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Cross Connection Control

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The next-generation technology for
AGING WATER INFRASTRUCTURE



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WEBINAR MODERATOR



Emily Meek
Standards Engineer
American Water Works
Association

Emily Meek is a Standards Engineer with the American Water Works Association (AWWA), working with volunteer committees to produce a wide range of ANSI/AWWA standards, manuals and training materials for the water industry. She is the staff advisor for standards committees on disinfection, valves, pipe rehabilitation, fiberglass resin products, and wastewater management. Emily received her Masters of Science in Water Resources and Environmental Chemistry, Toxicology and Risk Assessment from Indiana University.

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PANEL OF EXPERTS



Carolyn Stewart, ASCT
Canadian Consultant



Byron Hardin, CPM
President
Hardin and Associates
Consulting, LLC



Mitch LeBas, PE
President
Backflow Prevention
Services, LLC



AGENDA

- I. Blueprint to Establishing an Effective Cross Connection Control Program
- II. Key Components for an Effective Backflow Prevention Program
- III. Overcoming Obstacles in Cross Connection Control Programs

Carolyn Stewart, ASCT

Byron Hardin, CPM

Mitch LeBas, PE



ASK THE EXPERTS



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BLUEPRINT TO ESTABLISHING AN EFFECTIVE CROSS CONNECTION CONTROL PROGRAM

Carolyn Stewart, ASCT
Communicate to Educate
Canadian Consultant

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Purpose

You will learn to:

- Connect with your audience
- Deliver your message succinctly
- Explore consequences of not setting up a solid program thru Case Studies



Today, we will talk about...

Key Terms

Starting Point in Every Discussion

Communicate to Educate

Reading Comprehension, Talk so They Listen

Backflow Event

Preparing for the Repercussions of a Backflow Event



Backpressure due to pump

Leaky Shut-off Valve

90 psi

50 psi

Re-circulation pump with corrosive chemicals

Coffee maker

Water Main 50 psi

Backsiphonage

- Backsiphonage is the reverse flow of water

Example, normal direction of flow

Water Pressure

Water

OPEN TAP

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Key Terms



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COMMUNICATE TO EDUCATE

Skilled Readers	Poor/Marginal Readers	Solutions
Interpret meaning	Take words literally	Explain the concept/meaning
Read fluently	Read slowly/Miss words	Use common words/examples
Look up new words	Skip over the word(s)	Provide examples/review
Grasp the context	Miss the context	Start with context, use visuals
Avid reader	Tire easily	Short segments/easy layout

“Tell the story!”

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Creating Educational Material

- Learn your audience
 - Levels of literacy
 - Non technical terms
 - Demographics
- Formatting
 - Create lists
 - Short simple sentences

Hose bibbs
Hose bibbs are part of our everyday life. They allow us to hook up a garden hose to water the plants, wash the car, clean out the gutters, fill the swimming pool, etc. However, every time you connect a garden hose to a hose bibb, you are extending the end of the water line. To make sure that no harmful materials are drawn back into the garden hose, a vacuum breaker should be installed on each hose bibb. When the hose bibb is exposed to freezing conditions, make sure to use a self draining, frost-proof vacuum breaker.

Boilers
Due to the pressure that may build up inside of a boiler, the pressure of the boiler water may exceed that of the water feeding the boiler. The boiler water (which may be chemically treated with poisonous anti-corrosion compounds, etc.) may be pushed, or backpressured, into the make-up water line. This chemically treated water may be forced back into your home's drinking water system, unless there is an appropriate backflow preventer that is designed for backpressure.

Cross-Connections in Household Plumbing
A cross-connection is a connection between the drinking water plumbing system and any other source, which may contribute to the degradation of the quality of the drinking water. Your local water agency, health agency, and building and safety department work hard to provide the safest water possible to your home. However, once this water enters your property, there are common problems that may arise due to improper changes in, or misuse of, your plumbing system. In a home there are several areas where cross-connections may exist. The items listed in this brochure are typical areas where cross-connections may be found in a home. However, this is not an inclusive list.

USC Foundation brochure



Creating Educational Material

- Assessing
 - Comprehension
 - Colour blindness
 - Font including size
 - Technical terms

Protection from Thermal Expansion
Protection from thermal expansion is provided in a plumbing system by the installation of a thermal expansion tank and a temperature and pressure relief valve (T & P Valve) at the top of the tank.
The thermal expansion tank controls the increased pressure generated within the normal operating temperature range of the water heater. The small tank with a sealed compressible air cushion provides a space to store and hold the additional expanded water volume.
The T & P Valve is the primary safety feature for the water heater. The temperature portion of the T & P Valve is designed to open and vent water to the atmosphere whenever the water temperature within the tank reaches approximately 210° F (99° C). Venting allows cold water to enter the tank.
The pressure portion of a T & P Valve is designed to open and vent to the atmosphere whenever water pressure within the tank exceeds the pressure setting on the valve. The T & P Valve is normally pre-set at 125 psi or 150 psi.
Water heaters installed in compliance with the current plumbing code will have the required T & P Valve and thermal expansion tank. For public health protection, the water purveyor may require the installation of a check valve or backflow preventer downstream of the water meter. In these situations, it is essential that a T & P Valve and thermal expansion tank be properly installed and maintained in the plumbing system.

For further information contact your local water purveyor, City or County building department, licensed plumber or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992 or on the web at www.pnws-awwa.org

Protect Your Water Heater from Thermal Expansion
Without a functioning Temperature & Pressure Relief Valve your water heater can
Explode
with the force of **Dynamite**

PNWS (AWWA) brochure



Talk So They Listen

Low inputs, low budget

- Community based social behaviour program
 - Deliver workshops for plumbers, testers, engineers, and trades to identify and correct hazards
 - Transfer knowledge to industry groups (HOA, Hospitality/Dentist Associations)
- Presentations to Council
- Collaborate with Fire Dept., Bldg. and Plumbing Inspectors

High inputs, large budget

- Publish CCC Bulletins/videos on company website
- Promote program on targeted local media
- Create bill stuffers (or order online)



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PREPARING FOR THE REPERCUSSIONS OF A BACKFLOW EVENT

Incident investigations are from source to tap...
no shortcuts



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PREPARING FOR THE REPERCUSSIONS OF A BACKFLOW EVENT

Case Studies

CORPUS CHRISTI, Texas — City officials confirmed Saturday that there are four cases of people who have skin and intestinal issues consistent with exposure to contaminated water.

The Caller-Times also has confirmed that the Texas Commission on Environmental Quality's initial report shows a backflow issue at a mixing tank Dec. 7. However, it's not clear whether that was the first potential contamination or if there were even earlier backflows.

Corpus Christi is in the third day of the chemical contamination scare afflicting the city's water system. At a news conference Saturday afternoon at City Hall, Mayor Dan McQueen said 30 water samples are being tested in Houston. It's expected those results will be ready sometime Sunday. He was reluctant to give a timeline for when the water system might be cleared of the chemical contaminant because it's possible the chemical breached the system as early as Dec. 1.

Don't drink the water: Chemical identified in Texas city water supply Assistant City Manager Mark Van Vleet said the city has finished flushing about half of the city's dead-end water mains. The Associated Press reported that an internal email sent Wednesday by Susan Clewis, a regional director for the Texas Commission on Environmental Quality, contained an incident report that described the leak as a "backflow incident from a chemical tank impacting the public water system." It was reported Dec. 7 at a plant run by Ergon Asphalt and Emulsions.



BLUEPRINT TO ESTABLISHING AN EFFECTIVE CROSS CONNECTION CONTROL PROGRAM

Remember these visuals?



SUMMARY



Know your audience before you tell your story.



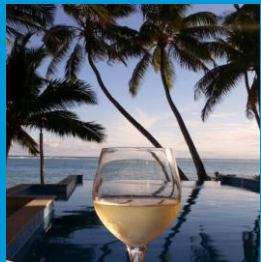
Resources:

- PNWS -AWWA brochures: https://www.doh.wa.gov/Portals/1/Documents/4200/cross_connection.pdf
- Community Based Social Marketing: <https://cbsm.com/>
- Espresso App: <https://www.expresso-app.org/>
- AWWA M14: Backflow Prevention and Cross-Connection Control: Recommended Practices
- USC Foundation: <https://fccchr.usc.edu/tools.html>
- CSA B64: Selection and installation of backflow preventers/Maintenance and field testing of backflow preventers
- CSA B128: Design and Installation of Non-Potable Water Systems/Maintenance and Field Testing of Non-Potable Water Systems

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Questions to be addressed at the end of this webinar.

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**“Thousands have lived without love,
not one without water.”** Poet W. H. Auden

Thank you for your time.

Carolyn Stewart, AScT

Canadian Consultant

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ASK THE EXPERTS



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Byron R. Hardin, CPM
President
Hardin & Associates Consulting, LLC

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KEY COMPONENTS FOR AN EFFECTIVE BACKFLOW PREVENTION PROGRAM

Byron R. Hardin, CPM
President
Hardin & Associates Consulting, LLC

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RATIONALE

- Protection of public health and safety
- The need for a proactive program
- Identifying federal, state, and local regulations compliance requirements
- Communication to the customer the financial and legal impacts of backflow and cross-connection



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LEARNING OBJECTIVES

- Identify the key components needed for your backflow prevention cross-connection control program
- Benefits of record management
- Regulatory Requirements
- Cross-Connection Emergency Response Plan



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AGENDA

- Regulatory Compliance Provisions
- Backflow Prevention Device Installation and Testing
- Cross-Connection Control Water Use Surveys
- Program Implementation Costs (User Fees)
- Education and Training
- Record Retention Program Review
- Emergency Response Plan

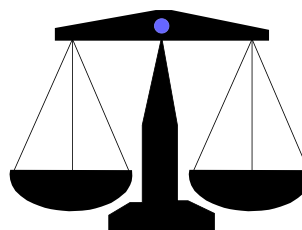
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UNDERSTANDING THE REGULATORY REQUIREMENTS

- Federal
- National Standards
- States
- Provinces
- Local Government Agencies



Things to consider:

- Who is responsible for enforcement of standards?
- Water purveyor or customer responsible for compliance to the regulations
- Adoption of ordinances, policies, national standards

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INSTALLATION AND TESTING

- Hire approved (licensed or registered) personnel for the installation and testing of backflow prevention assemblies
- Ensure that local jurisdictions rules and manufacturer recommendations are met
- Use only assemblies or devices approved by the appropriate federal, province, state or local authority
- Test all backflow prevention assemblies at the frequencies recommended or required by your jurisdiction



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INSTALLATION AND TESTING CONT.

- Provide backflow prevention in new construction through coordination with the local Building Inspection Office
- For existing buildings, develop a program in-house or to inspect for the adequacy of cross-connection control
- Prioritize inspections based upon the expected degree of risk / hazard.
- Make sure that a backflow inspector conducts inspections for hazards to be controlled



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CROSS-CONNECTION CONTROL WATER USE SURVEYS



Standard of Competency:

- A person performing a cross-connection survey must have industry knowledge (adequate licenses and training) with water distribution and internal potable water conveyance systems
- He/she may have no familiarity with other types of piping systems and should enlist the aid of another competent person familiar with these types of piping systems to aid in the inspection

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CROSS-CONNECTION CONTROL WATER USE SURVEYS



- Call for an appointment
- Ask to see plans
- Prepare the survey form
- Begin at the service connection
- Inspect outside of building
- Inspect each point of use (Internal / External)
- Document all non-compliance issues
- Perform the lead test (if required)
- Complete and sign the survey form

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CROSS-CONNECTION CONTROL WATER USE SURVEYS

Equipment: (Partial list)

- Camera /cell phone
- Flashlight
- Lead Test Swabs
- Lead Evidence Containers / Plastic Bags
- Permanent Marker
- Survey Forms
- Laser pointer
- Personal Protective Equipment



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FUNDING CROSS-CONNECTION PROGRAMS

- User fee pay system
- Tester registrations
- Device / assembly annual registration fee (permit fees for each separate unit)
- Water rate adjustments
- Tester is assessed a fee by the local jurisdiction on each device tested
- Building permit fees
- Fines and penalties



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EDUCATION AND TRAINING

- Identify stakeholders
 - Internal
 - External
- Evaluate, expand, refine and sponsor training workshops
- Prioritize education and public awareness needs
- Develop programs to meet those needs
- Develop positive public awareness of backflow prevention utilizing media

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RECORD IMPLEMENTATION

- Assigning who will manage the process
- SOP development / training
- Inventory your backflow program records
- Storing your records / on site or cloud
- Paper copy vs. digital
- Retention and destruction schedule
- Auditing
- Reporting to regulatory authority
- Disaster recovery plan



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BENEFITS OF RECORD MANAGEMENT

- Reduces record volume and storage costs
- Efficient retrieval of records
- Enables regulatory compliance
- Maintains accountability
- Manages risk
- Automates workflow
- Improves customer service



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CONSEQUENCES WITHOUT RECORD MANAGEMENT

- Wasted time sorting through messy filing cabinets
- Wasted space is used to store paperwork
- Pay for document storage
- Files are misplaced, buried, and lost
- Communication between coworkers erodes
- Lack of policies and procedures
- Customer confidence
- No back up processes
- Regulatory fines and penalties



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RECORD DISPOSAL

- Disposal must be done responsibly through a clear understanding of:
 - an organization's business and legal functions
 - the value of the information to the organization
 - legislative retention requirements including information of historical value under the Public Records Act
 - the technology that supports the information

Authorities should define how long they need to keep particular records, should dispose of them when they are no longer needed and should be able to explain why records are no longer held.



CROSS-CONNECTION EMERGENCY RESPONSE PLAN

- Handling of the complaint
- Identify and Isolate the Cross-Connection
- Notify authorities, public, and media
- Distribution sampling
- Distribution flushing (where, when and how)
- Remediation Procedures
- Enforcement
- Restore Consumer Confidence in Water Quality
- Documentation



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REVIEW OF KEY ELEMENTS OF A PROGRAM

- Regulatory compliance provisions
- Implementation and following of national guidelines
- Internal support
- Involvement with other organizations
- Public awareness / education
- Complaint investigation and documentation
- Emergency Response Plan



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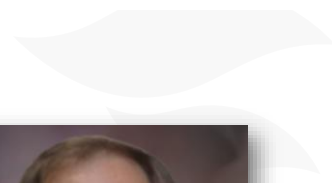


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OVERCOMING OBSTACLES IN CROSS CONNECTION CONTROL PROGRAMS



Mitch LeBas, PE
President
Backflow Prevention Services,
LLC

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IDENTIFYING OBSTACLES

Task Uncertainty
Time and Cost Burden
Lack of Education
Poor Planning
Poor Record Keeping
Lack of Resources



Program development, implementation, and management
can be a challenge if not properly prepared.

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TASK UNCERTAINTY

Identify program
purpose

Set goals!

Team effort



Program development, implementation, and management can be a challenge if not properly prepared.

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PROGRAM GOALS

Goals

- Protect the water
- Minimize the cost burden to the customer
- Achieve regulatory compliance

Benefits

- Eliminates favoritism
- Helps get “buy in” from the customer
- Regulatory officials are pleased with the effort

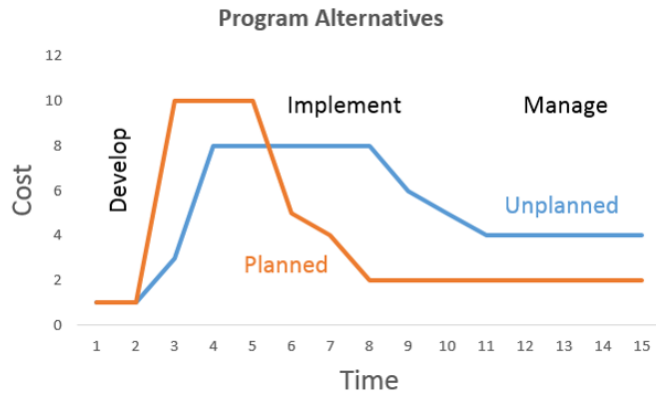
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TIME AND COST BURDENS

- Prepare Policy
- Educate the Customer
- Work Efficiently in documenting hazards and letter distribution
- Select Proper Recordkeeping Application



Everyone has burdens ... minimize those that are unnecessary!

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LACK OF EDUCATION

Educate all Stakeholders

- Politicians
- City Administrators
- EOC
- Customers

Develop Public Relations Campaign

- Civic Associations
- Homeowners Associations
- Television and Radio
- Professional Associations such as Engineers, Architects

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POOR PLANNING

Repercussions include:

- Turmoil within the community
- Unsafe water quality
- Death of a program

*Create good habits ...
they are just as hard to break as bad ones!*

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POOR RECORD KEEPING

Obstacles include:

1. Uncertified plumbers and testers working within the system
2. Poor installations
3. Inadequate tester monitoring
4. Unable to meet Goal 3 - Achieve Regulatory Compliance

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LACK OF RESOURCES



Manpower

- Seek individuals within professional organizations.
- Self train staff

Funding

- Municipal appropriation will be needed at program inception.
- Establish permit fees for installation and testing for long term program management.

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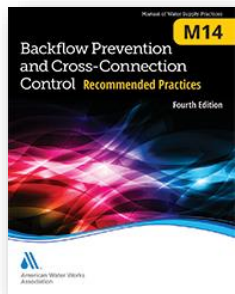
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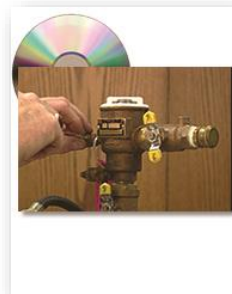
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ADDITIONAL RESOURCES



M14 Backflow Prevention and Cross-Connection Control: Recommended Practices
AWWA catalog number: 30014-4E



Backflow Prevention and Cross-Connection Control DVD
AWWA catalog number: 64398



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Aug 12 - Tools to Build Utility Source Water Protection Programs

Aug 19 - Sustaining an Asset Management Program: What Works?

Aug 25 - FREE Webinar from Yokogawa Fluid Imaging Technologies: Integrated Approach to Monitor Taste and Odor Producing Cyanobacteria

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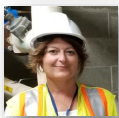
- As part of your registration, you are entitled to an additional 30-day archive access of today's program.
- Until next time, keep the water safe and secure.

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PRESENTER BIOGRAPHY INFORMATION



Carolyn Stewart has more than 15 years of surveying and program management experience in the cross connection control industry as a program manager and consultant. Her passion for building effective stand-alone programs is a key part of her commitment to serve on AWWA's Cross Connection Control Committee and M14 Revision Subcommittee.



Byron R. Hardin is President of Hardin & Associates Consulting, a firm committed to working with local governments in applying innovative solutions for optimal results. Prior to starting Hardin and Associates Consulting, Byron served as the Dallas/Fort Worth Office Manager for Brown and Caldwell. Byron currently has over 34 years of state, municipal and private sector experience in the areas of Business Management, Public Works, Water / Wastewater Utilities, and Environmental Health, where he served in the capacity of senior specialist and at department director level. At the state level, he served as Program Manager for the Texas Natural Resource Conservation Commission (TNRCC) in the Public Drinking Water Section/Water Utilities Division. He currently maintains several licenses and national certifications in the Public Works, Water Utilities, and Environmental Health fields. Byron is an approved instructor for Texas Commission on Environmental Quality and the Texas Department of State Health Services and currently instructs for the Texas State University Certified Public Manager Program. His educational background includes a Bachelor of Arts Political Science degree, from the University of Texas at Arlington and a graduate of the University of Texas at Arlington School of Urban and Public Affairs Certified Public Manager Program. Byron is a Texas native, and resides in the North Central Texas area with his wife of 35 years (Michelle) and their 18 year old son (Garrett).



Mitch LeBas, a licensed professional engineer in the State of Louisiana, is a member of the AWWA Cross Connection Control Committee and Chairman of the M14 Revision Subcommittee. He has been actively involved within the backflow industry for more than 15 years and has assisted more than 25 water systems with implementing backflow programs.



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