



Cross-Connection Control Program

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Owensboro Municipal Utilities

I. POLICY ON CROSS-CONNECTION CONTROL

The Kentucky Division of Water Regulations provide: "Cross-Connections prohibited. All cross-connections are prohibited. ... Every public water system shall determine if or where cross-connections exist and shall immediately eliminate them". 401 KAR 8:020, Section 2, Paragraph (2)

"Cross-connection means a physical connection or arrangement between two (2) otherwise separate systems, one (1) of which contains potable water and the other being either water of unknown or questionable safety, or steam, gas or chemicals, whereby there may be flow from one (1) system to the other, the direction of flow depending on the pressure differential between the two (2) systems." 401 KAR 8:010(29).

The City Utility Commission wishes to adopt and establish a Cross-Connection Control Policy for the water service area of Owensboro Municipal Utilities (OMU). Where actual or potential cross-connections exist, Devices must be installed, maintained and tested according to the OMU Cross-Connection Program.

OMU Customers with a meter size of 1-1/2 inches or larger or whose use of water poses a higher degree of hazard than that normally associated with use at a typical single family residence will be required to install an approved backflow prevention device. Customers may be required to complete and return to OMU a survey form regarding water use and potential cross-connections at the Customer's Premises.

OMU may also utilize inspections of Premises to determine whether a device is required. A Customer is required to permit access by OMU personnel to the Customer's Premises for the purpose of inspection for potential cross-connections. A Customer's refusal to permit entry for inspection may result in the Customer being directed to install an approved backflow prevention device or the disconnection of Customer's service.

Devices must be installed, maintained and tested according to the OMU Program. Any and all costs incurred with the installation, maintenance, and testing of cross-connection Devices and appurtenances shall be borne by the Customer.

Failure to meet the requirements of the Program can result in disconnection of service. All charges associated with the disconnection and reconnection of service must be paid by the Customer before service is restored.

II. INTRODUCTION

Random surveys of Customers served by the Owensboro Municipal Utilities' water distribution system has disclosed a potential threat to the health and safety of those served by the public water supply from cross-connections.

The possibility of backflow due to a cross-connection within the Customer's premises can be extremely dangerous because, when it occurs, the potable water supply may become contaminated with disease, toxic materials, and/or other hazardous substances.

Therefore, OMU has established a Cross-Connection Control Program, effective January 1, 1996, and amended October 24, 1996, to take reasonable precautions to protect the public water system from cross-connections originating from the Customer's system that may degrade the quality of the water in the distribution system. This program is designed for the detection and elimination of potentially hazardous cross-connections and the prevention of the creation of new cross-connections.

This program includes new commercial, industrial, lawn irrigation, and fire service accounts and any other new accounts that may be deemed to require a backflow prevention device. It also covers existing accounts that are identified by OMU as a potential hazard, including commercial, industrial, lawn irrigation, and fire service accounts and any other existing accounts that may be determined to require a backflow prevention device where any modifications, additions, or changes to the existing water system are made requiring a plumbing permit issued by the local authority or where the plans must be approved by the Fire Marshal.

Any and all cost incurred with the installation, maintenance and testing of the cross-connection control Devices and appurtenances shall be borne by the Customer.

III. OBJECTIVES OF PROGRAM

Owensboro Municipal Utilities' goal is to deliver safe and potable water to its Customers. To discharge this responsibility OMU must take reasonable precautions to protect the community distribution system from hazards originating from a Customer's system that may degrade the quality of the water in the public water distribution supply. To accomplish this OMU has established a Cross-Connection Control Program. It is the intent of OMU to achieve the following:

1. To comply with the appropriate laws, regulations and codes governing Owensboro Municipal Utilities in the area of cross-connection control and prevention.
2. To protect the health of the community by protecting the public water supply from possible contamination and/or pollution from the Customer's water system by isolating the Customer's water system from the public water supply by an approved backflow prevention device.
3. To eliminate or control existing or potential cross-connections between the Customer's water system and the community's water system.
4. To provide assurance to our Customers of protection from cross-connection contamination and/or pollution of the public water supply.
5. To provide a program which will ensure continued maintenance and testing of all backflow prevention devices.
6. To continue to work with other agencies for the development and implementation of rules, regulations, and codes in order to enforce Owensboro Municipal Utilities' Program.
7. To educate all concerned parties and to promote the understanding of cross-connection control and prevention.

IV. DEFINITIONS

Air Gap Separation: means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the receptacle. An approved air gap separation shall be at least double the diameter of the supply pipe measured vertically above the top rim of the vessel - in no case shall the gap be less than 1 inch.

Approved: as herein used in reference to a water supply system or backflow prevention device (or method) shall mean one that has been approved by OMU.

Auxiliary Supply: means any water source or system over which OMU has no control, other than a public water supply which meets the requirements of the Kentucky Division of Water Public and Semipublic Drinking Water Regulations.

Backflow: means the reversal of normal flow of water which could be contaminated with foreign liquids, gases, or substances into the distribution pipe lines of a potable supply of water. Backflow may occur under two conditions -- pressure greater than atmospheric (see "Back Pressure"), and pressure that is s

Backflow Prevention Device: means any effective device, method, or type of construction used to prevent backflow of water into a potable water system that has been approved by an Approved Testing Laboratory and OMU.

Backpressure: means backflow of water or other liquids, mixtures, or substances under pressure into the public water supply. This can be caused by a pump, elevated tank, boiler, or other means that could create pressure within the system greater than the supply pressure.

Back-siphonage: means the backflow of water or other liquids, mixtures, or substances into the public water supply caused by a negative or sub-atmospheric pressure within a public water supply. (e.g. main break)

Certified Backflow Prevention Device Tester: means a person who is qualified to test backflow prevention devices, has proven his competency to the satisfaction of Owensboro Municipal Utilities and is registered with Owensboro Municipal Utilities.

Check Valve: this term, as used in cross-connection control, means a check valve of substantial construction and suitable materials that is positive in closing and permits no leakage in a direction reverse to the normal flow. Note: A single check valve is not an approved backflow device.

Contamination: means an impairment of the quality of the water by sewage, process fluids, or waste to a degree which could create an actual hazard to the public health by poisoning or through the spread of disease by exposure.

Cross-Connection, Point of: means the specific point or location in a public or a Customer's potable water system where an existing or potential connection between the public water supply and a source of contamination or pollution occurs.

Customer: means OMU Customer, consumer or the owner, operator or occupant of a Premises served by or connected to OMU's potable or non-potable water systems.

Degree of Hazard: expresses the results of an evaluation of the potential risk of the Customer water system to the public health and/or the adverse effect of the hazard upon the public water supply.

Device: means a Backflow Prevention Device.

Double Check Valve Backflow Prevention Assembly: means an assembly composed of two independently acting, approved check valves, including tightly closing resilient seated shutoff valves attached at each end of the assembly and fitted with properly located resilient seated test cocks. This assembly shall only be used to protect against a non-health hazard (pollutant). All devices must be approved by OMU prior to installation.

Double Check-Detector Backflow Prevention Assembly: means a specially designed assembly composed of a line-size approved double check valve assembly with a bypass containing a specific water meter and an approved double check valve assembly. The meter shall register accurately for only very low rates of flow up to 3 gpm (gallons per minute) and shall show a registration for all rates of flow. This assembly shall only be used to protect against a non-health hazard (pollutant). The double check-detector backflow prevention assembly is primarily used on fire sprinkler systems. All devices shall be approved by OMU prior to installation.

Fire Sprinkler Systems: means any service connection intended to extinguish fires.

Health Agency: means the health authority having jurisdiction.

Industrial Fluids: means any fluid or solution that may chemically, biologically, or physically degrade the public water supply.

Laboratory, Approved Testing: means one that is approved by the appropriate health agency and OMU which is properly staffed and equipped with pumps, meters, measuring devices, and other equipment to test and evaluate fully a backflow prevention device for design, materials, construction, and operation. The facility must have both lab and field evaluation capabilities.

Non-potable Water: means water not safe for drinking, personal, or culinary use, or which is of questionable potability.

Non-Residential: means Premises that are not Residential.

Owensboro Municipal Utilities or OMU: means the City Utility Commission of the City of Owensboro, Kentucky, which does business as Owensboro Municipal Utilities.

OMU Water System: means the OMU Public Potable Water System and the OMU non-potable water system.

Pollution: means an impairment of the quality of the water to a degree which does not create a hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use.

Potable Water: means water which according to recognized standards, is safe for drinking, personal, or culinary use. This shall also mean the public water system as provided by OMU.

Premises: means the real property and all improvements erected or located thereon which are served by OMU through an OMU water meter or supplied through a connection with the OMU water system.

Pressure Vacuum Breaker Backsiphonage Prevention Assembly: means an assembly containing an independently operating internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with properly located resilient seated test cocks and tightly closing resilient seated shutoff valves attached at each end of the assembly. This assembly is designed to protect against a pollutant or a contaminant under a backsiphonage condition only.

Reduced Pressure Backflow Prevention Assembly: means a device containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit shall include properly located resilient seated test cocks and tightly closing resilient seated shutoff valves at each end of the

assembly. This assembly is designed to protect against a non-health hazard (pollutant) or a health hazard (contaminant). This assembly shall not be used for backflow protection of sewage or reclaimed water. All devices shall be approved by OMU prior to installation.

Reduced Pressure-Detector Backflow Prevention Device: means a device containing a minimum of two independently acting, approved check valves, together with an automatically operated pressure differential relief valve located between the two check valves. During normal flow and at the cessation of normal flow the pressure between these two checks shall be less than the upstream (supply) pressure. In case of leakage of either check valve, the differential relief valve, by discharging to the atmosphere, shall operate to maintain the pressure between the checks at less than the supply pressure. The unit must include tightly closing shutoff valves located at each end of the device, properly located test cocks and a bypass assembly consisting of a meter, reduced pressure backflow preventer, shutoff valves and testcocks. This device is designed to take the place of a single detector check for the appropriate type of fire line system. All devices shall be approved by OMU prior to installation.

Residential: means Premises where the water usage and risk of cross-connection are those normally associated with a typical single family residence.

Service Connection: Means the terminal end of a service from the public potable water system -- that is, where the water purveyor loses jurisdiction and sanitary control over the water at its point of delivery to the Customer's water system. If a meter is installed at the end of the service connection, then the service connection means the downstream side of the meter.

Tester: see Certified Backflow Prevention Assembly Tester.

Water Delivered: shall mean any water supplied by OMU from a public water system to a Customer's water system after it has passed the point of delivery and is no longer under the sanitary control of OMU.

Water District or Water Association: means water utilities that purchase water directly from Owensboro Municipal Utilities.

Water Purveyor: means Owensboro Municipal Utilities.

Water System, Customer's: means any water system, potable or non-potable, located on the Customer's premises, whether supplied by a public potable water system or an auxiliary water supply.

Water System, Public Potable: means any publicly or privately owned domestic water system operated under public health supervision. Such a system includes all sources, facilities, and appurtenances between the source and the point of delivery, such as valves, pumps, pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, treat, or store potable water for public consumption or use.

V. RESPONSIBILITIES

The implementation of regulations for the effective control of cross-connections requires the full cooperation of Owensboro Municipal Utilities, the Customer and the Certified Backflow Prevention Device Tester. Each has their responsibilities and each must carry out their phase of a coordinated cross-connection control program in order to prevent the backflow of contaminants into the public water supply. The responsibilities of each are outlined hereafter:

1. Owensboro Municipal Utilities

OMU has the responsibility to require measures to prevent water from any unapproved source, or any other substance, from entering the public water supply. OMU's responsibility begins at the source and includes all of the public water distribution system, and ends at the service connection to the Customer's water system. It is the responsibility of OMU to administer this Program and to review the Program as necessary, or at least on an annual basis. OMU shall exercise reasonable vigilance to insure that the Customer has taken proper steps to protect the public water system. In addition, OMU is responsible for educating the public about the reasons for the Cross-Connection Control Program and how our Customers can proceed to comply with the requirements of this Program.

2. Customer

The Customer has the primary responsibility of preventing pollutants and contaminants from entering their potable water system or the public water system. The Customer's responsibility begins at the service connection from the public water supply and includes all of their plumbing systems. The Customer, at his own expense, shall install, operate, test and maintain required approved backflow prevention devices as directed by OMU. The Customer shall maintain accurate records of tests and repairs made to these devices and provide OMU with copies of such records. The records shall be on forms approved by OMU. Following any repair, overhaul, re-piping or relocation of a required device, the Customer shall have it tested to insure that it is in good operating condition and will prevent backflow. Testing of backflow prevention devices required by OMU shall be performed by a Certified Backflow Prevention Device Tester.

3. Certified Backflow Prevention Device Tester

The certified backflow prevention device tester will be responsible for making competent inspections, testing, and repairing or overhauling backflow prevention devices and making reports of such work to the Customer and OMU on forms approved by OMU. They shall include the list of materials or replacement parts used. They shall be equipped with and be competent to use all the necessary tools, gages, manometers and other equipment necessary to properly test, repair and maintain the devices. It will be their responsibility to insure that parts equal in quality to those parts supplied by the manufacturer of the device being repaired are used in the repair of the device. It will be

their further responsibility not to change the design, material or operational characteristics of the device during repair or maintenance. A certified tester shall perform the work and be responsible for the competency and accuracy of all tests and reports. All testers must be registered as certified testers by Owensboro Municipal Utilities. Testers whose certification has been accepted by the Blue Grass Cross-Connection Prevention Association, or who have received comparable training and testing, may be registered on the Owensboro Municipal Utilities Certified Tester List. OMU may require further documentation to substantiate certification. Certification of the tester, and documentation of the equipment calibration will be submitted by the tester to maintain registration with OMU as a Certified Backflow Prevention Device Tester. OMU reserves the right to add or delete testers from this list.

VI. CROSS-CONNECTION CONTROL PROGRAM

These regulations are designed to provide procedures for the implementation and enforcement of the Cross-Connection Control Program.

1. Installation Requirements

This section sets out the guidelines for determining whether a backflow prevention device will be required.

1.a. Residential

Residential Customers using water solely for purposes normally associated with residential use, and who are not determined to be a special case under Subsection 1.b. hereof, will not be required to install an approved backflow prevention device under current policy.

1.b. Special Case Residential

If OMU determines that an unacceptable degree of hazard is posed by the water uses at a residential premises, the Customer will be required to install an approved backflow prevention assembly. For example, a device will be required if the residence has a permanently installed lawn irrigation system, solar heating system, or if a business is operated out of the home where water is used in a way as to warrant a backflow prevention device. The Customer will be advised as to the type of device required and be given ninety (90) days in which to install the device, unless additional time is granted by OMU. If a backflow has occurred, immediate action may be required by OMU.

1.c. Non-Residential

(1) All Non-residential Premises shall have a backflow prevention device, except as otherwise provided herein.

(2) A Non-residential Customer whose service is to Premises which are not used for an activity listed in Section 2.(2)(i) of this Article, who has an OMU meter of a size less than one and one-half inches, and whose use of the Premises poses no greater degree of hazard to the OMU water supply system than a Residential Customer, will not be required to install a device. OMU shall determine whether or not any Premises meets the criteria necessary to excuse installation of a device. OMU may use surveys, questionnaires, inspections, records of other agencies, and any other pertinent information to determine if a device will be required. OMU reserves the right to require a device if OMU later determines that the degree of hazard requires one. A prior determination that a device is not required will not preclude a later determination by OMU that one will be required.

1.d. Fire Sprinkler Systems

All Premises containing a fire sprinkler system using a chemical additive must have a reduced pressure backflow prevention assembly installed before the point where chemical is added.

All Premises containing a fire sprinkler system that does not use a chemical additive and is not protected by an approved reduced pressure backflow prevention assembly shall be flushed annually and OMU shall receive a copy of the flushing report. If a backflow has occurred, OMU may require more frequent flushing or the installation of a double check valve assembly.

If a new fire sprinkler system that does not use a chemical additive is installed, an approved backflow prevention assembly must be installed for the system.

1.e. Water Districts & Water Associations

Any Water District or Water Association that has a Cross-Connection Prevention Program that has been filed with the Commonwealth of Kentucky that is at least as stringent as OMU's Program must install a double check backflow prevention assembly at all connection(s) with the OMU system as soon as practicable. Any Water District or Water Association that does not have a Program that meets both of the above conditions must install a reduced pressure backflow prevention assembly at all connection(s) with the OMU system as soon as practicable.

1.f. Direct Sewage Connections & Auxiliary Water Systems

Any Customer that has a direct connection to a sewage system or an auxiliary water system on its' premises will be required to install an approved reduced pressure backflow prevention assembly at the service connection(s). This is in addition to the approved air gap required by the Kentucky Plumbing Code that must be installed separating these systems from the potable supply. Reduced pressure backflow prevention assemblies are to be installed within ninety (90) days of notification and air gaps are to be installed within two weeks of notification unless otherwise stated in the compliance notice.

1.g. Time of Installation

Any Device required by this program shall be installed at the time when one of the following first occurs:

- (1) A Customer requests service to Customer's Premises;
- (2) There is a change in Customer for the Premises;

(3) The activities at the Customer's Premises include any activity identified in Section 2.(2)(i). of this Article.

(4) OMU determines that a Device is required and notifies a Customer of such determination.

1.h. Type of Device

OMU shall determine what type of backflow prevention device shall be installed by the Customer. A reduced pressure backflow prevention device will be required unless OMU determines that the degree of hazard or the particular circumstances existing at the Customer's Premises justify the use of a different Device.

2. Evaluation and

Determinations

(1) OMU shall make all evaluations of the cross-connection hazards which exist in supplying a Customer's water system and may use surveys and on site inspections of Premises for that purpose. An approved backflow prevention device shall be required at any point of connection between the public water supply and the Customer's water system where OMU determines that a present or potential contamination or pollution hazard to the public water system may exist.

(2) The following conditions are examples of situations where a Device will be required:

(a) Premises that use water for purposes other than domestic uses.

(b) Any new or existing OMU water account with an auxiliary water system or a direct connection to a sewer on the premises will be required to install an approved reduced pressure backflow prevention assembly at the service connection(s). Auxiliary water systems and direct connections to sewers must be separated from OMU's supply by an approved air gap.

(c) Premises on which any substances are handled in such a fashion as to create an actual or potential hazard to the public water system. This shall include premises having sources or systems containing process fluids of waters originating from the public water system which is no longer under the control of OMU.

(d) Premises having internal cross-connections that, in the judgment of OMU, are not correctable or intricate plumbing arrangements which make it impractical to determine whether or not cross-connections exist.

(e) Premises having a repeated history of cross-connections being established.

(f) Premises, which are determined by OMU to create an existing or potential hazard to the public water system.

(g) Premises with an OMU meter size of one-and a half inches or greater.

(h) Premises which because of their height or plumbing configuration could place significant back pressure on the OMU distribution system.

(i) Premises used for any of the following:

- Sewer Pump Station
- Sewer Package Plant
- Storm Sewer
- Hospitals
- Mortuaries
- Medical Laboratories
- Urgent Care Centers
- Dental
- Irrigation Systems
- Meat Packing Houses
- Biochemical Laboratories
- Restricted Premises
- Plating Plants
- Radioactive/Nuclear Companies
- Rubber Plants
- Paper Product Plants
- Dye Works
- Automotive Plants
- Automotive Garages
- Aircraft Plants
- Sand & Gravel Plants
- Power Plants
- Gas Production Plants
- Film Laboratories
- Car Washes
- Canneries
- Coin Laundries
- Laundries and cleaners
- Industrial Premises
- Restaurants
- Manufacturing Plants
- Chemical Co.
- Petroleum Processing
- Food Processing Facilities
- Nursing Homes

- Bottling Plants
- Breweries
- Dairies
- Hotels
- Motels
- Ranches & Farms

Note: This list is not all encompassing, but shall be used only as a reference guide.

(3) Customers may be required to complete and return to OMU a survey of water uses at the Customer's Premises within 15 days of receipt of the survey form. The survey will be used by OMU to determine if a Device is required or if an inspection of the Premises by OMU will be necessary. The Customer will be notified if an inspection is required. OMU will use the information gathered to determine if a Device is required. If a survey form is not completed and returned to OMU or if a Customer does not allow an inspection to occur in a timely manner, the Customer may be required to install a Device. If OMU determines that a present hazard to the OMU water system may exist, it may discontinue service to the Premises until the required Device is installed.

3. Implementation

Owensboro Municipal Utilities considers “containment” to be adequate protection for the public water supply. Containment is not intended for protection of the Customer’s internal water system hazards. The responsibility for segregating domestic and industrial water uses internally depends upon the plumbing inspectors, health officials and the Customer. According to the Kentucky Plumbing Code, Customers are required to protect their internal plumbing systems against backflow from all cross-connections. The requirements of this Program are in addition to all requirements of the plumbing code. Should there be a change in the use of water on the premises, the Customer shall inform OMU. OMU will evaluate Customer’s uses and notify the Customer of any requirements necessary for compliance with this Program.

4. Compliance and Enforcement

Once a requirement directive has been issued for an approved backflow prevention assembly to be installed, the Customer has ninety (90) days to comply. In the case of an air gap requirement notification, the Customer will have two (2) weeks to install an approved air gap, unless noted otherwise in the compliance directive. The Customer may request an extension in writing for delays beyond the Customer’s control. The Customer must obtain approval from OMU in writing for any extensions of time. After the allotted time has expired, if the Customer has failed to comply with the requirements of OMU to install either the approved backflow prevention assembly or the approved air gap, OMU will send a certified letter informing the Customer that their water service has been scheduled for termination. OMU will also notify the Health Department and the Fire Department that the water service to the facility is scheduled for

termination. Once terminated, the water service to the facility will remain off until the facility achieves compliance.

Customers are required to test backflow prevention device(s) at the time of installation and at least once a year thereafter. OMU reserves the right to require additional testing or replacement of the device, if deemed necessary. The installation date of the backflow prevention device will become the required annual testing date. Testing reports must be received by OMU within thirty (30) days after the required testing date. Testing forms and a list of certified testers will be provided by OMU upon request. Only results from certified backflow prevention device testers registered with Owensboro Municipal Utilities will be accepted. After the allotted time has expired, if OMU has not received the required test results, OMU will send a certified letter informing the Customer that their water service has been scheduled for termination. OMU will also notify the Health Department and the Fire Department that the water service to the facility is scheduled for termination. Once terminated, the water service will remain off until the facility achieves compliance.

A Customer whose premises contain a backflow prevention device which was installed prior to implementation of this Program, but which is not an approved backflow prevention device under the Program, may be permitted to continue the use of such device, as long as the Customer submits a report annually to OMU listing all current uses of water within the Premises and tests the device annually, if OMU determines that no unreasonable degree of hazard to the OMU water system will result from continued use of the device. The reporting and testing date will be the anniversary of the date OMU accepted the device. If thirty (30) days after the reporting and testing date, OMU has not received the water use report and test report, OMU will send a certified letter informing the Customer that their water service has been scheduled for termination. OMU will also inform the Health Department and the Fire Department that the water service to the facility has been scheduled for termination. Once terminated the water service will remain off until the facility achieves compliance.

Samples of these compliance letters are attached in the appendix of this Program.

5. Installation

Proper installation of backflow prevention devices and/or methods is essential to an effective cross-connection prevention program. Typical installation drawings are shown in the Appendix. The general installation of backflow prevention devices for "Containment" purposes are as follows:

1. They shall be located between the source of the water supply (meter vault or box) and Customer's facilities and before any secondary plumbing or piping, with the exception of a Pressure Vacuum Breaker Backflow Prevention Assembly on a lawn irrigation system. No piping other than sprinkler lines shall be tied into the line after the Pressure Vacuum Breaker Assembly. The Pressure Vacuum Breaker Assembly shall be installed immediately after the tie-in point for the irrigation system.

2. The approved assembly must be installed as one unit. Separation of the various parts is grounds for rejection.
3. The devices shall be installed in the manner approved by the certified testing facility which approved it.
4. A device must have been approved by a recognized testing facility, using both lab and field evaluation, that has been approved by OMU.
5. It is recommended that where continuous water service is critical, a second device be installed in parallel with the first. No by-pass lines will be allowed.
6. All devices shall be the same size as the line in which they are installed.
7. Upon installation of an approved backflow prevention device, it shall be tested to determine that it is operating properly by a Certified Backflow Prevention Device Tester registered with OMU.
8. The water line shall be thoroughly flushed prior to installing a device to remove all debris. Debris hanging up under one of the check valves is one of the most common causes of trouble with these devices.
9. No backflow prevention devices shall be allowed in pits.
10. Where devices are installed outside above ground, freeze protection should be provided.
11. Appropriate drainage shall be available for installation of Reduced Pressure Backflow Prevention Assemblies.
12. Thermal expansion concerns should be addressed when installing backflow devices.

5a Location

Care in the selection of the installation site for any backflow prevention device is essential to its continued effective operation. They must not be installed in locations where the device is subject to freezing, corrosive fumes, grit, abrasive liquids, etc. The device must be protected against mechanical abuse. All devices shall be installed so that they will be easily accessible for testing and repairs. Devices, other than Pressure Vacuum Breaker Backflow Prevention Assemblies, must be installed at a height of between 12" to 36". Devices must be at least 12" from a back wall and at least 24" from a front wall or any obstruction. Pressure Vacuum Breaker Backflow Prevention Assemblies must be installed at least 12" above all downstream piping and highest point of use.

5b Continuous Service

Where a Customer requires continuous uninterrupted service and where it is not possible or practical to provide water service from two separate service lines in to a premise, as permitted by OMU, it is recommended that provisions be made for the installation of two (2) backflow prevention devices in parallel. This would prevent loss of service during testing and repair of the device(s).

5c Devices Inside Building

Backflow prevention devices installed inside a building shall be located as close as possible to the point where the piping enters the building, down stream of any meters maintained by OMU. There shall be no connections or branches prior to the backflow prevention device.

5d Devices Inside Pit

No backflow prevention devices shall be allowed in pits.

5e Approved Air Gap Separation

An approved air gap separation shall be installed as approved by the Kentucky Plumbing Code. An approved air gap separation must be installed between the water source and any direct connection to a sewage system or an auxiliary water system. This is in addition to a Reduced Pressure Backflow Prevention Assembly which is required at all facilities that have either or both of the above systems on the premises.

5f Reduced Pressure Backflow Prevention Assemblies

The reduced pressure backflow prevention assembly shall be installed as approved by the testing laboratory with adequate space to facilitate maintenance and testing. The manufacturer's recommendations on installation shall be followed. The operating effectiveness of the device is nullified if the relief port is subject to flooding. A reduced pressure backflow prevention assembly can discharge significant amounts of liquid if the relief port is opened. Flooding and equipment damage could occur if proper drainage is not provided. Reduced pressure backflow prevention assemblies installed above or near electrical equipment could damage the equipment.

These devices should never be installed below grade level. Under no circumstances, should the relief port be plugged. This device depends upon an open relief port for safe operation. Care must be taken to protect the device from freezing. When the device is located inside a building, there must be a suitable means of taking care of any discharge. If there is a drain provided for the relief valve port, there must be an appropriate fixed air gap separation between the relief port and the drain line. All water lines should be thoroughly flushed prior to installation of the device.

5g Double Check Valve Backflow Prevention Assemblies

THESE DEVICES WILL ONLY BE ACCEPTED IN SPECIAL CIRCUMSTANCES, AND ONLY UPON PRIOR WRITTEN APPROVAL BY OMU, OR AS OTHERWISE STATED IN PROGRAM DOCUMENT.

Double check valve backflow prevention assemblies shall be installed as approved by the testing laboratory with adequate space to facilitate maintenance and testing. The manufacturer's recommendations on installation shall be followed. The device must be protected from freezing. All water lines should be thoroughly flushed prior to installation of the device.

A double check valve backflow prevention assembly should only be considered when the probability of backflow and the degree of hazard is considered low. The degree of protection offered by this device is much less than that of an air-gap separation or a reduced pressure backflow prevention assembly.

5h Pressure Vacuum Breaker Backflow Prevention Assemblies

This type of assembly is allowed only on irrigation systems using no chemical additives. Pressure vacuum breaker backflow prevention assemblies shall be installed as approved by the testing laboratory with adequate space to facilitate maintenance and testing. The manufacturer's recommendations on installation shall be followed. The device must be protected from freezing. All water lines should be thoroughly flushed prior to installation of the device.

A pressure vacuum breaker backflow prevention assembly should only be considered when there is no possibility of backpressure, only backsiphonage. The degree of protection offered by this device is much less than that of an air-gap separation or a reduced pressure backflow prevention device.

5i Thermal Expansion

Downstream of the backflow prevention devices thermal water expansion and/or water hammer may cause excessive pressures. To avoid possible damage to the Customer's water system, water hammer arresters, surge protectors, or thermal expansion tanks should be installed as required by the Ky. State Plumbing Code - 815 KAR 20:120, Section 2, Paragraph 6.

6. Testing of Backflow Prevention Devices

When backflow prevention devices are relied upon to provide protection against backflow, it is necessary that the devices be inspected, tested and repaired on a periodic basis by a Certified Backflow Prevention Device Tester. It must be assumed that all devices are subject to wear and deterioration which can render them ineffective or

prevent them from meeting the performance standards established for these devices. All inspections, testing, and repairs of these backflow prevention devices shall be in accordance with this Program and OMU directives.

All backflow prevention devices shall be tested on at least an annual basis. A full report on the testing of each device, giving pertinent test data and indication what, if any, repairs were made, is to be sent to OMU. All devices failing to meet performance standards, shall be repaired and retested promptly. If repair of a device cannot be made promptly, OMU shall assess any hazard that is created and require that appropriate action be taken by Customer. Spare parts should be kept available by the Customer to repair backflow prevention devices to prevent downtime.

Backflow prevention devices which have a history of not meeting these performance standards, may be placed on a semi-annual or quarterly testing schedule. Devices repeatedly found not to meet the standards are to be replaced with new devices. Any and all costs incurred for testing and repairs shall be borne by the Customer.

As a prelude to each of the field test procedures, it is essential that the Certified Backflow Prevention Device Tester follow some basic steps.

1. NOTIFY - Owner of the assembly must be notified that water service will be shut off during the test procedures. Special arrangements may have to be made so that interruption of service will not create a hardship to the Customer.
2. IDENTIFY - Make sure that the proper assembly is being tested by checking the identification tag for the make (manufacturer), model, and serial number. Record all of this information, as well as the test date, before leaving the location.
3. INSPECT - Inspect the assembly for the required components for the field test procedure.
4. OBSERVE - Carefully observe area around assembly for telltale signs of leakage - e.g. moss or algae growth, plant life, or soil erosion.
5. TEST - Testing is to be conducted according to approved test procedures for the particular backflow prevention device being tested.

6. RECORD

KEEPING - All records required by OMU are to be filled out on site, and mailed to OMU after completion. Failure to properly fill out or send test reports to OMU could result in having the testers name removed from the list of registered testers for OMU. A copy of the test results are to be given to the owner of the device and a copy retained by the tester.

7. Record Keeping System

OMU's Cross Connection Control Program will maintain a record keeping system for each location covered by this program. A separate file shall be created and maintained for each location.

Records are to include, but are not limited to:

1. The Customer's name and address.
2. The history site survey form containing:
 - a. Contact person and phone number
 - b. Degree of hazard rating
 - c. Type of backflow prevention method used
 - d. Installation review by Plumbing Inspector
 - e. Model, size & serial number of installed device
3. Test reports from the Certified Backflow Prevention Device Tester

The records of cross-connection control activities will be kept assembled in a fashion that will facilitate evaluation of the overall program. The record keeping system will permit a ready review of the pertinent history and Program compliance measures required for each affected facility.

VII. DISCLAIMER

Owensboro Municipal Utilities does not endorse or recommend any particular brand of backflow prevention device since there are many different types of approved backflow preventers. The standards for backflow preventers are those set by the "Foundation for Cross Connection Control and Hydraulic Research" of the University of Southern California (F.C.C.C.H.R. of U.S.C.).

A device approved by the "Foundation for Cross Connection Control and Hydraulic Research" of the University of Southern California shall be deemed an approved device. From time to time Owensboro Municipal Utilities may recognize a device approved by another testing lab which has demonstrated proficiency in testing and evaluation of devices as an approved device.

Any questions regarding approval status of a particular device may be directed to OMU.

VIII. REFERENCES

Owensboro Municipal Utilities used the following references as guidelines in preparing this Cross Connection Prevention Program:

1. MANUAL FOR CROSS-CONNECTION PREVENTION (1992), Kenton County Water District No. 1, Engineering Technician - John Scheven
2. MANUAL FOR CROSS CONNECTION PREVENTION, Kentucky-American Water Company, Supervisor - Harold Garrison
3. CROSS CONNECTION CONTROL MANUAL, U.S. Environmental Protection Agency, Office of Water (WH-550A, EPA 570/9-89-007, June 1989)
4. RECOMMENDED PRACTICE FOR BACKFLOW PREVENTION AND CROSS CONNECTION CONTROL, AWWA Manual M14, Second Edition - 1990
5. MANUAL OF CROSS-CONNECTION CONTROL, Foundation for Cross-Connection Control Research, University of Southern California
6. KENTUCKY STATE PLUMBING LAW, REGULATIONS & CODE, Department of Housing, Buildings and Construction, Division of Plumbing, 1993-1994

