Bedford Regional Water Authority
Cross Connection Control
and
Backflow Prevention
Program

I. Purpose of the Program

Purpose of this Program is to abate or control actual or potential cross connections and protect the public health. This Program provides for establishment and enforcement of a program of cross connection control and backflow prevention in accordance with the Commonwealth of Virginia, State Board of Health, *Waterworks Regulations*, or as amended.

This Program is directed at:

A. Service line containment:
Abate or control actual or potential cross connections and protect the public health by installation of an appropriate backflow prevention assembly or by installation of a backflow elimination method, at the service connection.

B. Voluntary isolation in lieu of containment:
Evaluate the alternative of point-of-use isolation protection in lieu of service line containment at each premise where containment is required.

C. Public Education and Assistance:
Provide a cross connection awareness public education program and provide public assistance where requested.

D. Premise Owner/Occupant Awareness:
Advise those affected that service line containment does not provide protection from cross connections in the internal service plumbing of a building.

II. Authority for Program

Commonwealth of Virginia, Department of Health, *Waterworks Regulations*, Cross Connection Control and Backflow Prevention in Waterworks. This article requires as a condition for the issuance and continued use of the operation permit for the Bedford Regional Water Authority (BRWA), that the owner of the waterworks establish and enforce a program of cross connection control and backflow prevention.

This cross connection control and backflow prevention program is approved by the State Health Commissioner as noted by the affixed approval stamp.

III. Enforcement of the Program

A. Request for Information
Upon request, the owner or occupants of property served shall furnish to the BRWA pertinent information regarding the consumer's water supply system or systems on such property for the purpose of assessing the consumer's water supply system for cross connection hazards and determining the degree of hazard, if any. The refusal of such information, when requested, shall be deemed evidence of the presence of a high degree of hazard cross connection.

B. Notice of Corrective Action

Any consumer's water supply system owner who may be in violation of any provision of this Program shall be served a written notice sent certified mail to the consumer's water supply system owner's last known address, stating the nature of the apparent violation, corrective action required, and providing a reasonable time limit, not to exceed 30 days, from the date of receipt of the notice, to bring the consumer's water supply system into compliance with this Program.

C. Enforcement

The BRWA shall take positive action to ensure that the waterworks is adequately protected from cross connections and backflow at all times. Appropriate preventive and control measures shall be required and installed. If a required backflow prevention assembly is not installed, tested, and maintained in accordance with the applicable sections of this Program; or if a required backflow prevention assembly has been removed or bypassed; or if unprotected cross connections exist on the premises and the BRWA has determined that there is inadequate backflow prevention at the service connection, the BRWA shall discontinue or refuse the water service to the consumer and water service shall not be restored until the deficiencies have been corrected or eliminated to the satisfaction of the BRWA.

IV. Right of Entry

As noted in Bedford County Code Chapter 18 – Water and Sewers >>>Article V – Cross-Connection Control and Backflow Prevention:

Sec. 18-104. – Right of Entry

(1) Authorized representative(s) from the Bedford Regional Water Authority shall have the right to enter, upon presentation of proper credentials and identification, any building, structure or premises at reasonable times, to perform any duty imposed by this Article. Those duties shall include, but are not limited to, taking photographs and video, sampling and testing water, and/or inspections and observations of all piping systems connected to the public water supply.

(2) Where a consumer has security measures in force which would require proper identification and clearance before entry into their premises, the consumer shall make necessary arrangements with security guards so that upon presentation of suitable identification, Bedford Regional Water Authority personnel will be permitted to enter, without delay, for purposes of performing their specific responsibilities. Refusal to allow entry for these purposes may result in discontinuance of water service.

(3) Upon request, the consumer shall furnish to the Bedford Regional Water Authority any pertinent information regarding the water supply system on such property where cross-connections and backflow are deemed possible.

V. General Responsibilities of the Bedford Regional Water Authority

Effective cross connection control and backflow prevention requires the cooperation of the BRWA, the owner(s) of the property served the Building Official, and the certified Backflow Prevention Device Worker.

A. The Program shall be carried out in accordance with the Commonwealth of Virginia, State Board of Health, *Waterworks Regulations* and shall as a minimum provide containment of potential contaminants at the consumer's service connection.

B. The BRWA has full responsibility for maintaining water quality in the distribution system and for the construction, maintenance and operation of the waterworks beginning at the water source and ending at the service connection.

C. The owner of the property served and the BRWA have shared responsibility for water quality and for the construction, maintenance, and operation of the consumer's water supply system from the service connection to the free flowing outlet.

D. The BRWA shall, to the extent of their jurisdiction, provide continuing identification and evaluation of all cross connection hazards having potential for impairing the quality of the water as delivered. Continuous identification and evaluation shall include: assessment of each residential and non-residential consumer's water supply system including any existing backflow prevention assemblies or devices or backflow elimination methods; a determination of the degree of hazard, if any, to the waterworks (See Table 1, Determination of Degree of Hazard.); and a determination of he appropriateness of existing preventative and control measures. Assessments shall as a minimum be conducted at three (3) year intervals.

E. To facilitate assessing each residential and non-residential consumer's water supply system, the BRWA shall maintain an up to date inventory of all users, both metered and non-metered.

VI. General Responsibilities of the Consumer's Water Supply System Owner

A. The consumer's water supply system owner(s), at their own expense, shall have operational tests made at least annually of backflow prevention assemblies which are required by this Program.

B. Operational testing or work shall be performed by Backflow Prevention Device Workers certified by the Virginia Department of Professional and Occupational Regulation (DPOR), Virginia Board for Contractors, under the Tradesman Regulations, to test and repair assemblies. Assembly testing procedures shall be those acceptable to the DPOR, Board for Contractors. Assembly test equipment shall conform to the USC Field Test Kit Standard as test equipment is made available. Test forms can be found on the BRWA website, www.brwa.com, under "Public Information", click on "Backflow Prevention".

C. The consumer's water supply system owner(s) shall cause all backflow prevention assemblies, devices, or backflow elimination methods required under Section IX, to be maintained in good working order and shall not make or cause to be made any piping or other arrangements or modifications for the purpose of bypassing or defeating assemblies, devices, or backflow elimination methods.

D. The consumer's water supply system owner(s) shall provide copies of assembly test results, maintenance records, and overhaul records to the BRWA within 30 days of completion of such testing or work.

VII. Non-residential Customer Assessments

A. General
The non-residential consumer's water supply system owner will be advised in writing of the results of each assessment, the assigned degree of hazard, and if any preventative and control measures are required or recommended or if any existing preventative and control measures need attention.

B. Frequency
Assessments of each non-residential consumer's water supply system and a determination of the degree of hazard, if any, to the waterworks will be made at least

on a three (3) year cycle. The BRWA may, at his discretion, schedule more frequent assessments at high hazard facilities.

C. Type

Assessments will be conducted by on site interview and voluntary survey or by questionnaire. An initial on site interview will be conducted with the owner or owner's representative of each non-residential consumer's water supply system identified in Section IX. A questionnaire will be sent to each remaining non-residential consumer's water supply system owner or, at the discretion of the BRWA, the questionnaire may be completed by telephone interview. Subsequent assessment type will be determined on a case-by-case basis by the BRWA.

D. Assessment By On Site Interview and Voluntary Survey

1. Available information about the premises to be assessed will be gathered prior to the interview.
2. The reasons for cross connection control and backflow prevention will be explained to the consumer's water supply system owner or representative.
3. Interviews will follow a prepared questionnaire used to assess the need for cross connection control by containment.
4. Water uses after it enters the premises will be determined.
5. During these interviews, a request to conduce a voluntary survey will be made and each installed assembly, device, or elimination method will be inspected for appropriateness, proper installation and general appearance.
6. Plans for future expansion and possible additional protection requirements will be discussed.
7. During the voluntary survey of the premises, a determination of the need for point-of-use isolation protection for the protection of the consumer's water supply system users will be made and consideration given to substituting point-of-use isolation protection for containment.
8. All information will be recorded on the prepared questionnaire. This will include water uses, assessment of degrees of hazard and diagrams.

E. Assessment By Mailed Questionnaire

1. The appropriateness, proper installation, and general appearance of each installed assembly, device or elimination method will be evaluated by the BRWA for those facilities where a questionnaire will be mailed.
2. The results of the mailed questionnaire will be reviewed by the BRWA to reaffirm the degree of hazard and to assess the facility for new hazards. Based on the response to the questionnaires, cross connection control interviews will be scheduled and appropriate assemblies, devices, or elimination methods required providing containment and/or point-of-use isolation where appropriate.

F. Assessment By Telephone Interview

1. For those facilities where telephone interviews will be conducted, the questionnaire used for mailings will be completed by the caller to reaffirm the degree of hazard and to assess the facility for new hazards.
2. During these interviews, each installed assembly, device, or elimination method will be discussed and evaluated to determine appropriateness, proper installation, and general appearance. Point-of-use isolation protection will be discussed with the owner.

G. Lack of Response to Assessment

No response to a questionnaire or telephone interview will prompt an on site interview. Refusal of access for interview or provision of pertinent information will prompt the designation of a high hazard premise and the requirement to install a high hazard service line containment assembly or a backflow elimination method.

VIII. Residential Customer Self-Assessments

A. In lieu of an annual assessment of residential connections, a continuous public education program will be provided to increase the awareness of cross connections and the public health hazards of backflow. The public education program will be designed to prompt residential customer self-assessments.

B. Public Education

The public education program will be a continuous program targeted to the residential customer and the business and industries serving the residential dwelling market, both rental and purchase.

The cross connection control and backflow prevention program public education program will include:

1. a discussion of the conditions that lead to backflow
2. residential plumbing hazards having the potential for cross connections and backflow
3. health effects of cross connections and backflow
4. public education materials and methods of delivery
5. clubs, organizations, civic organizations, school systems, etc. where public education programs are presented or provided and program content
6. guidance/resources to identify actual or potential cross connections
7. preventative and control measures to control or eliminate the hazards at the point-of-use
8. contact information for assistance
9. sources for additional information

IX. Prevention and Elimination Measures for Containment – Location

A. Service Connection Containment
A backflow prevention assembly or backflow elimination method shall be installed at the service connection to a consumer's water supply system where, in the judgment of the BRWA a health, pollutional, or system hazard to the waterworks exists or may exist.

B. Containment Beyond the Service Connection
When, as a matter of preference or practicality, the backflow prevention assembly or backflow elimination method may be located downstream of the service connection but prior to any unprotected takeoffs. Inside the building is the preferred location.

C. Point-of-Use Isolation In Lieu of Service Connection Containment
Where, in the judgment of the BRWA, all actual or potential cross connections can be easily abated or controlled at each point-of-use and where the consumer's water supply system is not intricate or complex, point-of-use isolation protection by application of appropriate backflow prevention assemblies or devices or backflow elimination methods

may be applied in lieu of installing a backflow prevention assembly or backflow elimination method at the service connection. Table 2, Assembly and Device Application, shall be used as a guide to determine the appropriate backflow assembly or device where point-of-use isolation protection is being applied in lieu of service line containment.

D. The location of service line containment assemblies or backflow elimination methods will be determined by property survey, where necessary. Containment measures serving public buildings or other public facilities may be located on public property.

E. Where the assembly or backflow elimination method will be located within the jurisdiction of the Building Official, it must be located prior to any unprotected takeoffs. The Building Official will be advised and concur prior to installation.

X. Prevention and Elimination Measures for Containment – Where Required

A. A backflow prevention assembly or backflow elimination method shall be installed where any of the following conditions exist. The type of assembly or method required shall depend on the degree of hazard determined according to Table 1, Determination of Degree of Hazard.

1. Premises on which any substance is handled in such a manner as to create an actual or potential hazard to the waterworks (this shall include premises having auxiliary water systems or having sources or systems containing process fluids or waters originating from the waterworks which are no longer under the control of the waterworks owner).
2. Premises having internal cross connections that, in the judgment of the BRWA may not be easily correctable or having intricate plumbing arrangements that make it impracticable to determine whether or not cross connections exist.
3. Premises where, because of security requirements or other prohibitions or restrictions, it is impossible or impractical to make an assessment of all cross connection hazards having the potential for impairing the quality of the water as delivered.
4. Premises having a repeated history of cross connections being established or reestablished.
5. Premises having fire protection systems, lawn sprinkler systems, or irrigation systems.
6. Premises having frostproof yard hydrants, drinking fountains or other appurtenances or plumbing fixtures with below-grade weep holes subject to contamination.
7. Other premises having conditions specified by the BRWA where cause can be shown that a potential cross connection hazard not enumerated above exists.

B. Premises having booster pumps or fire pumps connected directly to the waterworks or indirectly through a service connection shall have the pumps equipped with a pressure sensing device to shut off or regulate the flow from the pumps when the pressure at any service connection in the distribution system drops below the minimum working pressure required of 20 psi. In no case shall the pressure sensing device be set lower than 10 psi gauge.

C. An approved backflow prevention assembly or backflow elimination method shall be installed at, but not necessarily limited to, the following types of facilities:

1. Hospitals, mortuaries, clinics, veterinary establishments, nursing homes, dental offices and medical buildings;
2. Laboratories;

3. Piers, docks, waterfront facilities;
4. Sewage treatment plants, sewage pumping stations, or storm water pumping stations;
5. Food and beverage processing plants;
6. Chemical plants, dyeing plants and pharmaceutical plants;
7. Metal plating industries;
8. Petroleum or natural gas processing or storage plants;
9. Radioactive materials processing plants or nuclear reactors;
10. Car washes and laundries;
11. Water loading stations;
12. Lawn care companies and their vehicles with storage or mixing tanks;
13. Slaughter houses and poultry processing plants;
14. Farms where the water is used for other than household purposes;
15. Commercial greenhouses and nurseries;
16. Health clubs with swimming pools, therapeutic baths, hot tubs or saunas;
17. Paper and paper products plants and printing plants;
18. Pesticide or exterminating companies and their vehicles with storage or mixing tanks;
19. Schools or colleges with laboratory facilities;
20. High-rise buildings (4 or more stories);
21. Multi-use commercial, office, or warehouse facilities;
22. High density, multi-use residential complexes served through a master meter.
23. Others specified by the BRWA when reasonable cause can be shown for a potential backflow or cross connection hazard.

D. Where lawn sprinkler systems, irrigation systems or fire protection systems are connected directly to the waterworks with a separate service connection, a backflow prevention assembly or backflow elimination method shall be installed.

E. All temporary or emergency service connections shall be protected where in the judgment of the BRWA a health, pollutional, or system hazard to the waterworks exists or may exist for a potential backflow or cross connection hazard.

XI. Type of Protection Required

A. The type of protection required shall depend on the degree of hazard, which exists or may exist. The degree of hazard, either high, moderate, or low, is based on the nature of the contaminant; the potential health hazard; the method of backflow (either by backpressure or by backsiphonage); and the potential effect on waterworks structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water. Table 1 shall be used as a guide to determine the degree of hazard for any situation.

B. Backflow elimination methods, which include the air gap, physical disconnection, and discontinuance or refusal of service, give the highest degree of protection and shall be used whenever practical to do so in high hazard situations subject to backpressure.

C. An air gap, a physical disconnection, a reduced pressure principle backflow prevention assembly (RP or RPZ), or discontinuance or refusal of service will protect against backpressure and backsiphonage.

D. The reduced pressure principle backflow prevention assembly shall be used in high hazard situations subject to backpressure where it is impractical to eliminate the cross connection by an air gap or physical disconnection.

E. Pressure vacuum breaker assemblies (PVB) will not protect against backpressure, but will protect against backsiphonage. Pressure vacuum breakers may be used in low, moderate or high hazard situations subject to backsiphonage only.

F. A double gate - double check valve assembly (DG-DC) will protect against backpressure and backsiphonage but it shall not be used in high hazard situations.

G. Backflow prevention devices consisting of dual independent check valves with or without an intermediate atmospheric vent shall only be used in low hazard situations.

H. Barometric loops are not acceptable.

I. Interchangeable connections or changeover devices are not acceptable.

XII. Approved Backflow Prevention Assemblies, Devices, and Backflow Elimination Methods for Containment

A. Backflow prevention assemblies for containment shall be the reduced pressure principle backflow prevention assembly, the double gate-double check valve assembly, and the pressure vacuum breaker assembly.

B. Backflow elimination methods shall be an air gap, physical disconnection, or discontinuance or refusal of service. The minimum air gap shall be twice the effective opening of a potable water outlet unless the outlet is a distance less than three times the effective opening away from a wall or similar vertical surface, in which case the minimum air gap shall be three times the effective opening of the outlet. In no case shall the minimum air gap be less than one inch. Physical disconnection and discontinuance or refusal of service eliminates any connection, direct or indirect, between a waterworks and a nonpotable or questionable quality system.

C. Backflow prevention assemblies shall conform to the latest available American Water Works Association (AWWA) standards; shall hold current University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USC) approval; and shall be listed by the American Society of Sanitary Engineers (ASSE).

D. Backflow prevention assemblies shall be installed, maintained, and repaired in accordance with the University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USC) and the manufacturer's instructions. Orientation of the assembly shall be as approved by the USC.

E. For the purpose of application of point-of-use isolation protection in lieu of service line containment, assemblies or devices, or backflow elimination methods shall be as specified by BRWA where reasonable assurance can be shown that the assembly, device, or method will protect the waterworks. As a minimum, devices used in point-of-use isolation shall be listed by the American Society of Sanitary Engineering (ASSE) and comply with the Uniform Statewide Building Code. Assemblies used in point-of-use isolation shall be in compliance with Section XI C. and D. See Table 2, Assembly and Device Application.

F. Backflow prevention devices or assemblies with openings, outlets, or vents that are designed to operate or open during backflow prevention shall not be installed in areas subject to flooding or in pits and shall be installed in a free atmosphere.

G. Backflow prevention devices or assemblies shall not be subjected to operating conditions of working pressure, backpressure, temperature, or flow rate which exceed

the test conditions of the performance evaluation standard under which the device is listed (ASSE) or the assembly is approved (USC).

XIII. Inventory

An inventory will be maintained of all required backflow prevention assemblies and devices and backflow elimination methods including all backflow prevention assemblies, devices, and backflow elimination methods installed as a result of residential customer self-assessments.

XIV. Testing

A. The schedule of testing of all required backflow prevention assemblies shall not exceed 1 year. The BRWA may, at its discretion, schedule more frequent testing at high hazard facilities and at facilities scheduled to upgrade the type of protection.

B. The operational testing schedule will include all backflow prevention assemblies installed as a result of residential customer self-assessments.

C. BRWA test and maintenance forms (Section XXX. M.) shall be properly completed and submitted to the BRWA Compliance Inspector within 30 days of completion. Completed forms can be hand delivered, mailed, faxed, or scanned to the BRWA.

1. Hand Delivered or Mailed: 1723 Falling Creek Road, Bedford, VA 24523
2. Fax to (540) 586-5805. Please see the fax example in Section XXX.N.
3. Scan to: backflow@brwa.com

D. All backflow prevention assemblies or devices that PASS testing shall be tagged with a certification tag. The certification tags are available at the Customer Service desk at the BRWA main office located at 1723 Falling Creek Road, Bedford, VA 24523.

E. The BRWA will review and track the cross connection control operational verification reports and notify the consumer's water supply system owner in writing as to the testing requirements 60 days prior to their due date.

F. Copies of test results, maintenance records, and overhaul records will be reviewed for completeness and accuracy and a determination as to pass or fail made. The BRWA will notify the consumer's water supply system owner within 10 working days of receipt of such testing or work and of its acceptance.

XV. Backflow Events

In the event of the backflow of pollution or contamination into the waterworks, the BRWA will promptly take or cause corrective action to confine and eliminate the pollution or contamination. The BRWA will report to the appropriate Commonwealth of Virginia, Department of Health, Office of Drinking Water, Field Office in the most expeditious manner (usually by telephone) when backflow occurs and will submit a written report by the 10th day of the month following the month during which backflow occurred. The report will address the incident, its causes, effects, and preventative or control measures required or taken.

XVI. Consumer Notification

The BRWA will notify the consumer's water supply system owner in writing as to the required location of any assembly, device, or backflow elimination method; type of

assembly, device, or backflow elimination method, including applicable University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC), American Society of Sanitary Engineering (ASSE), and American Water Works Association (AWWA) approvals, listings, or standards; installation requirements; and the deadline for completing the installation, usually 15 days.
If the consumer's water supply system owner fails to install any required assembly, device, or backflow elimination method within the deadline or fails to complete testing, inspecting or overhauling as required, a second notification will be prepared and will include a notification of discontinuance of water service unless compliance is obtained within 30 days.

XVII. Records

Records of voluntary surveys and inspections of backflow prevention assemblies or devices or backflow elimination methods; test results of backflow prevention assemblies; assessments of consumer's water supply systems; and backflow incidence reports, for residential and non-residential customers will be maintained by BRWA for ten years. Continuous public education program records will be maintained by BRWA for ten years. Continuous public education program records will include: education materials and methods of delivery; other educational activities; and documentation of all public contacts including assistance provided.

XVIII. Point-of-use Isolation Protection

Any premises, residential, commercial, or industrial, where all actual or potential cross connections can be easily correctable at each point-of-use and where the consumer's water supply system is not intricate or complex, point-of-use isolation protection by application of appropriate backflow prevention assemblies, devices or elimination methods may be used in lieu of installing a containment device at the service connection if the following conditions are met:

A. The method of protection provided shall be, in the judgment of the BRWA Operations Manager, the method which best provides protection; and

B. The consumer's water supply system owner grants access for inspections; and makes a request in writing for point-of-use isolation protection; and

C. The Building Official concurs.

D. Assemblies, devices, or elimination methods installed under this section will be selected from *Table 2 – Assembly and Device Application*.

Point-of-use isolation protection applied in lieu of service line containment will be in accordance with the Memorandum of Agreement between the Department of Housing and Community Development and the Department of Health. See attachments.

XIX. Pressure Sensing Devices

Hydraulic analysis will be used to determine the set point of required pressure sensing devices used to shut off or regulate the flow from pumps connected directly or indirectly to the distribution system. The device shall be set at the service connection pressure which corresponds to the minimum working pressure required at the critical node in the affected distribution system subsystem. See *Waterworks Regulations* § 12 VAC 5-590-690C. for minimum working pressure requirements. In no case shall the pressure sensing device be set lower than 10 psi gauge.

XX. Ensuring Backflow Assemblies Hold Current Approval

The BRWA will ensure that all backflow prevention assemblies hold current approval by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USC). The consumer's water supply system owner will be notified of any USC Special Notice which may affect the status of an installed assembly.

XXI. Temporary or Emergency Connections and Water Loading Stations

Requests for temporary or emergency service connections and temporary or permanent water loading stations will be directed to the BRWA for approval.
The BRWA will perform periodic inspections of these facilities.

XXII. Coordination

A. The BRWA will route through the Building Official all new plans for service connections to serve fire service connections, lawn sprinkler systems, or irrigation systems. All backflow prevention recommendations beyond the service connection will be forwarded to the Building Official for proper Building Permit reference and application.

B. The BRWA will ensure coordination between the BRWA and the Building Official of cross connection control requirements at new premises, premises where usage has changed, premises where booster or fire pumps are used, and all others where plumbing modifications would necessitate the implementation of this program.

C. Required assemblies shall be tested and inspected and required elimination methods shall be inspected by the BRWA prior to final approval and use of the system.

D. A follow up test and inspection of required assemblies will be performed by the BRWA within 30 days of final approval.

XXIII. Premises with Individual Water Supplies

A. Premises with individual water supplies requesting a new service connection or reconnection to the waterworks will be assessed by on site interview for cross connection hazards and the appropriate backflow elimination method installed, inspected, and operational prior to making the service connection.

B. Premises with individual water supplies, i.e., an auxiliary water system, may, upon approval of the BRWA, maintain the water supply on the premises if the auxiliary water system is physically disconnected from the consumer's water supply system. Maintenance of the physical disconnection and access must be included in the Waterworks User Agreement. The Building Official's and Health Department concurrence will be needed.

C. Subsequent assessment type will be determined on a case-by-case basis by the BRWA. Assessments will be conducted to verify the maintenance of the physical disconnection.

XXIV. Records

A. An up-to-date listing of all customers (users, metered and non-metered) will be maintained by the BRWA. The list will contain:
   1. owner of premises

2. tenant
3. name of premises
4. service address
5. phone number
6. contact person
7. number of service connections
8. size of service connection
9. assessment type: (on site Interview) (mailed questionnaire) (telephone interview)
10. Assigned degree of hazard
11. assessment frequency

B. An up-to-date listing of consumer's water supply system owners who have cross connection preventative and control measures installed will be maintained by the BRWA Operations Manager. The list will contain:
   1. owner of premises
   2. tenant
   3. name of premises
   4. service address
   5. phone number
   6. contact person
   7. location of cross connection preventative and control measures
   8. type of preventative and control measures (service line containment) (point-of-use isolation) (isolation in lieu of containment)
   9. type of protection (USC assembly) (ASSE device) (pressure sensing device) (air gap) (physical disconnection)
   10. manufacturer
   11. model number
   12. serial number
   13. size
   14. ASSE number
   15. testing frequency (annually) (semi annually) (quarterly)
   16. pressure sensing device pressure set point
   17. basis for pressure sensing device pressure set point
   18. access granting documentation (on file) (denied) (not necessary)

C. An up-to-date listing of consumer's water supply system owners who have an auxiliary water system available to the premises. In addition to the applicable records note above, the water usage records will be reviewed to determine if the auxiliary water system is being used.

D. Questionnaires will be maintained by the BRWA for 10 years.
   The questionnaire will contain:
   1. owner and address of residence
   2. occupant if different from owner
   3. telephone number
   4. brief explanation of the program
   5. brief explanation of causes of backflow and preventative and control measures
   6. some likely cross connections:
      a. a garden hose with its outlet submerged
      b. kitchen sink spray hose with its spray head submerged
      c. hand-held shower massager with its head submerged
      d. garden hose used as an aspirator to spray soap or garden chemicals
      e. spring, hot-tub, cistern, or swimming pool connected to the house plumbing system
      f. water softeners improperly connected

7. specific questions which will include but not be limited to:
   a. individual wells, springs or cisterns on the property
   b. pressure booster pumps
   c. water storage tanks
   d. water treatment systems
   e. outside hose bibs used in conjunction with:
      chemical sprayers
      jet spray washers
      swimming pools, hot tubs, saunas, etc.
      lawn sprinkler or irrigation systems
   f. photographic developing
   g. utility sinks with hoses extending below sink rim
   h. animal watering troughs
8. existing cross connection control preventative and control measures:
   a. working properly
   b. leaking, noisy
   c. any modifications or repairs made
   d. date of last test
   e. any problems with hot water tank relief valve or faucet washers not lasting very long
9. also included with the questionnaire should be:
   a. educational material
   b. who to contact for further information
   c. who to contact if contamination is ever suspected
   d. a deadline to respond to the questionnaire

E. Assessment reports shall be maintained by the BRWA for 10 years. The report will contain:
   1. inventory information as noted above
   2. completed questionnaire
   3. assessment report of:
      a. degree of hazard
      b. appropriateness of assembly, device, or backflow elimination method
      c. installation acceptable
      d. general condition of device or backflow elimination method
      e. repair/replacement recommendations
      f. new/additional assembly, device, or backflow elimination method recommendations
      g. any indication of thermal expansion problems

F. Testing reports shall be maintained by the BRWA for 10 years. Testing reports will contain:
   1. inventory information as noted above
   2. line pressure
   3. results of testing
   4. test method used
   5. date, signature, and certification number of the Backflow Prevention Device Worker
   6. If repairs were made, the test report will contain:
      a. which parts replaced
      b. replacement parts used
      c. probable cause of test failure
      d. preventative measures taken

XXV. Assembly, Device, and Backflow Elimination Method Selection Guidelines

A. Virginia Cross Connection Control Association — Recommended Best Practice

B. International Plumbing Code and its Commentary

C. EPA *Cross-Connection Control Manual*

D. Virginia *Waterworks Regulations*

E. AWWA M-14 Cross Connection Control Manual

F. University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research

XXVI. Examples:

Types of facilities, probable degree of hazard and type of containment assembly required. All containment assemblies will comply with AWWA Standards, be approved for containment by the USC, and be listed by the ASSE. In high hazard situations subject to backpressure, backflow prevention by an elimination method should be the method of choice, wherever practical.

A. Hospitals, mortuaries, clinics, veterinary establishments, dental offices, nursing homes, and medical buildings: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

B. Laboratories: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

C. Piers, docks, waterfront facilities: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

D. Sewage treatment plants, sewage pumping stations, or storm water pumping stations: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

E. Food and beverage processing plants: Generally, a moderate hazard, Double Gate—Double Check Valve Assembly (DG—DC) ASSE #1015; Use of toxics, etc., in processing: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

F. Chemical plants, dyeing plants and pharmaceutical plants: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

G. Metal plating industries: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

H. Petroleum processing or storage plants: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

I. Radioactive materials processing plants or nuclear reactors: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

J. Car washes and laundries: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

K. Water loading stations: High hazard, Air Gap Physical Disconnection or Reduced Pressure Principle Device (RPZ) ASSE #1013

L. Lawn sprinkler systems, irrigation systems: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013 or Atmospheric Vacuum Breakers (AVB) ASSE #1001 or Pressure Vacuum Breaker (PVB) ASSE #1020, depending on method of backflow and pressure or flow conditions

M. Fire service systems: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

N. Slaughter houses and poultry processing plants: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

O. Farms where the water is used for other than household purposes: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

P. Commercial greenhouses and nurseries: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

Q. Health clubs with swimming pools, therapeutic baths, hot tubs or saunas: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

R. Paper and paper products plants and printing plants: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

S. Pesticide or exterminating companies and their vehicles with storage or mixing tanks: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013 at service connection and on vehicles

T. Schools or colleges with laboratory facilities: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

U. High-rise buildings (4 or more stories): Unless otherwise covered, Moderate hazard, Double Gate-Double Check Valve Assembly (DG-DC) ASSE #1015

V. Multiuse commercial, office, or warehouse facilities: Unless otherwise covered, Moderate hazard, Double Gate-Double Check Valve Assembly (DG- DC) ASSE #1015

W. High-density, multi-use residential complexes served through a master meter: Unless otherwise covered, Moderate hazard, Double Gate-Double Check Valve Assembly (DG- DC) ASSE #1015

XXVII. Assembly, Device, and Backflow Elimination Method Testability/Serviceability

A. Containment or point-of-use isolation assemblies used within the consumer's water supply system that are capable of being tested and repaired in-line include the Reduced Pressure Principle Device (RPZ), Double Gate-Double Check Valve Assembly (DG-DC) & Pressure Vacuum Breaker (PVB).

B. Residential Dual Checks without an intermediate atmospheric vent and Boiler Dual Checks with an intermediate atmospheric vent are testable but most of these ASSE listed devices must be removed for testing. Some can be overhauled in-line.

C. Generally, a visual inspection is the only means to inspect most Hose Bibb Vacuum Breakers (HBVBs) since they cannot be removed if installed in accordance with the manufacturer's instructions. Some manufacturers do provide frostproof wall hydrants with HBVBs which can be easily removed for inspection and replacement.

D. Pipe connected Atmospheric Vacuum Breakers (AVBs) can be inspected by removing the top cover.

E. Air gaps, physical disconnection, and discontinuance or refusal of water service require only a visual inspection.

XXVIII. Thermal Expansion

Customers will be advised of the potential for thermal expansion prior to or during installation of a backflow prevention device. Solutions to thermal expansion will be at the discretion of the consumer's water supply system owner and at the expense of the consumer's water supply system owner.

XXIX. Definitions

As used in this Program, the words and terms shall be as defined in the Commonwealth of Virginia, State Board of Health, *Waterworks Regulations* 2005, or as amended.

AIR-GAP SEPARATION (AG): The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet conveying water to a tank, plumbing fixture, receptor, or other assembly and the flood level rim of the receptacle. An approved air-gap separation shall be a distance of at least two (2) times the diameter of the supply pipe measured vertically above the top rim of the vessel – with a minimum distance of one (1) inch, using whichever measurement is greater.

APPROVED: Accepted as meeting the applicable specification of the Bedford Regional Water Authority and approved by the Commonwealth of Virginia Waterworks Regulations, Uniform Statewide Building Code, and the International Plumbing Code.

ATMOSPHERIC VACUUM BREAKER (AVB): An approved device consisting of a check valve and an air inlet to relieve a vacuum. It shall effectively shut off the reverse flow of water when a negative pressure exists on the supply side of the device. (Note* The BRWA does not approve of the use of AVB’s on irrigation systems under any circumstances.)

AUXILIARY WATER SUPPLY: Any water supply on or available to the premises other than the purveyor’s approved public potable water supply. These auxiliary waters may include water from a private non-potable water supply or any natural source(s) such as a well, spring, river, stream, harbor, etc., or “used waters” or “industrial fluids”. These waters may be contaminated or they may be objectionable, and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

BACKFLOW: The undesirable reversal of flow of water or other liquids, mixtures, or substances under pressure into the distribution pipes of a potable water supply system, as the result of a cross-connection, from any source or sources other than its intended source.

BACKFLOW PREVENTION DEVICE: A backflow prevention device shall mean any effective device, method, or construction used to prevent backflow into a potable water

system. The type of device used should depend on the degree of hazard, either existing or potential.

BACKFLOW PREVENTION ASSEMBLY/DEVICE - APPROVED: The term "approved backflow prevention assembly or device" are those that meet AWWA standards, and are approved by ASSE and the USC-FCCC (University of Southern California Foundation for Cross Connection Control and Hydraulic Research). NOTE: USC approval is specific to orientation, horizontal or vertical, device model number and size. Approvals are continuously verified and can be rescinded.

BACK-SIPHONAGE: The backflow of a fluid or other liquids, mixtures, or substances into the distributing pipes of a potable water supply system by negative or reduced pressure from any source other than its intended source.

BACKPRESSURE: Any elevation of pressure in the downstream piping system (by pump, elevation of piping, or steam and/or air pressure) above the supply pressure at the point of consideration which may cause or tend to cause, reversal of the normal flow.

CROSS CONNECTION CONTROL MANAGER: The Bedford Regional Water Authority Operations Manager or as designated by the Executive Director of the BRWA.

CONTAMINATION: An impairment of the quality of the potable water by the introduction of any solid, liquid, or gaseous compounds or mixtures to a degree which would create an imminent danger to the public health, degrade the water quality and create a health hazard.

CROSS-CONNECTION: Any physical or potential connection or arrangement of piping or fixtures between two otherwise separate piping systems, one of which contains potable water, and the other non-potable water or industrial fluids of questionable safety, through which, or because of which, backflow or back-siphonage may occur into the potable water system. A water service connection between a public potable water distribution system and a customer's water distribution system, which is cross-connected to a contaminated fixture, industrial fluid system or with potentially contaminated supply or auxiliary water system, constitutes one type of cross-connection. Other substances may be gases, liquids, or solids, such as chemicals, wastes products, steam, water from sources (potable or non-potable), or any matter that may change the color or add odor to the water.

CROSS-CONNECTION – CONTROLLED: A connection between a potable water system and a non-potable water system with an approved backflow prevention assembly properly installed and maintained so that it will continuously afford the protection commensurate with the degree of hazard.

DOUBLE CHECK VALVE ASSEMBLY (DCVA): An assembly composed of two single, internally loaded, independently acting check valves, installed as a unit between two tightly closing resilient seated shutoff valves and fittings with properly located resilient seated test cocks. The check valve shall permit no leakage in a direction reverse to the normal flow. This assembly shall only be used to protect against a non-health hazard (that is, a pollutant).

HAZARD-DEGREE OF: The term "degree of hazard" is a qualification of what potential and actual harm may result from cross-connection within a water using facility. Establishing the degree of hazard is directly related to the type and toxicity of contaminates that could feasibly enter the public water supply system and is determined by the Bedford Regional Water Authority Operations Manager.

HAZARD – HEALTH: A cross connection or potential cross connection involving any substance which, if introduced into the potable water supply, could cause death or illness, spread disease, or have a high probability of causing such effects.

HAZARD – PLUMBING: A plumbing type cross connection in a consumer's potable water system that has not been properly protected by an approved air gap or an approved backflow prevention assembly.

HAZARD – NON-SYSTEM: A cross-connection or potential cross connection involving any substance that generally would not be a health hazard but would constitute a nuisance or be aesthetically objectionable, if introduced into the potable water supply.

HAZARD – SYSTEM: An actual or potential threat of severe damage to the physical properties of the public potable water system or the consumer's potable water system or of a pollution or contamination that would have a protracted effect on the quality of the potable water in the system.

INDUSTRIAL FLUIDS SYSTEM: Any system containing a fluid or solution that may be biologically, chemically, or otherwise contaminated or polluted in a form or concentration, such as would constitute a health, system, pollution, or plumbing hazard, if introduced into an approved water supply. This may include, but not limited to, polluted or contaminated waters; all types of process waters and used waters originating from the public water system that may have deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalis; circulating cooling towers connected to an open cooling tower; and/or cooling towers that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters; such as wells, springs, streams, rivers, bays, harbors, irrigation systems, and so forth; oils, gases, glycerin, paraffin, caustic or acid solutions, and other liquid and gaseous solutions used in industrial or other purposes for fire-fighting purposes.

REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY (RP): The approved reduced pressure principle backflow prevention assembly consists of two independently acting, approved check valves, together with a hydraulically operating pressure differential relief valve located between the two check valves, and below the first valve. The first check valve reduces the supply pressure a predetermined amount so that during normal flow and at cessation of normal flow the pressure between the check valves shall be less than the supply pressure. In case of leakage of either check valve, the differential relief valve, by discharging to atmosphere, shall operate to maintain the pressure between the check valves less than the supply pressure. The unit shall include tightly closed shut-off valves located at each end of the device, and each device shall be fitted with properly located test clocks.

PRESSURE VACUUM BREAKER ASSEMBLY (PVB): A pressure vacuum breaker is similar to an atmospheric vacuum breaker except that the checking unit "poppet valve" is activated by a spring. This type of vacuum breaker does not require a negative pressure to react and can be used on a pressure side of a valve.

WATER PURVEYOR: The Bedford Regional Water Authority. As used herein the terms water purveyor and Bedford Regional Water Authority may be used synonymously.

WATER SYSTEM – CUSTOMER'S: The term "customer's water system" shall include any water system located on the customer's premises, whether supplied by a public

potable water system or an auxiliary water supply. The system or systems may be either a potable water system or an industrial piping system.

WATER - USED: Any water supplied by the Bedford Regional Water Authority water system to a customer's water system after it has passed through the point of delivery and is no longer under the sanitary control of BRWA.

XXX. Attachments

A. Table 1, Determination of Degree of Hazard

B. Table 2, Assembly and Device Application

C. Department of Housing and Community Development Memorandum of Agreement

D. List of Certified Backflow Prevention Device Workers

E. Application Form

F. Typical Installation sketches

G. Education Literature

H. Backflow Criteria Guideline

I. Survey Inspection Letter

J. Report of Assessment

K. Device Testing Due

L. Device Repair Needed

M. Test Form

N. Transmittal of Test Results

O. Device Required

P. Notice of Violation

Q. Termination of Service

R. Thermal Expansion Possible

S. Verification of Auxiliary Water Supply Physical Disconnection Due

T. Educational Material

   a. VDH Material

   b. BRWA Survey Flyer

TABLE 1 — Determination of Degree of Hazard

Cross connections that meet or may meet the following conditions shall be rated at the corresponding degree of hazard.	
High Hazard	The contaminant is toxic, poisonous, noxious or unhealthy. In the event of backflow of the contaminant, a health hazard would exist. A high probability exists of a backflow occurrence either by backpressure or by backsiphonage. The contaminant would disrupt the service of piped water for drinking or domestic use. Examples — Sewage, used water, nonpotable water, auxiliary water systems and toxic or hazardous chemicals.
Moderate Hazard	The contaminant would only degrade the quality of the water aesthetically or impair the usefulness of the water. In the event of backflow of the contaminant, a health hazard would not exist. A moderate probability exists of a backflow occurrence either by backpressure or by backsiphonage. The contaminant would not seriously disrupt service of piped water for drinking or domestic use. Examples — Food stuff, nontoxic chemicals and non-hazardous chemicals
Low Hazard	The contaminant would only degrade the quality of the water aesthetically. In the event of backflow of the contaminant, a health hazard would not exist. A low probability exists of the occurrence of backflow. Backflow would only occur by backsiphonage. The contaminant would not disrupt service of piped water. Examples — Food stuff, nontoxic chemicals and non-hazardous chemicals.

Table 2 – Assembly and Device Application

Degree of Hazard	Method of Backflow	Pressure or Flow Conditions	Device	ASSE #
High	BP or BS	Continuous	RPZ*	1013 & 1047
	BS only	Non-continuous	Pipe Applied AVB*	1001 & 1035
		Non-continuous	Hose Bibb AVB	1011 & 1052
		Non-continuous	Wall Hydrant w/AVB	1019
		Continuous	PVB*	1020 & 1056
Moderate	BP or BS	Continuous	DG-DC*	1015 & 1048
Low	BS only		Dual Check:	
		Continuous	w/o Vent	1024 & 1032
		Continuous	w/ Vent	1012 & 1022

NOTES:

1. * USC approved containment assemblies are available
2. Degree of Hazard - See Table 1 — Determination of Degree of Hazard.
3. BS means backflow by backsiphonage.
4. BP means backflow by backpressure or superior pressure.
5. Continuous means operating under continuous flow or pressure. This condition usually applies to devices installed inline and may have valves downstream of the device.
6. Non-continuous means operating intermittently not to exceed 12 hours under continuous pressure or flow in a 24-hour period. This condition usually applies to devices which are connected to hose bibbs, hydrants, or faucets which are open to the atmosphere. Valves should not be located downstream of these devices.
7. RPZ means a reduced pressure principal backflow prevention assembly.
8. Pipe applied AVB means an atmospheric vacuum breaker permanently installed in the plumbing or on faucets.
9. Hose bibb AVB means a hose bibb type atmospheric vacuum breaker with a single or with dual checks and a vent. ASSE 1052 is preferred.
10. Wall hydrant w/AVB means a through-the-wall, frostproof self-draining type wall hydrant with AVB attached or built in.
11. PVB means a pressure vacuum breaker.
12. Spill resistant AVB have the same ASSE # as standard, pipe applied AVB.
13. Spill resistant PVB have ASSE # 1056.
14. DG-DC means a double gate-double check valve assembly.
15. Dual Check without a vent means a device composed of two independently acting check valves ("residential dual check" and "beverage dispenser dual check").
16. Double check with a vent means a device composed of two independently acting check valves with an intermediate atmospheric vent ("boiler dual check").

MEMORANDUM OF AGREEMENT
between the
Board of Housing and Community Development
and the
Virginia Department of Health

In accordance with Section 36-97 "et seq." Code of Virginia, the Virginia Department of Health (hereafter referred to as the "Department") and the Board of Housing and Community Development (hereafter referred to as the "BHCD") on this June 28, 2002, agrees to coordinate the Uniform Statewide Building Code (hereafter referred to as the "USBC") and the Virginia Waterworks Regulations (hereafter referred to as the "Regulations"). The parties agree to the following.

1. That adoption and promulgation of the USBC is the responsibility of the BHCD; that enforcement of the USBC is the responsibility of the local building department; and that adoption, promulgation and enforcement of the Regulations is the responsibility of the Department.

2. That the jurisdiction of the USBC includes all buildings and structures and their internal service plumbing, up to the point of connection to the water meter; and that the jurisdiction of the Regulations includes the meter, all public water supply transmission mains, treatment facilities, and raw water collection and transmission facilities. Where no meter is installed, the point of demarcation between the jurisdiction of the USBC and of the Regulations is the point of connection to the public water supply main; or, in the case of an owner of both public water supply system and the building served, the point of demarcation is the point of entry into the building;

3. That both the USBC and the Regulations will include a clear reference to jurisdiction of the other document.

4. That the Regulations will require each waterworks owner to have a cross-connection prevention program consistent with the Regulations. The regulations will require, as a minimum, a containment device at each service connection where a health, pollution or system hazard to the waterworks exists. It is recognized that in lieu of such containment devices, point of use devices shall comply with the provisions of the USBC. Point of use devices approved by the waterworks owner/Department shall be deemed to be in compliance with the USBC.

5. That wherever public water supply and/or water treatment equipment or facilities are located in a building or structure, the Regulations apply to all such equipment and the USBC applies to the structure and all of its incidental utilities (i.e. heating, electrical, house plumbing, etc.).

6. That the building official is required by the USBC to be assured that the water supply to a building is safe and of adequate capacity before issuing a building permit. Building permits involving a new water connection or extension of an existing connection to a public water supply main shall not be issued when the Department has notified the building official in writing that the water supply system is at or above its permitted capacity.

7. That appropriate amendments, additions, or deletions will be made to the Regulations and to the USBC to insure that there is no jurisdictional conflict between the two documents.

8. That it is the intention of both the BHCD and the Department to cooperate with each other in resolving any technical conflicts between the Regulations and the USBC, and in developing and implementing operational procedures to insure and promote a constructive working relationship between building and health officials.

9. That, except in matters of imminent danger to pubic health or safety, whenever conflicts or disagreements arise between the two agencies or their staffs, all appropriate regulatory procedures will be exhausted prior to any judicial action.

10. This Agreement may be amended or terminated by mutual consent of the parties.

The undersigned agree to the conditions of this Agreement.

William C. Shelton
Director, Department of Housing and
Community Development
for the Board of Housing and
Community Development

Dr. Robert B. Stroube
State Health Commissioner,
Virginia Department of Health

LIST for Certified Backflow Testers

The Bedford Regional Water Authority (BRWA) offers the following list and information to our customers only as a convenient reference list and may not be all inclusive of DPOR certified testers in the local region.

The BRWA does not endorse, guarantee or warrant any work performed by contractors listed here. All interactions between customers and contractors are private business transactions between those two entities.

PLEASE SEE ADDITIONAL INFORMATION ON PAGE 2

NAME	PHONE	ADDRESS	CITY & STATE	ZIP
Roto Rooter	434-525-2315	311 Brook Park Place	Forest, VA	24551
Magic City Sprinkler	540-345-9818	1601 Granby St., N.E.	Roanoke, VA	24012
RSG Landscaping & Lawn Care, Inc.	434-993-2753	P.O. Box 110	Concord, VA	24538
Hiller Systems, Inc.	757-549-9123	1242 Executive Blvd	Chesapeake, VA	23320
The Service Company of Virginia	800-941-4612	3131 Southside Avenue	Richmond, VA	23228
Fire Sprinkler Ltd.	434-821-4222	8142 Wards Road	Rustburg, VA	24588
Mallard Irrigation, LLC	434-525-0511	240 Locksley Place	Forest, VA	24551
Southern Air, Inc.	434-385-6200	2655 Lakeside Drive	Lynchburg, VA	24501
Central Virginia Irrigation & Landscaping	434-444-3432	3574 Bell Town Road	Bedford, VA	24523
Eagle Fire, Inc.	804-743-2500	7459 White Pine Road	Richmond, VA	23237
Varney, Inc.	5403438580	P.O. Box 3187	Roanoke, VA	24015
Comfort Systems USA	540-989-5699	6450 Merriman Rd Suite E	Roanoke, VA	24018
K. Petrie Landscaping, Inc.	434-841-2846	8638 Bear Creek Rd	Gladys, VA	24554

- *Only Commonwealth of Virginia Department of Professional & Occupational Regulation (DPOR) certified backflow device workers may test backflow in the BRWA Service Area. Other licensed backflow contractors, not listed, may also test backflow preventers provided they are Virginia DPOR certified. The BRWA does not accept backflow testing certifications issued by local municipalities.*

- ***Backflow Preventer test are required annually and the test results are to be recorded on the BRWA test form(s) and original is to be returned to the address supplied on the test form.*** *BRWA Backflow Prevention Assembly Test Forms and the most current list of certified testers are also available on the internet at:* www.brwa.com **(click the "Public Information" link).**

Last updated 8/19/14

- *Please include the **customer's address and phone number** on each test form.*

- *The BRWA highly recommends that whenever customers prepare to hire someone to test their device they should inquire of the proper State approval backflow inspection credentials of those being considered as certifications are subject to suspension, revocation and expiration. Customers may also check the current status of the contractor's license at the Commonwealth's DPOR website (click on "License Lookup" at www.dpor.virginia.gov) or by calling (804) 367-8511.*

- *Virginia licensed backflow testers, with the appropriate credentials for testing backflow devices, and interested in being listed here should contact the Cross Connection Control coordinator for the BRWA, at (540) 586-7679. An application form is located on the BRWA website for companies or contractors requesting to be added to the list (click the "Public Information" link).*

Last updated 8/19/14

Bedford Regional Water Authority
List of Certified Backflow Testers
Application Form

To have you company added to the Bedford Regional Water Authority List of Certified Backflow Testers the following information is required:

Company Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Contact Name: _____

Phone #: _____ Fax #: _____

e-mail address: _____

(It is the responsibility of the applying company to ensure all information is accurate and legible prior to submitting form)

In addition to the above information, the applying company shall provide legible copies of the following information:

1. A legible copy of DPOR Backflow Prevention Device Worker license(s) for all current employees that conduct testing.
2. A legible copy of Certificate of Accuracy for all backflow testing equipment used by the company.

The requested information and this form can be mailed, dropped off, faxed or emailed to:

Bedford Regional Water Authority
Attn: Backflow Prevention Program
1723 Falling Creek Road
Bedford, VA 24523
Phone – (540) 586-7679 ext. 123
Fax – (540) 586-5805
Email – backflow@brwa.com

If further information is required, please contact Thomas Cherro at (540) 586-7678 ext. 123 for assistance.

For BRWA Compliance Inspector to complete					
Date received: _____			Initials: _____		
Copy of license(s) attached?	Yes	No	Calibration certification attached?	Yes	no
Date entered into database: _____			Initials: _____		
Date added to list: _____			Initials: _____		
Date filed:			Initials:		

Bedford Regional Water Authority

Backflow Criteria Guideline
For
Existing Structures

(To include any Renovations, Expansions and Additions)

The following list is required by the Bedford Regional Water Authority to help determine the level and type of backflow prevention protection necessary

Please check yes or no to the following questions

Yes	No		
☐	☐	1.	Does the property have an active water service?
☐	☐	2.	Is the property used for commercial/institutional purposes? If yes, please specify: _____
☐	☐	3.	Is the property used for industrial purposes? If yes, please specify: _____
☐	☐	4.	Does the water service have an approved backflow prevention assembly already installed? If yes, please specify type/model: _____
☐	☐	5.	If a backflow assembly exists, has an annual test been performed and registered with the Bedford Regional Water Authority?
☐	☐	6.	Does the facility have a fire sprinkler system?
☐	☐	7.	If a fire sprinkler system exists, are there any additives in the sprinkler system? If yes, please specify: _____
☐	☐	8.	Are there any private fire hydrants on the property?
☐	☐	9.	Is there a vault on the premise?
☐	☐	10.	If a vault exists, does it drain properly?
☐	☐	11.	Does the property have an irrigation system?
☐	☐	12.	Is the structure on the property four or more stories high?

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: backflow@brwa.com - Website: www.brwa.com

Bedford Regional Water Authority

☐ ☐ 13. Are there any chemicals used or stored at the property that come in Contact with the water system that could pose a health hazard?
If yes, please specify: _____

☐ ☐ 14. Is there the necessary space outside the structure to install the appropriate backflow prevention assembly?

☐ ☐ 15. Are there any activities at this location that could be considered as a health hazard?
If yes, please specify: _____

Please provide the following contact information:

Company: _____

Printed Name: _____

Signature: _____ Date: _____

BRWA Compliance Inspector comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: backflow@brwa.com - Website: www.brwa.com

Bedford Regional Water Authority

[Click **here** and type Date for this letter]

[Click **here** and type recipient's Company]
[Click **here** and type recipient's Name]
[Click **here** and type recipient's Street Address]
[Click **here** and type recipient's City, State, Zip]

Re: On-site Cross-Connection Control/Backflow Prevention Survey Inspection

Dear Mr. /Mrs. [Click **here** and type the recipient's last name]

In accordance with the Commonwealth of Virginia, Department of Health, *Waterworks Regulations*, Cross-Connection Control and Backflow Prevention in Waterworks, the Bedford Regional Water Authority has initiated a cross-connection and backflow prevention program. As part of the inspection program, we will inspect your facility for the presence of cross-connections and determine the degree of hazard present. After the inspection, you will be notified in writing of the results of the survey and any corrective actions that will be necessary. You may be required to remove existing cross-connections, update existing backflow prevention assemblies or devices, or install backflow prevention assemblies or devices.

Backflow is a reversal of normal flow in a drinking water distribution system. Normally, water flows from the public water distribution (piping) system into your business. During backflow, water flows from your plumbing system back into the distribution system. Any contaminates that are picked up while the water is in your plumbing system could contaminate the water in the public water supply. Backflow may occur due to either a build-up of pressure that overcomes the pressure of the public water supply or to a loss of pressure in the distribution system that causes water to be siphoned from your plumbing system.

For backflow to occur, a cross-connection must exist. Two types of cross-connections exist, direct connection and the submerged inlet. A direct connection is created by connecting one pipe to another or container. A submerged inlet is a connection where incoming water enters a container below water level. The presence of either of these cross-connections may require that a backflow prevention assembly or device be installed on your premises.

The BRWA will be contacting you to arrange a convenient time for inspection. If you have any questions regarding the inspection please contact [Click **here** and type YOUR **Name**] at [Click **here** and type YOUR **Phone #** and **Extension**] . We appreciate your cooperation in helping the BRWA maintain a clean and safe water supply.

Sincerely,

[Click **here** and type YOUR **Name**]
[Click **here** and type YOUR **Title**]

CC: [Click **here** and type the name of any **carbon copy recipients**]
Enclosure

[initials of the person signing the letter in CAPS]/[initials of the letter writer in lowercase]

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: backflow@brwa.com - Website: www.brwa.com

Bedford Regional Water Authority

[Click **here** and type Date for this letter]

[Click **here** and type recipient's Company]
[Click **here** and type recipient's Name]
[Click **here** and type recipient's Street Address]
[Click **here** and type recipient's City, State, Zip]

Re: Report of Assessment

Dear Mr. /Mrs. [Click **here** and type the recipient's last name]

On [Click **here** and type **DATE of Inspection**], a survey inspection was conducted, as they apply to cross-connection control, in [Click **here** and enter NAME of **Establishment**], located at [Click **here** and enter ADDRESS for **Establishment**]. The following changes are required to be made within 15 days of receiving this letter:

[Click **here** and enter ASSESSMENT **findings**]

.

Please contact the Building Department (540) 586-7616, prior to making any plumbing modifications.

Once all changes have been made, please contact [click **here** and type YOUR **Name**] at [Click **here** and type Phone # and Extention] to schedule an inspection.

If you have any questions regarding the inspection please contact [Click **here** and type YOUR **Name**] at [Click **here** and type YOUR **Phone #** and **Extension**] . We appreciate your cooperation in helping the BRWA maintain a clean and safe water supply.

Sincerely,

[Click **here** and type YOUR **Name**]
[Click **here** and type YOUR **Title**]

CC: [Click **here** and type the name of any **carbon copy recipients**]
Enclosure

[initials of the person signing the letter in CAPS]/[initials of the letter writer in lowercase]

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: backflow@brwa.com - Website: www.brwa.com

Bedford Regional Water Authority

[Click here and type Date for this letter]

[Click here and type recipient's Company]
[Click here and type recipient's Name]
[Click here and type recipient's Street Address]
[Click here and type recipient's City, State, Zip]

Re: Backflow Prevention Assembly Testing Due

Dear Mr. /Mrs. [Click here and type the recipient's last name]

In order to comply with the Bedford Regional Water Authority (BRWA) Cross Connection Control and Backflow Prevention Program, the backflow prevention assembly installed at your service connection shall be tested by a certified backflow prevention device worker. The assembly shall be tested within 60 days from the date of this letter. The tester shall have the required BRWA testing forms, which shall be completed and a copy returned to the BRWA.

Should you need assistance locating a certified tester or should you need additional information or time to complete the required testing, please contact Thomas Cherro at (540) 586-7679 extension 123.

Sincerely,

Thomas Cherro
Compliance Inspector

CC: Elmer Handy – Operations Manager

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: brwa@brwa.com - Website: www.brwa.com

Bedford Regional Water Authority

[Click **here** and type Date for this letter]

[Click **here** and type recipient's Company]
[Click **here** and type recipient's Name]
[Click **here** and type recipient's Street Address]
[Click **here** and type recipient's City, State, Zip]

Re: Bedford Regional Water Authority (BRWA) Cross-Connection Control & Backflow Prevention Program – **Notice to Repair**

Dear Mr. /Mrs. [Click **here** and type the recipient's last name]

An inspection was conducted on "[Enter Date]" at "[Enter Location]" . The backflow assembly located "[Enter Assembly Location]" was leaking from the "[Enter CV1, CV2, RV, Testcocks, etc]" and is not compliant with BRWA Cross-Connection Control and Backflow Prevention Program and the Waterworks Regulations, Virginia Department of Health. The backflow assembly shall be repaired and tested by a Certified Backflow Prevention Device Worker within 30 days of receiving this letter. A list of companies with Certified Backflow Prevention Workers can be found at www.brwa.com, click on "Public Information". The test report will need to be completed and submitted to the BRWA within 30 days of the repair and testing.

If you have any questions regarding the inspection please contact [Click **here** and type YOUR **Name**] at [Click **here** and type YOUR **Phone #** and **Extension**] . We appreciate your cooperation in helping the BRWA maintain a clean and safe water supply.

Sincerely,

[Click **here** and type YOUR **Name**]
[Click **here** and type YOUR **Title**]

CC: [Click **here** and type the name of any **carbon copy recipients**]
Enclosure

[initials of the person signing the letter in CAPS]/[initials of the letter writer in lowercase]

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: backflow@brwa.com - Website: www.brwa.com

BEDFORD REGIONAL WATER AUTHORITY
TEST AND MAINTENANCE REPORT

CUSTOMER NAME: _____

STREET ADDRESS: _____

MAILING ADDRESS: _____

ASSEMBLY LOCATION: _____

TYPE OF ASSEMBLY: RP ☐ DCVA ☐ PVB ☐ SVB ☐ SIZE: _____

MANUFACTURER: _____ MODEL: _____ SERIAL NO: _____

GAUGE MANUF: _____ SERIAL NO: _____ DATE CALIBRATED: _____

Check Valve #1	Relief Valve	Check Valve #2	PVB or SVB
☐ leaked or ☐ closed tight differential pressure across check valve _____ psi	Opened at: _____ psi or did not open ☐ ***Outlet shut-off valve:*** ☐ leaked ☐ closed tight	☐ leaked or ☐ closed tight **OPTIONAL TEST** Differential pressure across check valve _____ psi	***Air Inlet:*** did not open ☐ or opened at _____ psi ***Check Valve:*** leaked ☐ or held at _____ psi
Replaced: Rubber parts kit ☐ CV assembly kit ☐ Seat Kit ☐ Other ☐ _____ or ☐ CV cleaned only	Replaced: RV Rubber kit ☐ RV assembly kit ☐ Seat Kit ☐ Other ☐ _____ or ☐ RV cleaned only For DCVA Only: ***Inlet shut-off valve:*** ☐ leaked ☐ closed tight ***Outlet shut-off valve:*** ☐ leaked ☐ closed tight	Replaced: Rubber parts kit ☐ CV assembly kit ☐ Seat Kit ☐ Other ☐ _____ or ☐ CV cleaned only	Replaced: Rubber parts kit ☐ CV assembly ☐ Air inlet valve ☐ Other ☐ _____ or ☐ Cleaned only
Differential pressure across check valve _____ psi	Relief valve opened at _____ psi	☐ leaked or ☐ closed tight	Air inlet _____ psi Check valve _____ psi

NOTE: All repairs shall be completed within five (5) working days.

REMARKS: _____

I hereby certify that this data is accurate and reflects the proper operation and maintenance of the assembly.

TESTER: _____ CERT. No: _____ DATE: _____

ASSEMBLY RE-CERT Due Date: _____ TIME: _____

This Assembly: ☐ PASSED ☐ FAILED Signature: _____

Test Reports are to be submitted to the BRWA with 30 days of completing the field test.

The test forms are located at www.brwa.com, click on "Public Information" and follow the link "Backflow Prevention"

Bedford Regional Water Authority

FACSIMILE TRANSMITTAL

To:	Compliance Inspector - BRWA	**Fax #:**	(540)586-5805
From:	Your Company Name	**Date:**	September 30, 2014
Re:	Cross-Connection Control & Backflow Prevention Program	**Pages:**	[Click here for # of pages]
CC:	[Click here and type name]	**CC Fax #:**	[Click here and type fax number]

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **For your info.**

Notes:

Add any notes for the Compliance Inspector

Please ensure that the highlighted information is included on your fax coversheet, as well as a Contact Name and Contact Phone number

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: brwa@brwa.com - Website: www.brwa.com

Bedford Regional Water Authority

[Click here and type Date for this letter]

[Click here and type recipient's Company]
[Click here and type recipient's Name]
[Click here and type recipient's Street Address]
[Click here and type recipient's City, State, Zip]

Re: Backflow Prevention Assembly Required

Dear Mr. /Mrs. [Click here and type the recipient's last name]

The Cross Connection Control questionnaire identified certain health hazards associated with your plumbing system, which must be corrected in order to protect "[Click here and type local water system]" waterworks serving our community. Backflow prevention devices or separations must be installed to comply with our waterworks operation permit. Below is a list of devices, their locations and appropriate standard to use when purchasing the device. Separations are also listed below:

"[Click here and type assembly information]"

The backflow prevention assembly installed at "[Click here and type assembly location]" shall be tested on installation and annually thereafter by a Virginia State certified backflow prevention device tester.

The device shall be installed and tested within **15 days** from the receipt of this letter.

If you have any questions or require additional information or additional time to complete the required work, please contact me by telephone at "[Click here and type phone # and extension]" .

Sincerely,

[Click here and type YOUR Name]
[Click here and type YOUR Title]

CC: [Click here and type the name of any carbon copy recipients]
Enclosure

[initials of the person signing the letter in CAPS]/[initials of the letter writer in lowercase]

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: backflow@brwa.com - Website: www.brwa.com

Bedford Regional Water Authority

[Click **here** and type Date for this letter]

FINAL NOTICE

[Click **here** and type recipient's Company]
[Click **here** and type recipient's Name]
[Click **here** and type recipient's Street Address]
[Click **here** and type recipient's City, State, Zip]

Re: Bedford Regional Water Authority (BRWA) Cross-Connection Control & Backflow Prevention Program – **NOTICE OF VIOLATION**

Dear Mr. /Mrs. [Click **here** and type the recipient's last name]

The BRWA mailed a request for backflow prevention installation request on "[Enter Date]" and a second letter on "[Enter Date]" , advising that in accordance with the BRWA Cross-Connection Control and Backflow Prevention Program and the Waterworks Regulations, Virginia Department of Health, a backflow prevention device is required at "[Enter Location]" . To date, the BRWA has not received the completed Field Testing and Maintenance Report showing that a "[Enter Device Type]" has been installed and is functioning properly. Therefore, "[Enter Company or Address]" is currently not compliant with the BRWA Cross-Connection Control and Backflow Prevention Program.

Failure to comply with the BRWA Cross-Connection Control and Backflow Prevention Program and the Waterworks Regulations, Virginia Department of Health will result in the termination of water service on "[Enter Date]" .

Your immediate attention to this matter is advised. If you have any questions regarding the inspection please contact [Click **here** and type YOUR **Name**] at [Click **here** and type YOUR **Phone #** and **Extension**] . We appreciate your cooperation in helping the BRWA maintain a clean and safe water supply.

Sincerely,

[Click **here** and type YOUR **Name**]
[Click **here** and type YOUR **Title**]

CC: [Click **here** and type the name of any **carbon copy recipients**]
Enclosure

[initials of the person signing the letter in CAPS]/[initials of the letter writer in lowercase]

1723 Falling Creek Road Bedford, Virginia 24523
Phone: 540-586-7679 - Fax: 540-586-5805
Email: backflow@brwa.com - Website: www.brwa.com

Normally, as water is heated and expands it would back up in the service line into the main if no usage was occurring. Installation of backflow prevention devices or certain plumbing appurtenances (pressure reducing valves) at the service connection or within the consumer's water supply system prevent thermally expanded water from flowing from the premises into the distribution system. When the water heater is operating, water is expanding and pressure is increasing, thermal expansion in a closed plumbing system under no flow conditions may cause the emergency temperature and pressure relief valve to open and close frequently and may reduce the life of plumbing fixtures and piping.

The temperature and pressure (T & P) relief valve is an emergency relief valve, not an operating control valve. If the T & P relief valve is used frequently, its useful life will be shortened and it could cease to function.
Thermal expansion can cause damaging stress and strain to water heaters, solenoid valves, O-rings, float valves, pump seals, and plumbing fixtures or fittings.

Generally, 80 psi for a short period of time is the maximum pressure under no flow conditions most fixtures, appliances or appurtenances should be subjected to.
Where thermal expansion is a problem the following devices could be installed:

1. a bladder or diaphragm type expansion tank;
2. an auxiliary pressure relief valve;
3. an anti-siphon ball cock with auxiliary relief valve into the toilet tank set at no more than 80 psi.

Installation should be in strict accordance with the manufacturer's instructions, the Uniform Statewide Building Code and the National Sanitation Foundation.

See Section 607.3 of the International Plumbing Code Commentary for additional information.

Effective Cross Connection Control Programs

Hip Pocket Tools for Operators

Catalog No. HTO/002/2006

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

Office of Drinking Water

At the end of this session...

You will be able to understand what a cross connection is (back flow, back pressure, backsiphonage), understand the need for an active program to address cross connections, identify essential elements of an on-going program, and understand the importance of good reporting and recordkeeping.

What is a cross connection?

A cross connection is any actual or potential link or connection between your drinking water system and any source of contamination.

Cross connections can occur due to backpressure or backsiphonage, which together are kinds of backflow.

Backflow is the reversed flow of contaminated water or other liquids into your drinking water system.

Did you know...?

Cross connections can occur anywhere

- Lawn chemicals backflowing through a garden hose
- Backsiphonage of "blue water" from a toilet into a building's water supply
- Backpressure of boiler water into an office building water supply
- Backflow from a fire sprinkler system

Backflow by backsiphonage occurs when a partial vacuum causes the water flow to reverse, and contaminants are siphoned or sucked into your drinking water.

Backflow by backpressure occurs when contaminants under pressures greater than the pressure in your drinking water system are pushed into your drinking water.

Can you think of a situation at your drinking water system where backflow might be a problem? Is the situation related to backsiphonage or backpressure?

Should I be concerned about cross connections?

Two examples from drinking water systems in Virginia highlight the seriousness of cross connections.

1. An exterminating company was using a water hose connected to a house to mix a chemical pesticide in a tank truck. At the same time, city workers were draining a distribution line serving the subdivision. The pesticide was drawn into the distribution system by backsiphonage. When water service was restored, water contaminated with the pesticide flowed directly into homes. For the lack of an inexpensive hose bibb vacuum breaker, this backflow event caused approximately $80 million in damages to the drinking water system and homes, where plumbing and appliances had to be removed and replaced.

2. A resident called the waterworks claiming, "Your water is burning my mouth!" The woman lived in an apartment located over a convenience store. The investigation showed that a pressurized canister of carbon dioxide used to mix sodas in the store had malfunctioned. As a result, carbon dioxide was forced into the drinking water piping by backpressure. The levels of carbon dioxide were high enough to burn the woman's mouth. If metallic pipe had been in use, the acidic mix of carbon dioxide and water could have led to serious illness or death.

What can I do to prevent cross connections?

Having an active program in place to control cross connections and prevent backflow is critical to ensuring the safety of your drinking water.

Did you know...?

Having an approved Cross Connection Control Program is not an option for public water systems? The Virginia *Waterworks Regulations* state:

> "...as a condition for the issuance and continued use of the operation permit ...each owner of a waterworks [shall] establish and enforce a program of cross connection control and backflow prevention for each waterworks. The cross connection control and backflow prevention program shall be approved by the division prior to issuance of the operation permit." §12VAC 5-590-580

What are the essential elements that make up an effective ongoing Cross Connection Control Program?

There are six key elements of an effective Cross Connection Control program (CCCP):

1. Consumer education and awareness

Your best resource to ensure an effective CCCP is consumers who know what a cross connection is, and how to safeguard against backflow at home, at school, or in the workplace.

Educational materials for consumers should describe...

- Conditions that lead to backflow
- Plumbing hazards with cross connection potential
- Health effects of cross connections
- Ways to eliminate hazards
- Sources of additional information and contact info for assistance

Ways to reach consumers include...

- Using the annual water quality report (also known as a Consumer Confidence Report) to explain your CCCP. Describe steps water customers can take, such as installing hose bibb vacuum breakers to prevent backsiphonage when using the garden hose.
- Sending educational materials as a billing insert
- Making Public Service announcements on local television or radio
- Providing education materials when new customers begin service
- Posting consumer education materials on employee bulletin boards

Did you know...?

An excellent resource for finding educational materials for your drinking water supply customers is the Virginia Cross Connection Control Association. Visit their web site at www.vccca.org.

Another good source for consumer information is the University of Florida's TREEO Center web site at www.nobackflow.com .

Can you think of other ways or opportunities to provide educational materials to consumers served by your drinking water system?

2. Risk assessment

What conditions are you likely to encounter in your water supply's service area? Before you determine what kind of cross connection protection is best, you have to evaluate situations that can produce backflow. This evaluation or risk assessment must be done for every service connection in your system. You must think about how water is used by consumers. Risk assessment involves two steps:

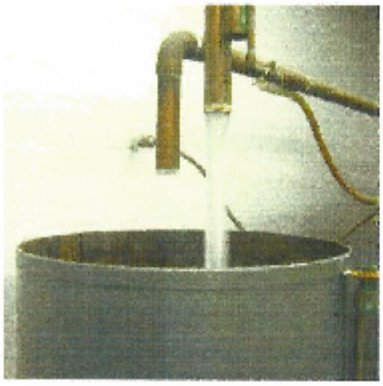
Step 1: Identify the conditions or facilities with potential for backflow.

Step 2: Assign a degree of hazard. This is based on the nature of the contaminant and its potential health effects.

> Did you know...?
>
> The Virginia *Waterworks Regulations* provides guidance for ranking the degree of hazard for potential cross connections as high, moderate, or low "based on the nature of the contaminant; the potential of the health hazard; the probability of the backflow occurrence; and the effect on waterworks structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water." § 12 VAC 5-590-620

What cross connection risks might exist at your drinking water system?

3. Selection of appropriate safeguards



Appropriate safeguards are tailored to the situation, based on degree of hazard, method of backflow (backsiphonage or backpressure), and pressure and flow conditions (continuous or non-continuous.)

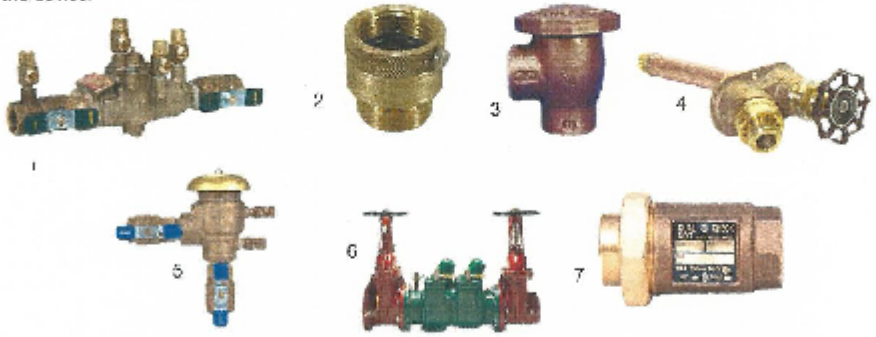
An air gap or physical disconnection gives the highest degree of protection from backflow. It should be used whenever it is practical to do so in high hazard situations. The length of the gap should be at least two times the diameter of the water outlet.

When use of an air gap is not suitable, a variety of backflow prevention devices can be installed. The table below describes the appropriate application of mechanical safeguards for various situations:

Degree of Hazard	Method of Backflow	Pressure or Flow Conditions	Device or Safeguard
High	Back pressure OR backsiphonage	Continuous	Reduced pressure principle backflow prevention assembly (RPZ)
	Backsiphonage ONLY	Non-continuous	Pipe applied atmospheric vacuum breaker, hose bibb vacuum breaker, or wall hydrant with hose bibb vacuum breaker
		Continuous	Pressure vacuum breaker
Moderate	Back pressure OR backsiphonage	Continuous	Double gate-double check valve assembly
Low	Backsiphonage ONLY	Continuous	Dual check valve

Continuous means operating under continuous flow or pressure. This condition usually applies to devices that are installed inline, where valves may be installed downstream of the device.

Noncontinuous means operating intermittently, and applies to devices which are connected to hose bibbs, hydrants, or faucets that are open to the atmosphere. In these cases, valves are not located downstream of the device.



(1) Reduced pressure principle backflow prevention assembly (RPZ) (2) Hose bibb vacuum breaker
(3) Pipe applied atmospheric vacuum breaker (4) Wall hydrant with hose bibb vacuum breaker
(5) Pressure vacuum breaker (6) Double gate – double check assembly (7) Dual check valve

What would be suitable safeguards for the situations you previously described?

4. Ongoing reassessment

The number of connections to your water system and the ways consumers use water from your system are constantly changing. How will you know when these changes occur, and whether they introduce new risks to your water system?

In order to have an effective CCCP, you must make an effort to continually reassess your drinking water system for cross connections. The Virginia *Waterworks Regulations* require that water system owners have inspections and appropriate testing of cross connection control devices conducted annually. Inspections should include examination of cross connection controls currently in use, as well as investigation to identify new potential cross connection situations. The *Regulations* require that records of the reassessment inspections be kept for at least ten years.

5. Recordkeeping

Recordkeeping is an essential part of effective CCCPs. Good recordkeeping serves numerous purposes:

- It enables you to pinpoint the location and type of potential cross connections that could affect your water system.
- It serves as an inventory of the safeguards that are used throughout the water system and why they are there.
- It allows you to assess how well the CCCP is being implemented.
- It serves as a resource to make sure that testable devices are being inspected and maintained properly.
- It provides accountability, by documenting who is performing specific CCCP tasks.
- It protects the water system from liability and charges of negligence.

All CCCPs include a recordkeeping element, though the specific documentation may vary from waterworks to waterworks. However, all CCCP records must to be saved for a minimum of ten years, and the

records must be made available to the Virginia Department of Health upon request. The records maintained by your waterworks may include the following:

- Results of questionnaires sent to customers
- Annual inspection forms
- Lists of potential cross connections (description and location)
- Inventories of the safeguards used for each potential cross connection, along with the reason for its selection
- Specific descriptions for each safeguard including manufacturer, model number, size, etc.
- Documentation of annual device testing, including testers' certifications, inspection dates, test results, etc.

What CCCP records are required for your water system? How might records make it easier to respond to or correct a cross connection incident?

---

6. Reporting

It is very important to notify the Virginia Department of Health IMMEDIATELY in the event of a cross connection or backflow incident at your public water system. Call your Office of Drinking Water field office if there is any indication or suspicion that contaminated water has entered the water system by backflow. Office of Drinking Water staff will provide specific guidance on correcting the situation, and on steps you should take to notify consumers. Prompt reporting is a necessary step to protect the health of your customers.

Did you know...?

The Office of Drinking Water has established toll-free emergency contact call numbers for waterworks use after normal business hours on nights, weekends, and holidays. Your emergency call will be delivered to a pager, and the call will be returned immediately.

(800) 608-3212
or
(800) 204-3527

More information on cross connection control and backflow prevention can be found at...

www.vccca.org and www.nobackflow.com

Catalog No. HTOA02-2005
Prepared by the Virginia Department of Health Office of Drinking Water
September 2005
Send comments to CDCVReview@vdh.virginia.gov Attn: Small Systems Coordinator

VDH VIRGINIA DEPARTMENT OF HEALTH Protecting You and Your Environment

Office of Drinking Water

Backflow Prevention Survey

The following survey will help us identify potential cross-connections on your property. If you are not sure if you have a potential cross-connection, check the "maybe" in the survey and we can help you investigate.

Mail completed survey to:
BRWA Backflow Prevention 1723 Falling Creek Rd.
Bedford, VA 24523

Complete survey online: Visit www.brwa.com. Click Public Information and then click Compliance Programs. Survey is in top right corner.

Potential Cross-Connection Sources Where Backflow Can Occur Please check all that apply	Do you have this on your property?		
	Yes	No	Maybe
Outside Spigots			
Outside spigots without vacuum breaker			
Yard hydrant or yard spigot/standpipe			
Wells & Irrigation Systems Not Protected by a Backflow Device (Connected to Public Water)			
Private well, spring or cistern			
Lawn irrigation/sprinkler system - supplied by a pond/lake			
Lawn irrigation/sprinkler system - supplied by public water			
Pools, Ponds & Hot Tubs not Protected by a Backflow Device (Connected to Public Water)			
Hot tub/Jacuzzi			
Water storage tanks			
Swimming pool			
Ornamental / Fish ponds or fountains			
Animal watering trough			
Internal Plumbing not Protected by a Backflow Device (Connected to Public Water)			
Fire protection sprinkler system			
Solar/steam water heating system			
Water filtration/water softener/booster pumps			
Darkroom/photo development			
Medical treatment system (such as dialysis machine)			
Mop/laundry/utility sink with hose bibb thread			
Dye Vat			
Shampoo bowl/sink			
Baptism pool			
Carbonated drink machine			
Anything Else? Are there any other items or treatment units connected to the water system on your property?			

Name: _____

Address: _____

Contact email and/or phone: _____

Bedford Regional Water Authority

Backflow Prevention Program

Bedford Regional Water Authority

540.586.7679
backflow@brwa.com
Working together to protect your drinking water supply

Protect Your Drinking Water

Important information on backflow prevention and identifying cross-connections.

WHAT IS A CROSS-CONNECTION?

A cross-connection is an actual or potential connection or link between the Water Authority's potable water system or your (the consumer) water system and ANY source of non-potable liquid, solid, or gas that could contaminate the potable water supply by backflow. Backflow is the reversed flow of water (or other liquid, solid, or gas from any source) back into the potable water system by either back siphonage or back pressure.

Back siphonage is backflow caused by a negative pressure (vacuum or partial vacuum) in the potable water system. Back siphonage occurs when the system's pressure is reduced below atmospheric pressure. The effect is similar to sipping water through a straw.

Example: Homeowner "Bob" has connected a pesticide bottle to his garden hose and starts treating the lawn. At the same time, the potable water system is being flushed, which creates a partial vacuum in the water main supplying Bob's house. If Bob does not have an atmospheric vacuum breaker attached at his hose connection, the pesticide can be siphoned back through the hose and into the potable water system. The contaminated water can then flow directly into Bob's home and/or other homes in Bob's neighborhood.

Backflow by back pressure occurs when the non-potable system's pressure exceeds the potable water system pressure. The effect is similar to blowing air through a straw to create bubbles at the other end. Back pressure can force or push an undesirable contaminant into your drinking water. Sources of backpressure may be pumps in the distribution system, boiler units, heat exchange devices, or power washing equipment.

Example: At ACME Industry, hot and cold water feed a pump operating at 75 psi with the discharge side of the pump connected to a gun-type spray nozzle. A hose connects a chemical tank to the pump, which supplies a chemical and water mixture to the spray gun.

The pump is left on between cycles, and the pump pressure of 75 psi overcomes the city water pressure of 50 psi causing the chemical to backflow from ACME Industry and into the supply water main. A customer at a nearby mall reports a bad taste in the water which eventually leads to the discovery of the backflow condition.

How can you prevent backflow from occurring?

Working together to protect your drinking water supply. The Bedford Regional Water Authority and all of our customers share the responsibility to help safeguard the public water supply. We are working with the Virginia Department of Health and our customers to identify potential backflow issues so that your drinking water quality is maintained at the highest possible level.

The most common cause of a cross-connection is one of the most over-looked items in the home - a garden hose. Hoses left submerged in swimming pools, landscaping ponds, or buckets or attached dispensers containing cleaning chemicals or pesticides are a cross-connection problem waiting to happen.

Per building codes, a hose-bib vacuum breaker should be attached to all outside spigots (hose-bibb vacuum breaker must be winterized). This device will help prevent a cross-connection, ensuring that your drinking water remains clean and safe.

Steps to protect your drinking water

1. Help us **identify potential locations** in our service area where backflow can occur. Mail the attached short survey or complete it online at www.brwa.com (go to Public Information/Compliance Programs).

2. If necessary, contact the Water Authority **to schedule a free assessment** with our staff to assist you in finding and removing any potential cross-connection sources.

3. **Remove any cross-connections** you find or install an approved backflow prevention device (available at hardware stores) where needed. A Water Authority representative is available to assist you with this process if needed.

4. **If you have a backflow prevention device installed by a certified plumber, have it tested annually** or after any repairs.

Need help?... Whether you found a cross-connection in your home or you aren't even sure where to start looking, we can help.

We have licensed technicians who are available to help you identify where backflow can occur on your property.

The service call is free!

Contact the Water Authority at 540-586-7679 or backflow@brwa.com