecticut and Arkansas where pressure in the tanks was greater than city water pressure.
- People were injured in explosions after flushing toilets
- Houses and businesses were damaged or destroyed by fires
- In the Connecticut incident ***enough propane backflowed to fill one mile of an 8" diameter water main***

More Horror Stories

- Waste water from the "Kill Floor" contaminated potable water at a meat packing house in Iowa costing Millions and 200 jobs while the plant was closed for clean up.
- Herbicide Paraquat backflowed in the public water supply in Maryland.
- An 8 block area was contaminated with "Soapy", "Muddy", "Grey-Green Slippery" recycled wash/rinse water that backflowed from a carwash in Washington.
- Sodium Hydroxide from a chemical plant backflowed into the municipal water supply in Alabama during a watermain break sending people to the hospital with burns and blisters in the mouth, throat and skin
- Blood from an autopsy table backflowed into a hospital's water supply in Michigan
- Pesticides Heptachlor, Chlordane and Dursban back syphoned into the public water supply in New Jersey contaminating 63 homes & businesses costing the company $21,000,000.
- Ethylene Glycol from a boiler backflowed into the potable water supply in a school in Colorado sending 9 students to the hospital.

Why Ongoing Assembly Testing is Necessary

- There are dangerous fluids directly and indirectly connected to the potable water supply
- Scheduled and unplanned events like hydrant flushing, water main breaks and fire fighting create the hydraulics for backflow
- Backflow prevention assemblies are mechanical
- Backflow prevention assemblies fail, are removed, are modified improperly
- Regular testing will keep the dangerous cross connections protected with properly functioning assemblies

Why Ongoing Assembly Testing is Necessary

- Are traffic signals not maintained at busy intersections because there has not been a fatal accident?
- Are speed limits near schools raised because a child has not be run over?
- Do you replace worn tires on your automobile?
- Are fire drills at schools suspended because there has not been a fire?
- Regular testing will keep the dangerous cross connections protected with properly functioning assemblies & **public health will be protected**

Sources

- TREEO Center – University of Florida
  http://www.treeo.ufl.edu/backflow/epa-resources/backflow-case-histories/
- American Backflow Prevention Association
  https://abpa.site-ym.com/page/Incidents
- Jim Purzycki – BAVCO
- Paul Schwartz – FCCC & HR-USC
- Les O'Brien – Retired TREEO Center – University of Florida
- Steve Miller – Blue Water Backflow Services
- Matt Kapcia – City of Troy; The Backflow School

Questions?

Thank You!