Backflow Prevention

Ohio EPA Rules Update

RCAP/Ohio AWWA
Small Systems Operator Training
May 24, 2016

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Division of Drinking and Ground Waters

Ohio Environmental Protection Agency

Backflow Prevention

Rule Update and Jurisdiction

- OVERVIEW OF BACKFLOW PREVENTION AND CROSS CONNECTION CONTROL CONCEPTS
- RULE OVERVIEW - FOCUS ON REVISIONS TO RULES
- HIGHLIGHTS OF NEW FORMAT AND PROVISIONS IN REVISED OHIO EPA'S BACKFLOW PREVENTION MANUAL
- ADEQUATE BACKFLOW PREVENTION PROGRAM
  - What this means for public water systems

Backflow and Cross-Connection Control *Overview*

CROSS- CONNECTION

Physical link or route that makes it possible for contamination to backflow into the potable water system

BACKFLOW

Reversal of flow such that water or other liquids, mixtures, or substances enter into the distributing pipes of a potable water supply from any source other than the intended source of the potable water supply.

Backflow and Cross-Connection Control *Overview*

BACKSIPHONAGE –

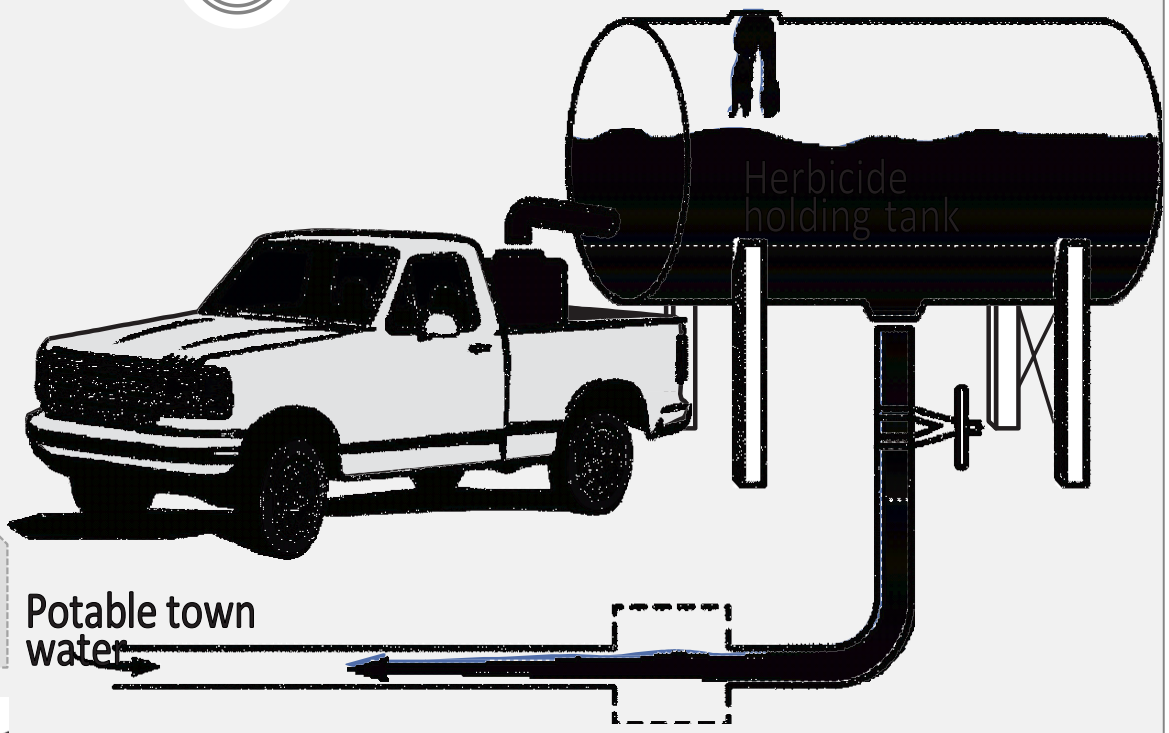
Reversal of flow due to a drop in pressure, vacuum or negative pressure condition in the piping allowing contaminants to be siphoned into the drinking water supply

BACKPRESSURE –

Reversal of flow due to an opposing pressurized system which overcomes the public drinking water supply pressure allowing movement of contaminants into the drinking water supply

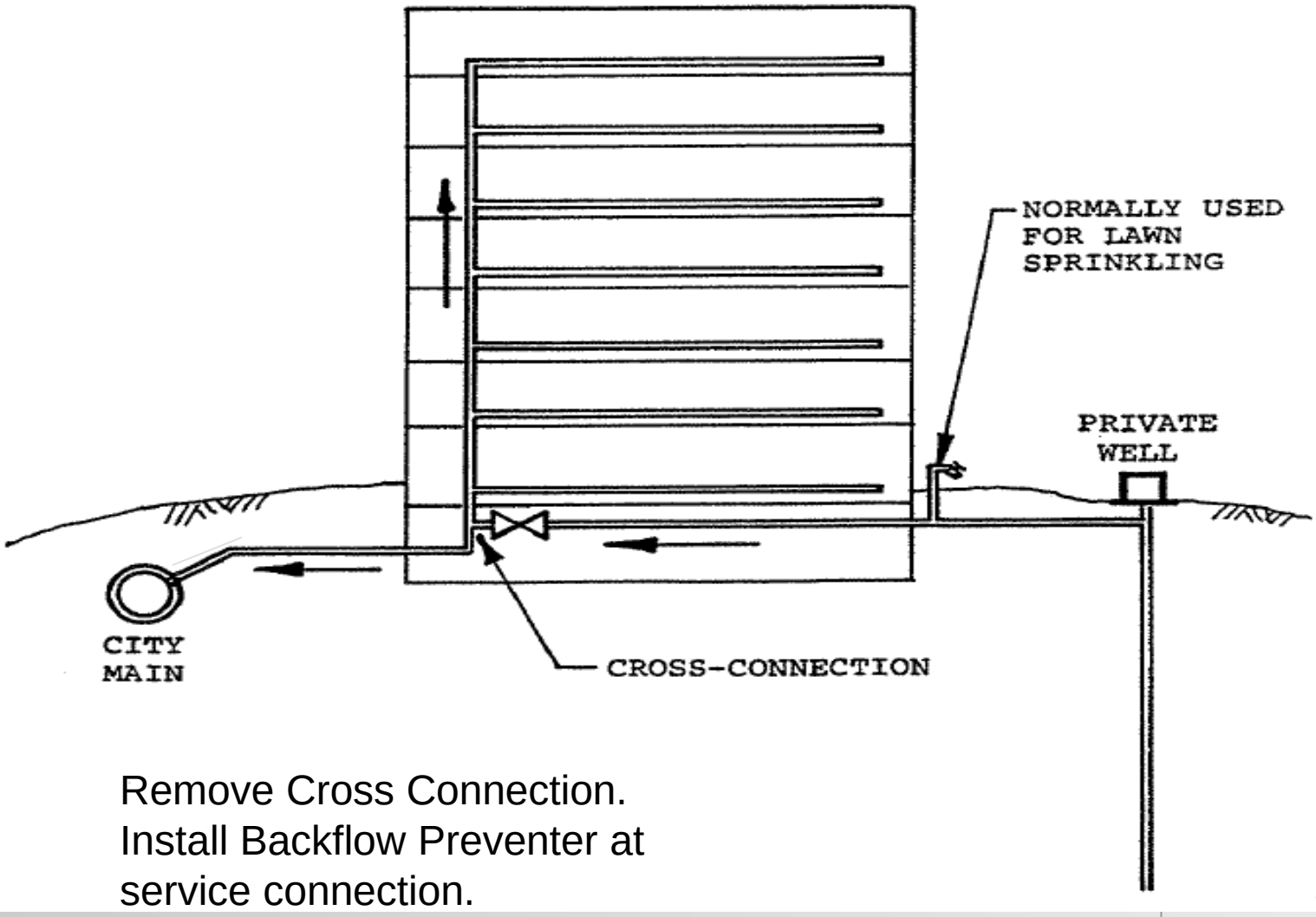
Backsiphonage

Pipe work, loss in pressure



Installation of backflow preventer necessary.

Backpressure

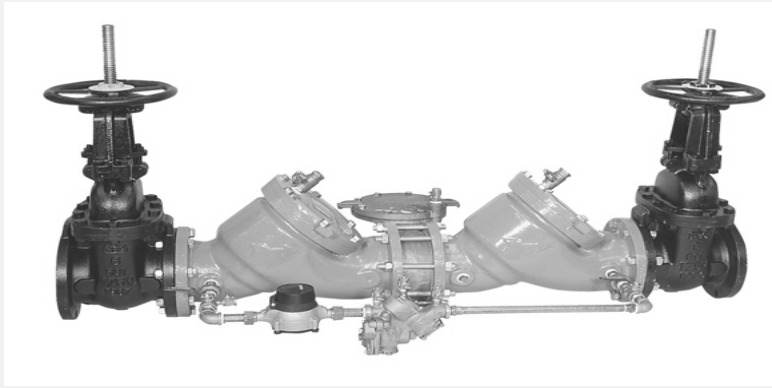


Remove Cross Connection.
Install Backflow Preventer at service connection.

Backflow Preventers

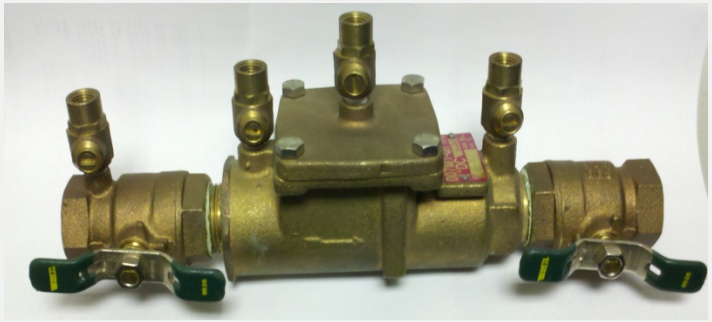
Air gap/Water loading station device

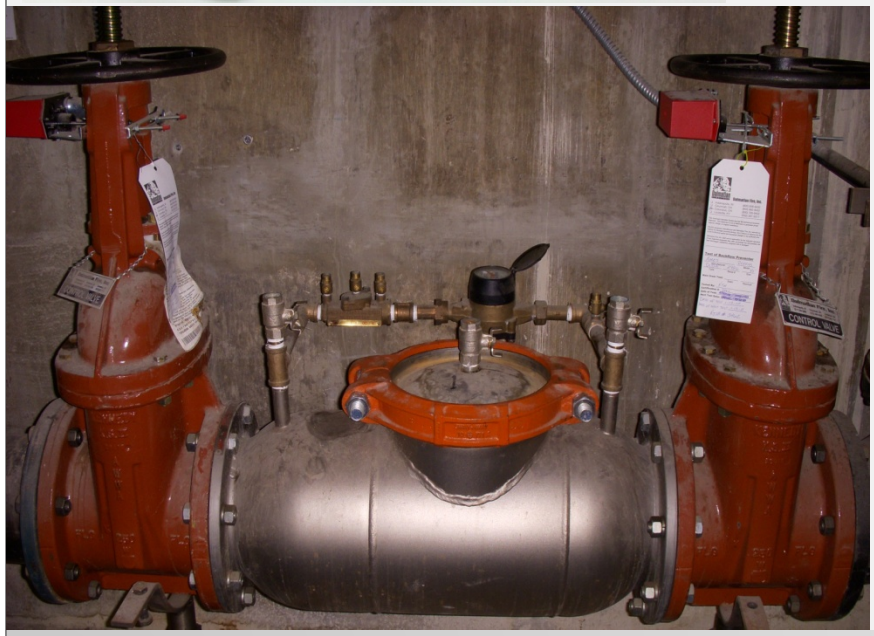
Reduced Pressure/Detector Assembly



Backflow Preventers

Double Check/Detector Check Assembly





Isolation Only Devices

Backflow Preventers

- Air Gap
  - Air gap discharge
  - Bulk water loading station air gap device
- Assemblies
  - Reduced Pressure Principle Backflow Prevention Assembly
  - Reduced Pressure Detector Check Assembly
  - Double Check Assembly
  - Double Check Detector Check Assembly
- Devices
  - Dual Check
  - Hose Bibb Vacuum Breaker
  - Atmospheric Vacuum Breaker
  - Pressure Vacuum Breaker
- Specific Valving/ Piping Configuration
  - Interchangeable Connection (four-way valve or swing connector)
  - Barometric Loop

Backflow and Cross-Connection Control *Overview*

RESPONSE NEEDED:

Comprehensive backflow prevention and cross-connection control program to address backflow hazards posed by cross-connections in plumbing systems and to public water supplies

RESPONSIBILITY:

Shared among regulatory agencies, supplier of water, local plumbing authorities and the consumer

Backflow Prevention and Cross Connection Control

Protecting our Public Drinking Water Supply from Sanitary Risk

Ohio Environmental Protection Agency

Backflow Prevention Rules

Proposed changes:

Ohio Administrative Code 3745 -95-01

-95-02

-95-03

-95-05

-95-06

-95-07

These changes were effective October 26, 2015

Access effective rules on OEPA website.

Rules and Effective Dates

Chapter 3745-95: Backflow Prevention and Cross-Connection Control

- 3745-95-01 (*26 October 2015*) Definitions.
- 3745-95-02 (*26 October 2015*) Cross-connections.
- 3745-95-03 (*26 October 2015*) Surveys and investigations.
- 3745-95-04 (*1 May 2003*) Where protection is required.
- 3745-95-05 (*26 October 2015*) Type of protection required.
- 3745-95-06 (*26 October 2015*) Backflow prevention devices.
- 3745-95-07 (*26 October 2015*) Booster pumps.
- 3745-95-08 (*26 November 1980*) Violations.
- 3745-95-09 (*19 April 2012*) Requirements for yard hydrants

Backflow Prevention
Rule Revisions: 95-01

CHAPTER 3745-95-01- *DEFINITIONS*

- Add definitions for containment principle

CONTAINMENT PRINCIPLE BACKFLOW PREVENTER –

Installed in a consumer's water system, to contain water within the premises, to prevent polluted or contaminated water from backflowing into the public water system.

Typically at service connection, unless placement otherwise specified in rule.

VS. ISOLATION –

Installation of individual fixture devices or "air gaps"

Protect the consumer's potable water supply

Backflow Prevention
Rule Revisions: 95-02

CHAPTER 3745-95-02- *BACKFLOW PREVENTION AND CROSS CONNECTION CONTROL*

- Add statement that public water systems must have a backflow prevention program consistent with these rules.
- Applies to ALL public water systems.

Backflow Prevention
Rule Revisions: 95-03

CHAPTER 3745-95-03 – *SURVEYS AND INVESTIGATIONS*

- Set a frequency for periodic survey or investigation

Revised Rule language:

- Conduct an initial assessment
- Conduct periodic surveys or investigations of water use practices within a consumer's premises to determine whether there are actual or potential cross-connections to the consumer's water system through which contaminants could backflow into the public water system.

Backflow Prevention
Rule Revisions: 95-03

CHAPTER 3745-95-03 – *SURVEYS AND INVESTIGATIONS*

Revised Rule language (con't):

TO MEET RESURVEY REQUIREMENT, THE SUPPLIER OF WATER MUST:

Conduct onsite investigation of all premises every five years to identify changes in water use practices that require mitigation

OR,

Develop, specify in writing, and implement, an alternate, on-going methodology to identify changes in water use practices at the consumer's property to mitigate new or increased hazards

On-site investigation required when a new or increased hazard is suspected to confirm degree of risk and how it will be addressed

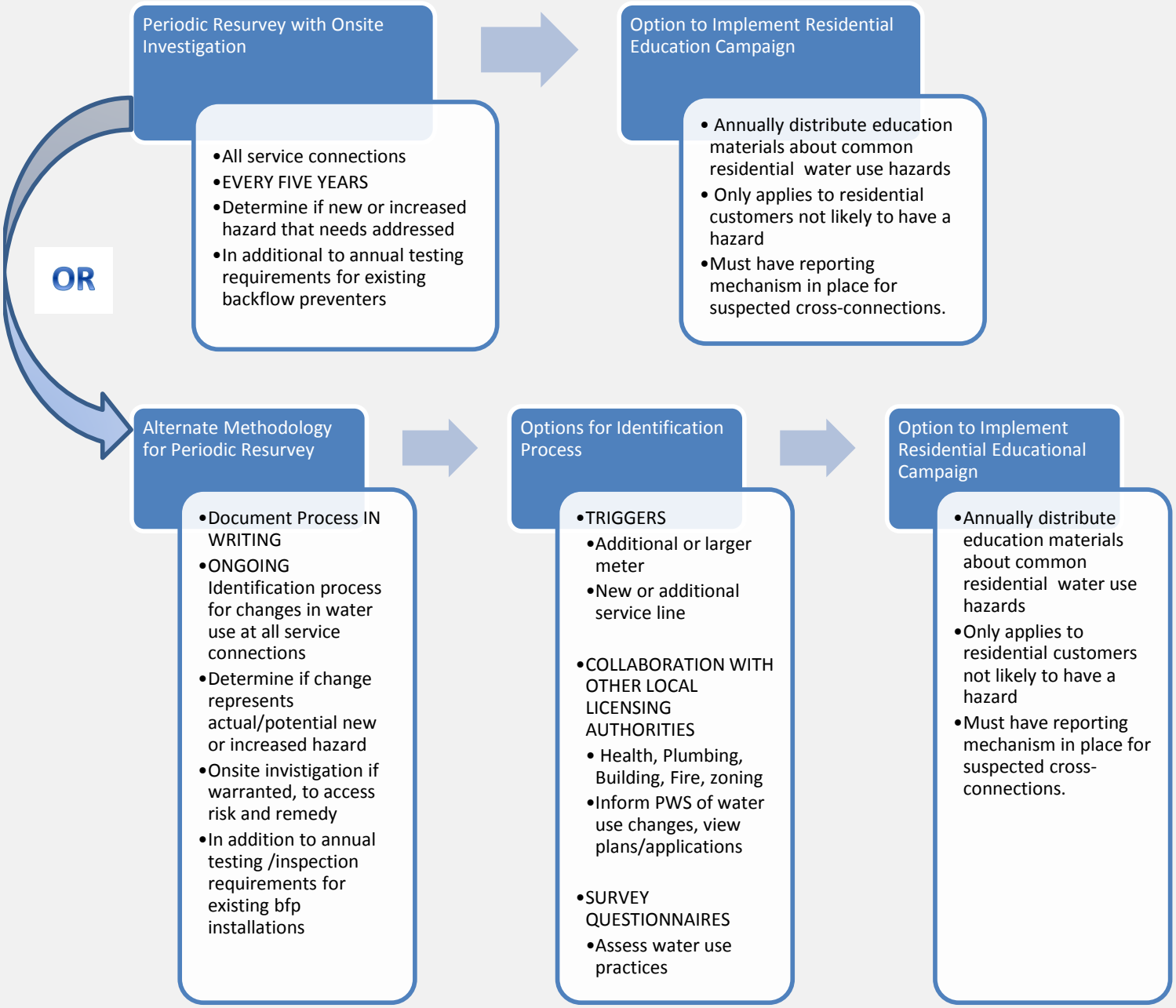
Backflow Prevention
Rule Revisions: 95-03

CHAPTER 3745-95-03 – *SURVEYS AND INVESTIGATIONS*

Proposed Rule language (con't):

IN LIEU OF CONDUCTING A SURVEY OR INVESTIGATION OF EACH RESIDENTIAL PREMISES WITHOUT A LIKELY HAZARD, THE SUPPLIER OF WATER MAY INSTITUTE AN ON-GOING EDUCATIONAL CAMPAIGN TO INFORM CONSUMERS OF COMMON BACKFLOW HAZARDS CREATED DURING RESIDENTIAL WATER USE AND PROVIDE A REPORTING MECHANISM FOR SUSPECTED CROSS CONNECTIONS.

AN EDUCATION CAMPAIGN MAY USE LOCAL MEDIA AND ADVERTISING RESOURCES, BUT MUST ALSO INCLUDE INFORMATION DELIVERED, EITHER ELECTRONICALLY OR HARD COPY, TO EACH RESIDENTIAL SERVICE CONNECTION AT LEAST ANNUALLY.


Periodic Resurvey with Onsite Investigation
•All service connections
•EVERY FIVE YEARS
•Determine if new or increased hazard that needs addressed
•In additional to annual testing requirements for existing backflow preventers
Option to Implement Residential Education Campaign
• Annually distribute education materials about common residential water use hazards
• Only applies to residential customers not likely to have a hazard
•Must have reporting mechanism in place for suspected cross-connections.
OR
Alternate Methodology for Periodic Resurvey
•Document Process IN WRITING
•ONGOING Identification process for changes in water use at all service connections
•Determine if change represents actual/potential new or increased hazard
•Onsite invistigation if warranted, to access risk and remedy
•In addition to annual testing /inspection requirements for existing bfp installations
Options for Identification Process
•TRIGGERS
•Additional or larger meter
•New or additional service line
•COLLABORATION WITH OTHER LOCAL LICENSING AUTHORITIES
• Health, Plumbing, Building, Fire, zoning
•Inform PWS of water use changes, view plans/applications
•SURVEY QUESTIONNAIRES
•Assess water use practices
Option to Implement Residential Educational Campaign
•Annually distribute education materials about common residential water use hazards
•Only applies to residential customers not likely to have a hazard
•Must have reporting mechanism in place for suspected cross-connections.

Degree of Hazard & Control Methods
Backflow Prevention
OAC Rule 3745-95

PROTECTION NEEDED FOR THE DEGREE OF HAZARD

Severe Health Hazard → **at least *AIR GAP***

Cause severe morbidity or death

Health Hazard → **at least *RP***

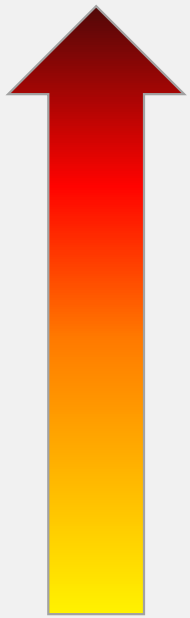
Danger to health

System Hazard → **at least *RP***

Cause damage to components of water system

Pollution hazard → **at least *DOUBLE CHECK***

Aesthetically objectionable or degrading to quality of water



Backflow Prevention
Rule Revisions: 95-05

CHAPTER 3745-95-05 – *TYPE OF PROTECTION REQUIRED*

Include alternative for water-only, residential irrigation system:

WATER-ONLY, RESIDENTIAL-TYPE IRRIGATION SYSTEM

-Not Subjected To Backpressure

-No Additives

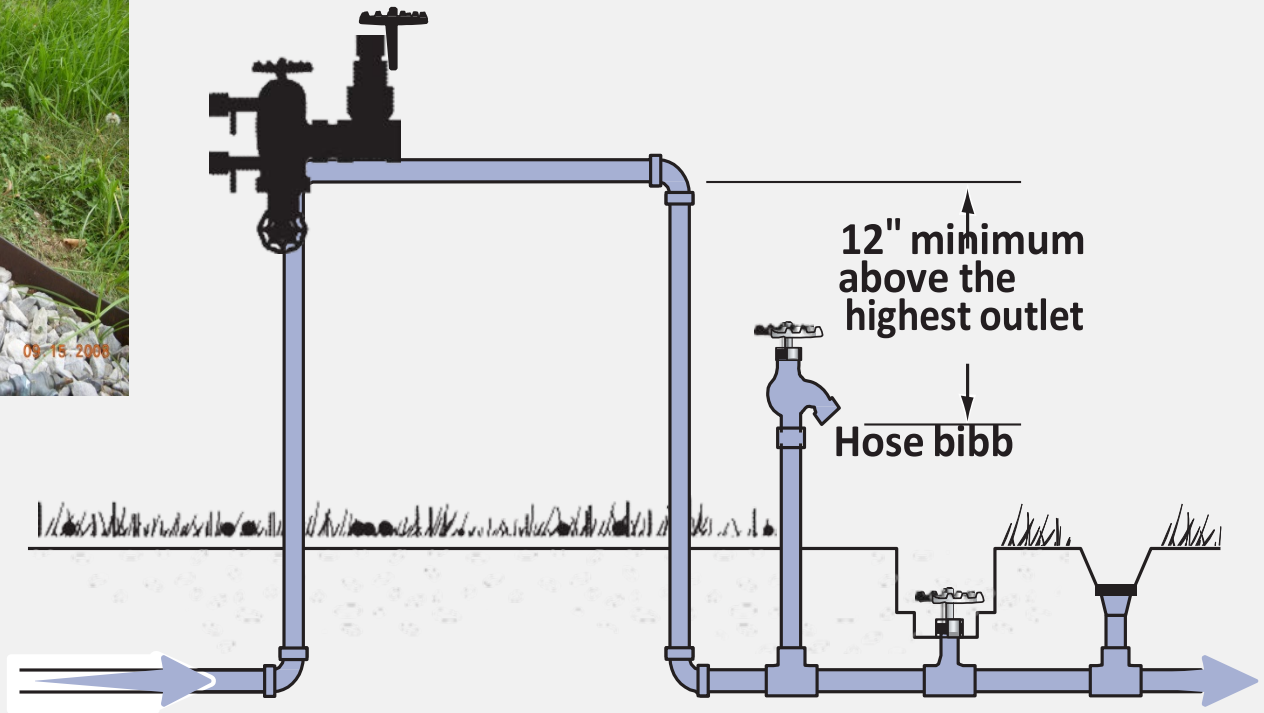
AN APPROVED PRESSURE VACUUM BREAKER CAN BE USED to isolate the service line to the irrigation system IN LIEU OF INSTALLING A CONTAINMENT ASSEMBLY at the service connection.

-Same Maintenance And Testing Requirements

CAN STILL REQUIRE CONTAINMENT PROTECTION AT THE SERVICE CONNECTION

Backflow Prevention
Rule Revisions: 95-05

Application of pressure vacuum breaker.



Backflow Prevention
Rule Revisions: 95-06

CHAPTER 3745-95-06 –*BACKFLOW PREVENTERS*

Update standards references for acceptable backflow prevention assemblies.

Reference Ohio Building Code-Plumbing Rule OAC 4101:3-13-01, for consistency in standard edition. Add Pressure Vacuum Breaker.

Specify records retention:

The supplier of water shall maintain an inventory of survey, investigation and backflow preventer installations.

Records of inspections, tests, repairs and overhauls shall be maintained by the supplier of water for a minimum of five years.

Degree of Hazard & Methods for BFP and X-Conn. Control

Hazard Level	Assembly	Certification Number	Protection Provided
Severe Health	Approved Air-Gap Separation	ANSI 112.1.2	Backpressure Backsiphonage
Health System	Reduced Pressure Assembly	ASSE 1013 AWWA C511 CSA B64.4 USC - RP	Backpressure Backsiphonage
Health System (Fire System Only)	Reduced Pressure Detector Assembly	ASSE 1047 CSA B64.4.1 USC - RPDA	Backpressure Backsiphonage
Pollution	Double Check Valve Assembly	ASSE 1015 AWWA C510 CSA B64.5 USC - DCA	Backpressure Backsiphonage
Pollution (Fire System Only)	Double Check Detector Assembly	ASSE 1048 CSA B64.4.1 USC -DCDA	Backpressure Backsiphonage
Health (Residential Irrigation with no pumps and no additives, only)	Pressure Vacuum Breaker	ASSE 1020	Backsiphonage Only

Backflow Prevention
Rule Revisions: 95-07

CHAPTER 3745-95-07 – *BOOSTER PUMPS*

- Allow install at 1,2 and 3 family dwellings with minimum suction pressure control.
  - Plumbing will require condition of obtaining a *certificate of occupancy*, based on notification to PWS of pump install and successful testing of the low pressure cutoff control.
- Incorporate variable speed suction limiting control as alternate minimum suction pressure control mechanism on fire pump installations.

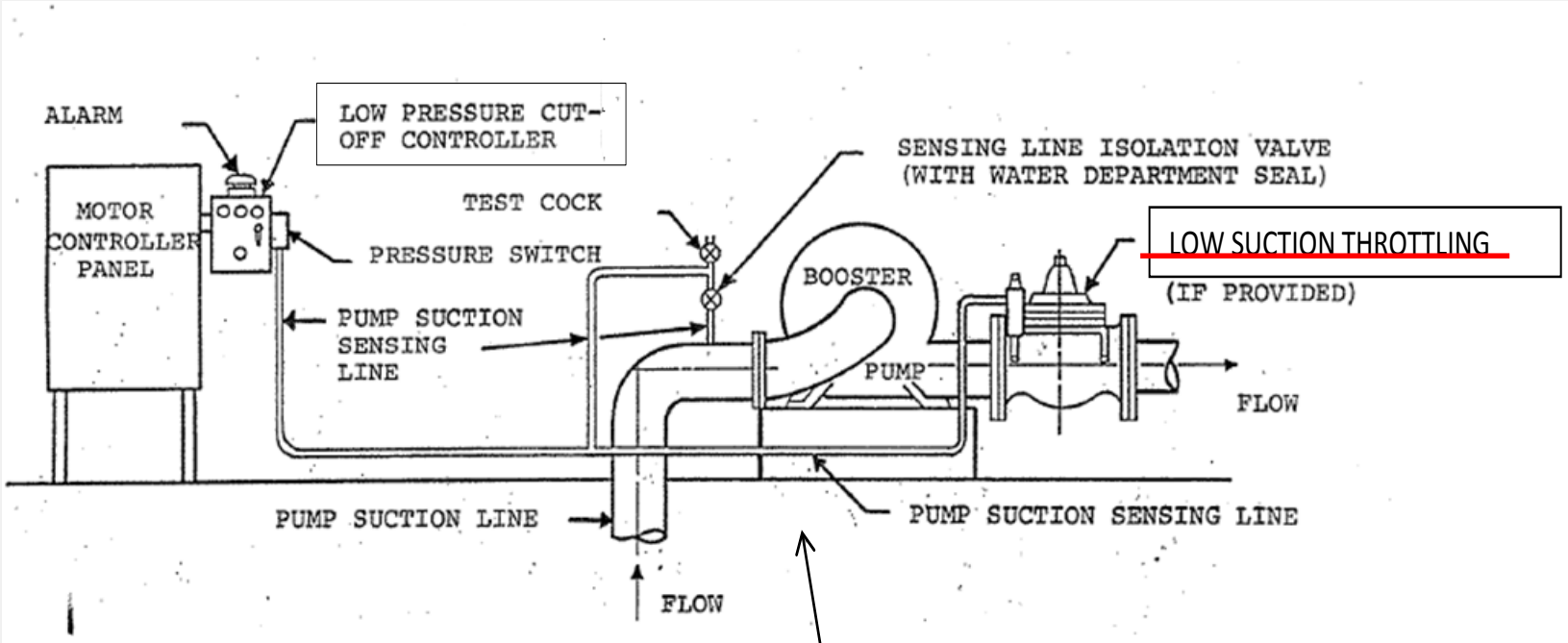
Changes are consistent with Ohio Building Standards (plumbing) and State Fire Code (NFPA 20 standards for fire pumps).

Backflow Prevention
Rule Revisions: 95-07

- Booster Pumps (non-fire)
  - No prohibition for 1,2,3 family dwellings.
  - Must have low pressure cutoff controller to maintain 10 psi minimum suction pressure.
- Fire pumps
  - As above (existing before 2008), or
  - Low suction throttling valve or variable speed suction limiting control to maintain minimum suction pressure

Booster (or Fire) Pumps

Minimum Suction Pressure Control Options



VARIABLE SPEED SUCTION LIMITING CONTROL ON PUMP DRIVER (not shown)

(Preset by manufacturer to maintain a min suction pressure)

Remaining Rules *(did not change)*

OAC 3745-95-04 (WHERE PROTECTION IS REQUIRED - AWS)

OAC 3745-95-08 (VIOLATIONS)

OAC 3745-95-09 (REQUIREMENTS FOR YARD HYDRANTS)

Where Protection Is Required
Current OAC 3745-95-04

- **Requires protection where a hazard exists, if not correctable, not accessible, history, etc.**
- **Requires protection at specific types of facilities**
- **Requires protection for <u>Auxiliary Water Systems</u>.**
  - Physically separate & require a reduced pressure principle backflow prevention assembly (RP) at the service connection, or eliminate AWS.
  - If on property, off premises, no risk of cross- connection of public water system with AWS, could implement alternative to RP
  - Accompanying *AWS guidance* and *educational brochure* available

Yard Hydrants
Current OAC Rule 3745-95-09

YARD HYDRANTS, with below ground weep holes:

- Publically owned/part of public water system, weep holes prohibited when accessible/intended for potable use (i.e. campgrounds)
- Owned/part of public water system, and not for potable use, or on private service connection, must install appropriate bfp assembly. Label not for human consumption or nonpotable.
- *Recommend ASSE 1057 freeze resistant sanitary yard hydrant*

Major Sections of BFP Manual

Backflow Prevention and Cross Connection Control Manual, FOURTH Edition 2015 now available

Manual Revisions:

Rule Changes

New Policy

New Guidance

Access it online.

1. The Problem
2. Backflow and Cross-Connection Theory and Concepts
3. Cross-Connection Control Program Authority and Rules
4. Backflow Preventers (types)
5. Degree of Hazard and Methods for Control
6. Components of a Backflow Prevention Program

Appendices (test procedures, sample ordinances, example survey forms and additional guidance)

BFP Manual
Components of an Adequate Program

QUALIFICATIONS FOR PROGRAM OVERSIGHT & TESTING OF BACKFLOW PREVENTERS

OEPA SANITARY SURVEY CHECKLIST USED TO DETERMINE ADEQUACY OF BFP PROGRAM

Ohio Environmental Protection Agency

BFP Manual
Components of an Adequate Program

QUALIFICATIONS (PROGRAM OVERSIGHT & TESTING)

THE INDIVIDUAL:

- Overseeing the program must be the operator of record or under his/her authority
- Implementing the program should have completed a training course about backflow prevention theory and testing procedures
- Testing containment assemblies should have ODOC tester certification
- Testing isolation devices must follow ODOC requirements
- Testing backflow prevention assemblies on fire protection system may need certification from State Fire Marshal

Components of an Adequate Backflow Prevention Program

SANITARY SURVEY CHECKLIST TO DETERMINE ADEQUACY OF BACKFLOW PREVENTION PROGRAM

COMPONENTS OF A GOOD BACKFLOW PREVENTION PROGRAM:

1. Local ordinance or other legal mechanisms in place to control cross-connections
2. Backflow preventer required is appropriate for degree of hazard
3. Backflow preventers are inspected/tested every 12 mos.
4. Discontinue service when backflow preventer not installed or properly maintained

Components of an Adequate Backflow Prevention Program

SANITARY SURVEY CHECKLIST TO DETERMINE ADEQUACY OF BACKFLOW PREVENTION PROGRAM

6. Minimum pressure sustaining controls maintained for booster and fire pump installations drawing from public water supply
7. Service connections with auxiliary water systems have physical separation and backflow preventer; or follow requirements of OAC 3745-95-04(C)(2)
8. Has a criteria for acceptable backflow preventer tester (recommend ODOC certification)
9. Backflow prevention needs for all existing customers have been identified

Components of an Adequate Backflow Prevention Program

SANITARY SURVEY CHECKLIST TO DETERMINE ADEQUACY OF BACKFLOW PREVENTION PROGRAM

10. Mechanism in place to identify backflow prevention needs on new service connections
11. Periodic resurvey, as defined in rule, of all consumers to determine current water use practices and that adequate protection is in place
12. Backflow preventers at treatment plants and other facilities owned by water system/municipality tested every 12 mos.
13. Air gap provided at bulk water sale stations
14. Trained PWS staff in cross connection control
15. Operator of record provide oversight/attest to bfp program

Non-community PWS Backflow Prevention Program

- What if a public water systems does not fit into the category of providing water to customers through a metered service connection?
  - Include restaurants, schools, nursing homes, etc. that have their own water supply and meet definition of public water system.
- Still must follow the requirements for having a backflow prevention program. Part of an adequate program is also complying with the Ohio plumbing code and enforcement so the potable supply is not contaminated.

Non-community PWS Backflow Prevention Program

- **PWS must comply with applicable provisions of OAC 3745-95. An adequate backflow prevention program (95-02) includes addressing backflow prevention on internal plumbing.**

- **Must also comply with the Ohio plumbing code (2011) for internal plumbing within buildings**
  - OAC Chapter 4101:3-3, under section 312 of Ohio Plumbing Code 312.10 (312.10.1 and 312.10.2) and 608

Non-community PWS Backflow Prevention Program

OAC 3745-95-06 and,

OAC Chapter 4101:3-3, section 312 of Ohio Plumbing Code, apply.

<u>Inspection and testing, record-keeping</u>

PWS must conduct inspection and testing of all testable backflow preventers every 12 mos (also part of plumbing code requirement) and repair or replace inoperable devices.

We want to see test reports showing “testable” backflow preventers are tested annually.

Non-community PWS Backflow Prevention Program

Plumbing Resources:

Board of Building Standards provide listing of local jurisdictional contacts for plumbing oversight in buildings (non-residential, includes residential dwellings over 3-family)

Some areas still enforced by State, others by local building department or local health department. Local entities were approved by State to enforce non-residential plumbing code provisions.

PWS owner/operator should contact local plumbing authority to address internal plumbing situation or backflow preventer deficiencies.

For More Information

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See website for effective rules and manual:
http://epa.ohio.gov/ddagw

-Quick link: Rules , then Effective Rules tab

-Quick link: Engineering and Plan Approval, Engineering tab, Backflow Prevention heading, manual 4th ed.

THANK YOU!
QUESTIONS??

END