

Backflow Prevention: Michigan's Program for Protecting Drinking Water

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Outline

- Why are the rules necessary?
- Basic concepts
- Brief history backflow prevention regulations
- Who do the rules apply to?
- What are the program basics?
- Useful references

What do these things have in common?

- Lawn sprinkling system
- Air conditioning system
- Metal plating factory
- Home water purification system

All have caused **illness or death** by accidentally contaminating a public water supply!

Why are these rules necessary?

To protect public health



What is a Cross-Connection?

“A connection or arrangement of piping or appurtenances through which a backflow could occur.”

Or

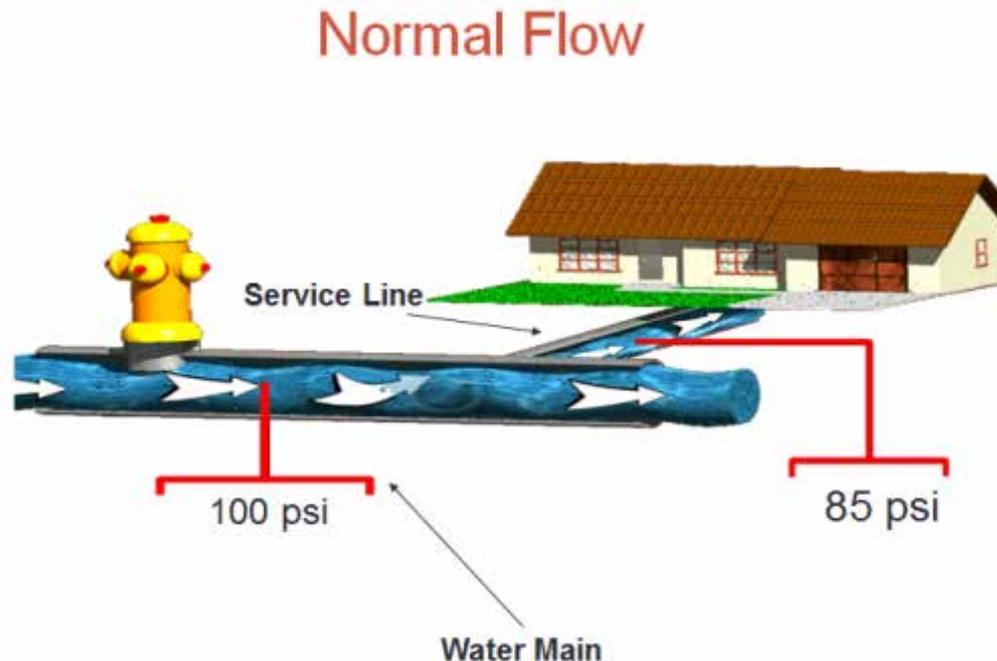
“Any piping arrangement which allows a potable water system to be connected to a non-potable system.”



Backflow

The undesirable reversal of flow of water or other substances into the potable water distribution supply.

It can be caused by backpressure, backsiphonage or combination of both.



Backflow

Backsiphonage



Backpressure



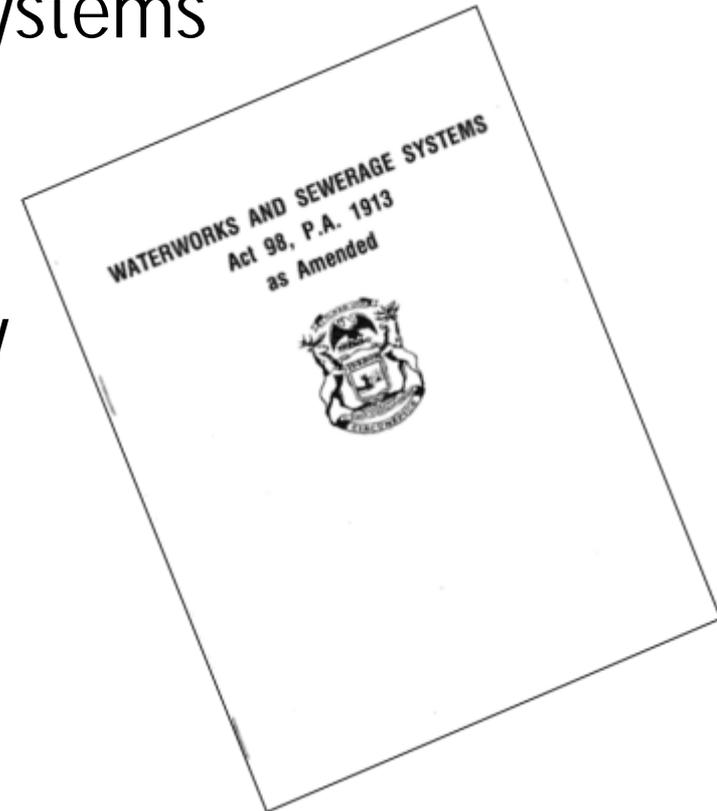
What's wrong with these pictures?



History of MI's Drinking Water Regulations

The Waterworks and Sewerage Systems
Act 98, P.A. 1913

- Promulgated August 15, 1913
- Department of Health authority
- Included water supply



First Cross Connection Rules

- **December 1938:** x-conn regulations adopted by the Advisory Council of Health
 - *No connection shall be installed or maintained between a potable public supply and pipes, pumps, or tanks supplied or possible of being supplied, from any non-potable source*



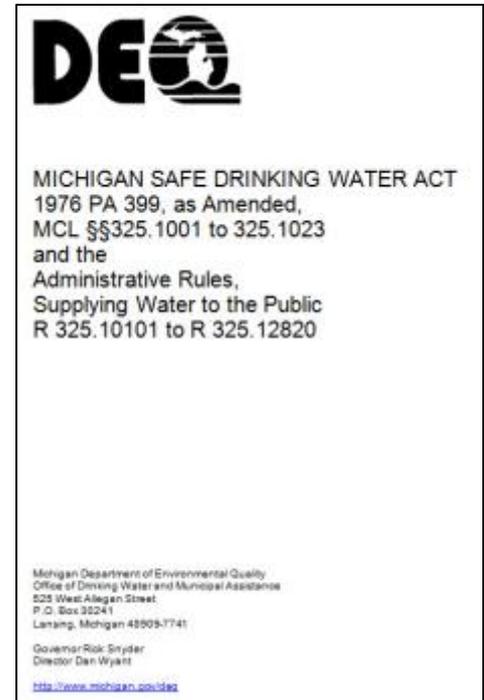
Cross Connection Rules (cont)

- **December 1938:** first x-conn regulations adopted by the Advisory Council of Health
- **April 1972:** x-conn rules were promulgated into Act 98
- Very similar to today's rules
 - Definitions, cross connections prohibited, required local programs, protective devices, annual reporting, piping identification, etc.



Cross Connection Rules (cont)

- 1974: Federal Safe Drinking Water Act
- 1976: Michigan Safe Drinking Water Act (Act 399) →
 - became effective Jan 4, 1977
- 1978: 1972 x-conn rules adopted by reference into Act 399
 - Part 14 – Cross Connections



Cross Connection Rules Manual

- 1st Edition was published in March, 1977 to supplement the 1972 x-conn rules
- 2nd Edition – October 1982
- 3rd Edition – April 1999
- 4th Edition – October 2008

***CROSS CONNECTION
RULES MANUAL
FOURTH EDITION***

October 2008

*Michigan Department of Environmental Quality
525 West Allegan Street
Lansing, Michigan 48909*

Michigan Plumbing Code

- Regulates design and installation of plumbing systems
- Intended to protect public health, safety, and welfare
- Adopts the International Plumbing Code
- Chapter 6 – Water Supply



Objective: Regulate design/installation so the water remains potable.

Who do the Rules Apply to?

Directly → Public Water Supplies

- Municipalities
- Condominium Associations
- Apartments

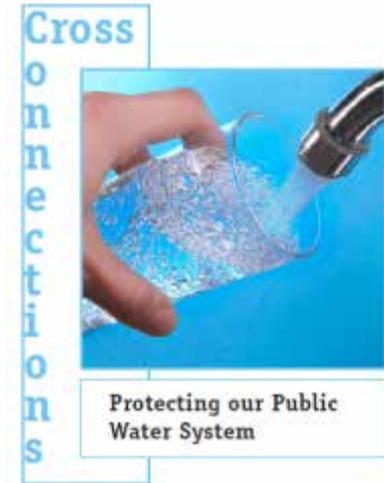
Indirectly → Water Customers

- Residential
- Commercial
- Industrial



Here's How it Works

1. DEQ requires the utility to have a formal program
 - Sanitary surveys
 - Surveillance visits
 - Approval of written program
2. Local utility requires customers to comply
 - Cross connection inspections
 - Public education
 - Testing/Inspection notices
3. Code inspector requires new construction to conform



A cross connection is an arrangement of piping that could allow undesirable water, sewage, or chemical solutions to enter your drinking (potable) water system as a result of backflow. Cross connections with potable piping systems have resulted in numerous cases of illness and even death.

Historically, cross connections have been one of the most serious public health threats to a drinking water supply system and many times are present in a residential water system.

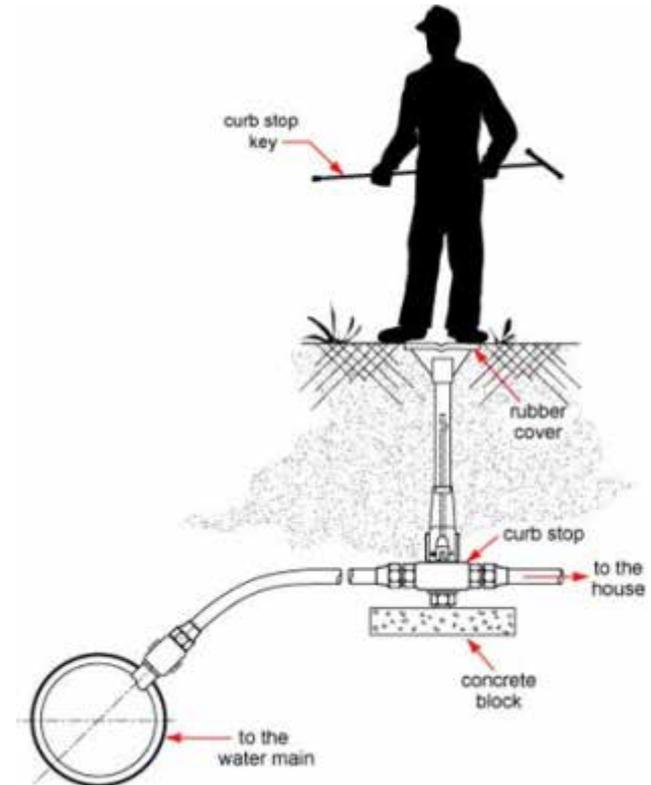


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Here's how it is enforced

1. Act 399: State can impose fines, public notification, escalated enforcement on water suppliers
2. Local water ordinance: Water utility can impose fines and ultimately terminate water service
3. Michigan Plumbing Code: Local inspector can deny approval of new plumbing work



Common Inspection Findings

No Air Gap



Improperly Installed
Backflow Preventer

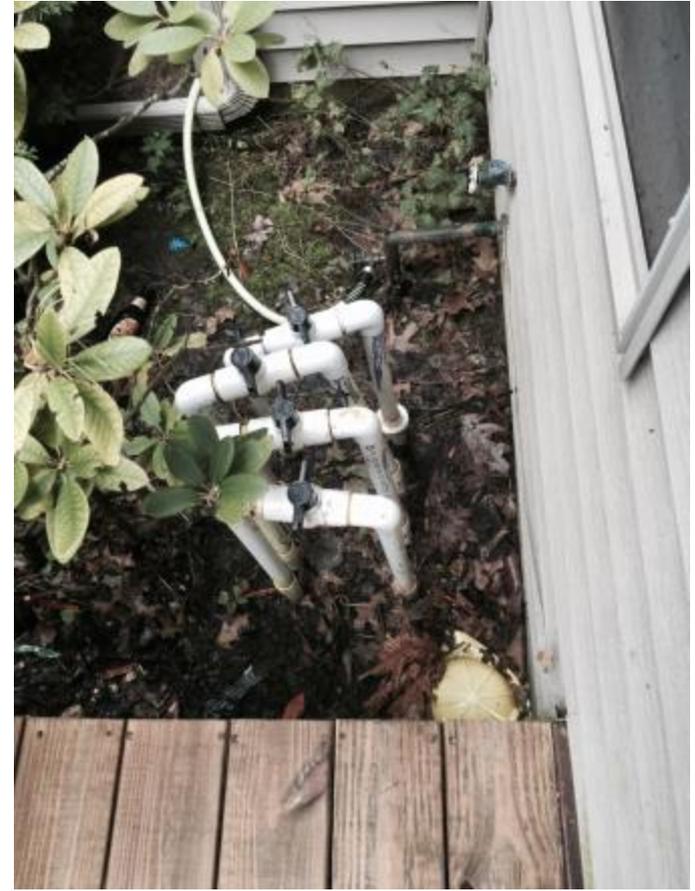


Common Inspection Findings

Wrong Backflow Preventer for Application



Missing Backflow Preventer



Common Inspection Findings

Unapproved Backflow Preventer

Illegal Bypass



Common Inspection Findings

Unapproved Device



Soap Dispensers



Approved Backflow Preventers

- Must meet  or  Standards
- Required by Plumbing Code
- Required Standards are listed in Cross Connection Rules Manual and MI Plumbing Code



Cross Connection Control Program

Basics

- Inspect water customers for cross connections
- Inform customers of testing requirements
- Review and track testing results
- Enforce non-compliance
- Maintain records
- Report efforts to DEQ

Common Goal - Work Collaboratively

Hints for success

- Knowledgeable local inspectors
- Transparency – share information
- Challenge questionable testing practices

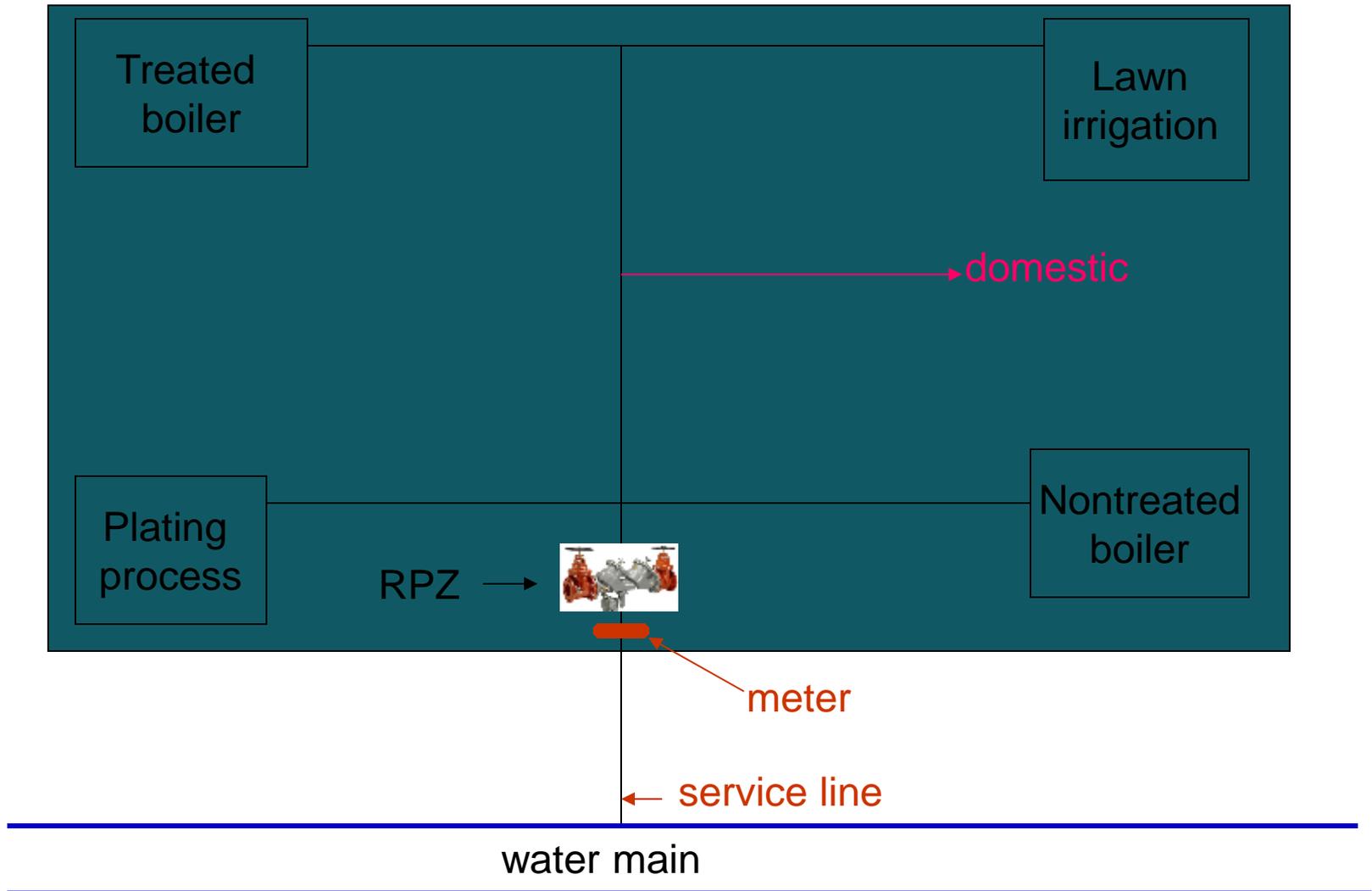


Common Misconceptions

1. Utilities profit from enforcing requirements
2. These rules aren't required in other communities
3. Backflow doesn't really occur
4. These rules have never been required before
5. Safe drinking water is the utility's responsibility not an employer's.

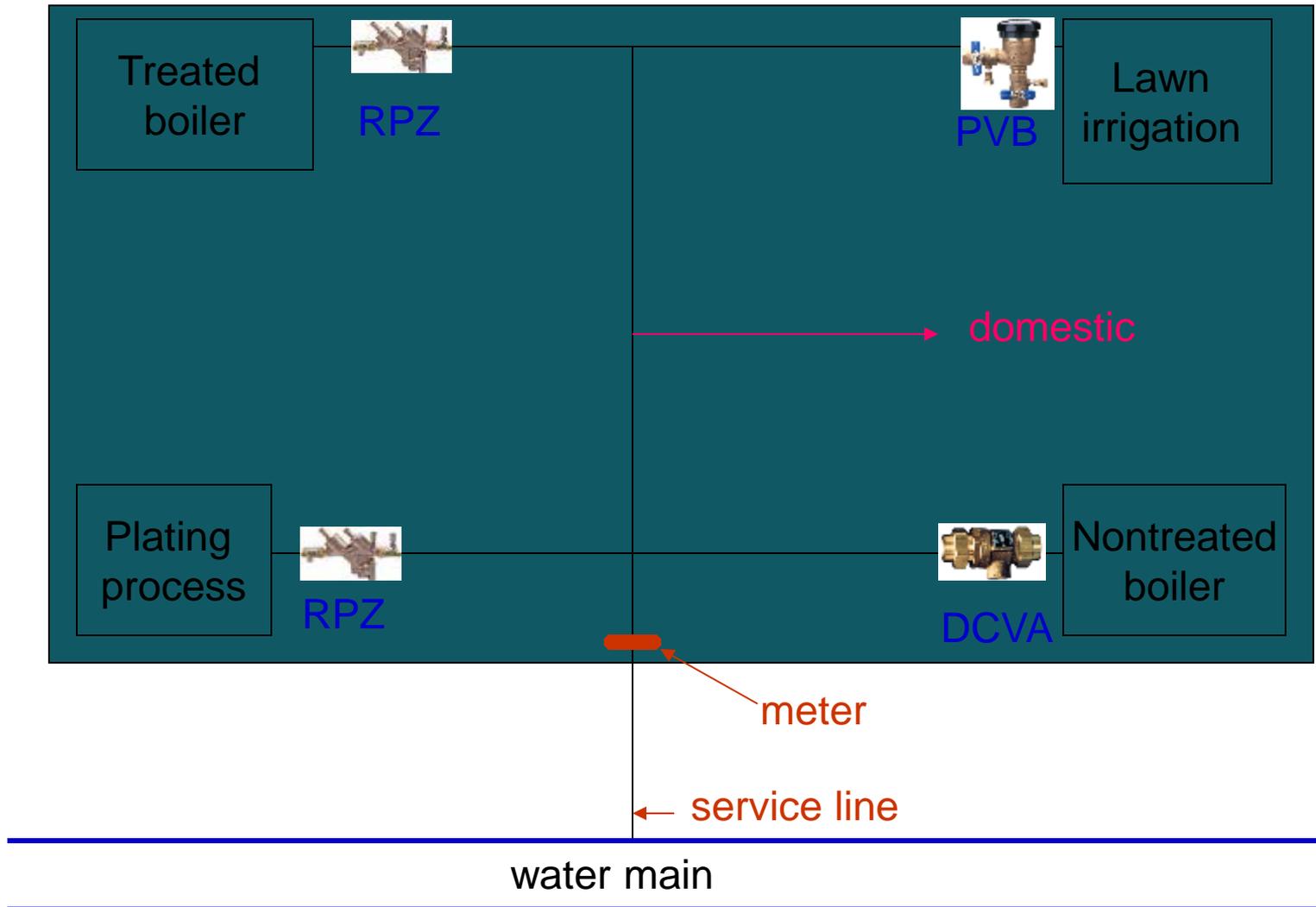
Containment Example

Protects the water supply, but not the building occupants



Isolation Example

Protects the building occupants & the water supply



Isolation vs. Containment

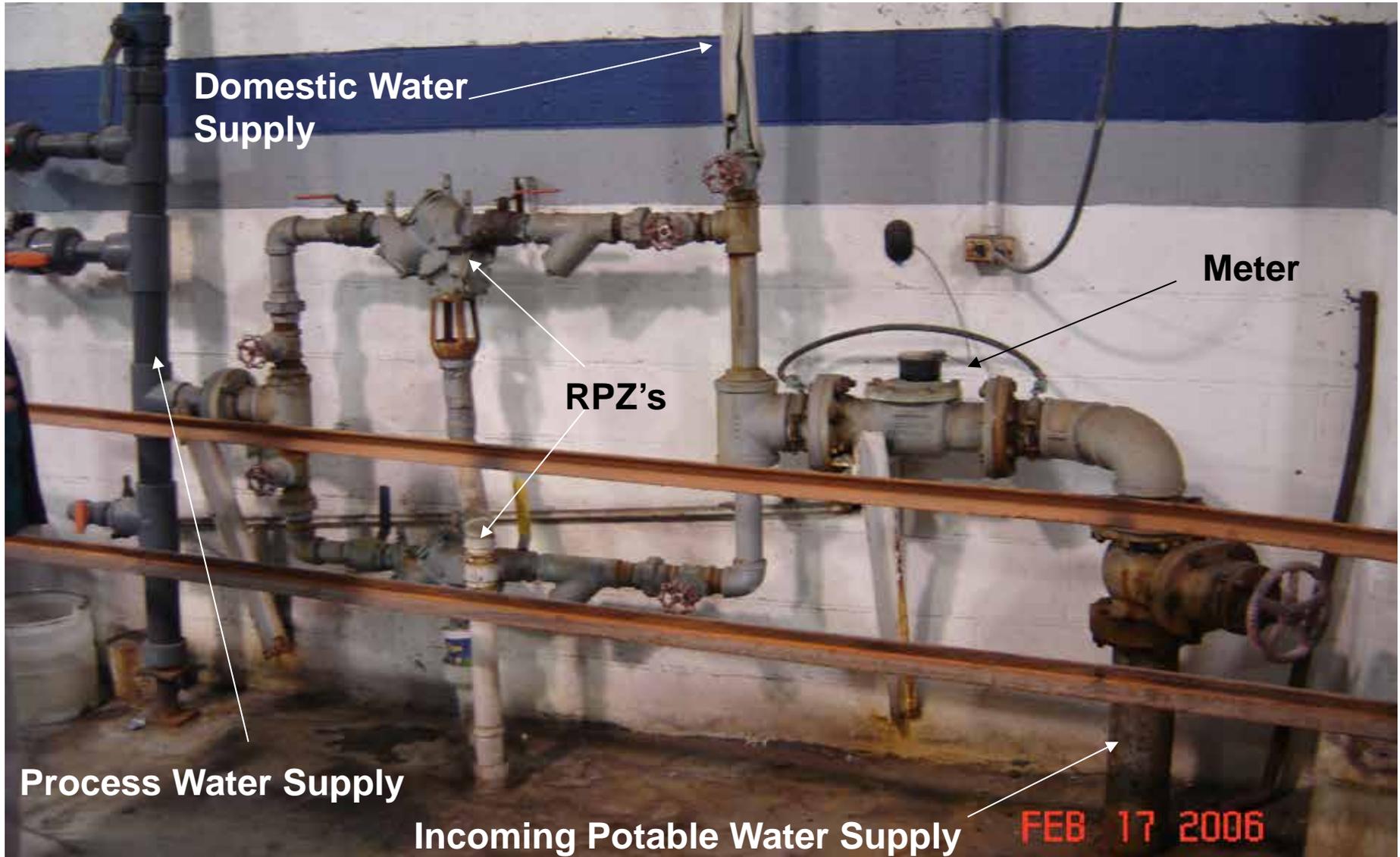
ISOLATION

- Preferred because in plant personnel are protected.
- Smaller size devices or no devices are required
- Often cheaper
- Educational for plant personnel, managers, & owners

CONTAINMENT

- Facility is contained (separated from public system)
- Frequent plumbing changes
- Untraceable or hidden plumbing
- Confusing plumbing
- Access to facility is refused or prohibited by owner
- Facility employees may not be protected

Isolation Example



Resources

Google search the following:

1. "MDEQ Community Drinking Water"
2. "State of Michigan Plumbing Division"
3. "American Backflow Prevention Association"
4. "EPA Cross Connection Manual"
5. "AWWA Manual M14"
6. "ASSE Plumbing"
7. "MPMCA"



Questions?



Michigan Department of Environmental Quality

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