

**Charleston Water System
Water Rules and Regulations**

SECTION H

RULES AND REGULATIONS FOR CROSS-CONNECTION CONTROL

1. SYSTEM PROTECTION and CROSS-CONNECTION CONTROL

A. **Purpose.** The purpose of these Rules and Regulations are:

- (1) To protect the public potable water distribution system of CWS from the possibility of contamination or pollution by isolating within its customers' internal potable water distribution system(s), or its customers' private water system(s), such contaminants or pollutants which could backflow into the public potable water distribution system; and,
- (1) To promote the elimination or control of existing cross-connections, actual or potential, direct or indirect, between its customers' in-plant potable water system(s) and non-potable water systems, plumbing fixtures and industrial piping systems; and,
- (3) To provide for the maintenance of a continuing Program for **System Protection and Cross-Connection Control** which will systematically and effectively prevent potential contamination or pollution of the potable water distribution system.

B. **Responsibility.** CWS shall be responsible for the protection of the public potable water distribution system from contamination or pollution due to the backflow of contaminants or pollutants through the water service connection. If CWS requires, now or in the future, an approved backflow prevention assembly to protect the public water distribution system, CWS shall give notice, in writing, to the customer to install an approved backflow prevention assembly(s) at each service connection to his premises. If the assembly(s) is not installed as required by CWS, the water service will be disconnected until such assembly(s) has been properly installed. A **Backflow "ADMINISTRATIVE FEE"** will be charged once annually for **EACH** backflow prevention assembly required to be installed, tested, and maintained by CWS on all services, except residential irrigation services. This fee is as shown in Exhibit E.

2. DEFINITIONS

A. **APPROVED.** Accepted by the CWS as meeting an applicable specification stated or cited in these Rules and Regulations, or as suitable for the proposed use.

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- B. **AUXILIARY WATER SUPPLY.** Any water supply on or available to the premises other than CWS's approved public potable water supply. Auxiliary water supply may include water from another purveyor's public potable water supply or any natural source(s) such as well, spring, river, stream, harbor, etc., or "used waters" or "industrial fluids". These waters may be polluted or contaminated or they may be objectionable and constitute an unacceptable water source over which CWS does not have sanitary control. It shall be unlawful to connect any of these sources of water, directly or indirectly, to CWS's public potable water distribution system.
- C. **BACKFLOW. The reversal of the normal direction of flow of water caused by either backpressure or backsiphonage.**
- (1) **"Backpressure"** occurs when the non-potable (private) water source pressure exceeds the public potable water pressure. This can occur through a rise in the non-potable pressure, a drop in the potable pressure or a combination of both. Increases in non-potable water pressure above potable water pressure can be created by booster pumps or temperature increases (e.g., in a boiler), or head pressure caused by elevation, or thermal expansion.
 - (2) **"Backsiphonage"** occurs when the public potable water supply line pressure falls below atmospheric pressure (14.7 PSI at sea level). In this situation, atmospheric pressure is creating a greater pressure on the non-potable system side in the reverse direction than the potable water system is maintaining in the normal direction of flow, and the potable water system falls below atmospheric pressure. Decreases in the pressure of the potable water system are caused by fire fighting, a break in the water main, or water mains being shut down for maintenance.

Backpressure and Backsiphonage are best described as **"Pressure Differentials"**.

- D. **BACKFLOW PREVENTION ASSEMBLY (APPROVED)** An **in-line** testable and **in-line** repairable assembly evaluated and approved by the University of Southern California's Foundation for Cross-Connection Control and Hydraulic Research, also known as the "foundation" or as **USC-FCCC & HR.**
- (1) **AIR-GAP.** The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other vessel and the flood level rim of said receiving vessel. An approved air-gap shall be at least twice the diameter of the supply pipe, measured vertically, above the overflow rim of the vessel; and in no case, less than one inch in pipe diameter.

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- (2) ***Reduced Pressure Principle Assembly (RP)***. An assembly consisting of two (2) independently operating spring loaded check valves with a hydraulically operating, spring loaded mechanical differential pressure relief valve located between the check valves , and at the same time lower than the first check valve. The assembly shall include four (4) properly located resilient seated test cocks and full flow characteristic resilient seated shut-off valves at each end of the assembly. The entire assembly shall meet the design and performance specifications as determined by a laboratory and field evaluation program resulting in an approval by a recognized approved testing agency for backflow prevention assemblies. The assembly shall operate to maintain the pressure in the zone between the two (2) check valves at an acceptable pressure level less than the pressure on the public water supply side of the assembly. At cessation of normal flow, the pressure between the two (2) check valves shall be less than the pressure on the public water distribution supply side of the assembly. In case of leakage of either of the check valves, the differential relief valve shall operate to maintain the reduced pressure in the zone between the check valves by discharging to the atmosphere. When the differential pressure in the zone is two pounds (2 #) per square inch or less than the supply pressure, the relief valve shall open to the atmosphere. To be approved by the foundation and by CWS, these assemblies must be readily accessible for in-line maintenance and testing, and be installed horizontally, unless approved by the foundation for a vertical orientation, in a location where no part of the assembly will be submerged. Specific installation requirements are illustrated in the Cross-Connection Control Program Manual on Backflow Prevention.
- (3) ***Double Check Valve Assembly (DCVA)***. An assembly consisting of two (2) independently operating spring loaded check valves with full flow characteristic resilient seated shut-off valves on each side of the check valves, plus four (4) properly located resilient seated test cocks for the testing of each check valve. The entire assembly shall meet the design and performance specifications as determined by a laboratory and field evaluation program resulting in an approval by a recognized testing agency for backflow assemblies. To be approved by the foundation and by CWS, these assemblies must be readily accessible for in-line maintenance and testing, and be installed horizontally, unless specifically approved by the foundation for a vertical orientation. Vertical installations will be accepted only if approved by the foundation for that orientation. Specific installation requirements are illustrated in the Cross-Connection Control Program Manual on backflow prevention.

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- (4) ***Pressure Vacuum Breaker (PVB).*** An assembly approved for lawn sprinkler irrigation systems consisting of a spring loaded Air-Inlet Valve and a spring loaded check valve, with full flow characteristic resilient seated shut-off valves, one on the inlet and one on the outlet side of the PVB, plus two (2) properly located resilient seated test cocks for testing the assembly. The entire assembly shall meet the design and performance specifications as determined by a laboratory and field evaluation program resulting in an approval by the foundation. To be approved by the foundation and by CWS, these assemblies must be readily accessible for in-line maintenance and testing, and be installed vertically, in a location where no part of the assembly will be submerged. It cannot be subjected to backpressure of any kind and must be installed at least twelve (12") inches above the highest irrigation head and/or downstream piping. Chemigation or aspiration of any herbicide, pesticide, fungicide or fertilizer is not permitted for use with a PVB. Specific installation requirements are illustrated in the Cross-Connection Control Program Manual on backflow prevention.
- E. ***CERTIFIED TESTER.*** An individual person who has proven his/her competency to test backflow prevention assemblies of all types, and to prepare reports on such assemblies, as evidenced by the successful completion of a training program approved by CWS. Minimum requirements are the successful completion of the Backflow Prevention Seminar administered by SC DHEC, and an in-depth "Program Orientation" presented by CWS to explain its rules and policies to newly certified testers before being added to the "**List of Certified Backflow Prevention Assembly Testers.**" CWS Approved Testers will be listed in a "three-tiered" format identifying each tester's level of training and certification. **CWS may, at a later date, require CWS-approved testers to purchase an annual tester permit. Additionally, CWS Approved Testers are required to conform to the Tester Ethics and Code of Conduct Policy and sign the Tester Affidavit.**
- F. ***CONTAMINATION.*** An impairment of the quality of the potable water by sewage, industrial fluids or waste liquids, compounds or other materials to a degree which creates an actual health hazard to the public health through poisoning or through the spread of disease.
- G. ***CROSS-CONNECTION.*** As defined by the State Safe Drinking Water Act, " Any **actual or potential** connection, link, or structural arrangement, **direct or indirect**, between a public water supply and any other source, link, or system through which it is possible to introduce into any part of the public potable water distribution system any used water, industrial fluid, gas or substance other than the undivided potable water with which the system is supplied." This would also include any temporary connections, such as swing connections, removable sections, four-way plug valve, spool pieces, dummy section of pipe, swivel or changeover devices or multi-port tube.

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- H. **CROSS-CONNECTIONS CONTROLLED.** A water service connection between a public potable water distribution system and a non-potable water distribution 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.
- I. **SYSTEM PROTECTION-CROSS-CONNECTION CONTROL BY CONTAINMENT METHOD.** The installation of an approved backflow prevention assembly at the water service connection to any customer's premises where it is physically and economically infeasible to find and permanently eliminate or control all actual or potential cross-connections within the customer's water system; or, it shall mean the installation of an approved backflow prevention assembly on the service line leading to and supplying a portion of a customer's water system where there are actual or potential cross-connections which cannot be effectively eliminated or controlled at a point of cross-connection. System protection or cross-connection control by containment requires that there are no service lines, taps, tees, or take-offs installed between CWS's water meter and the customer's approved backflow prevention assembly.
- J. **CROSS-CONNECTION CONTROL MANUAL.** Shall be defined as the latest revision of the Commissioners' **"Cross-Connection Control Program Manual on Backflow Prevention."** A copy of the most current edition may be obtained from the CWS or refer to the *Water and Wastewater Policies, Procedures and Standards Manual*. The manual is available on Charleston CWS's Web site.
- NOTE: The Charleston Water System of the City of Charleston, SC shall not be liable for damages, losses, claims, etc. arising from the lawful discontinuance of a water service, for any reason.**
- K. **CROSS-CONNECTION COMPLIANCE INSPECTOR.** Any employee of CWS designated by the Manager to enforce the provisions of these Rules and Regulations.
- L. **CUSTOMER.** Any person who is capable of receiving water from CWS's system through the customer's water system, without the regard to whether CWS is aware of the existence of such customer. If such person does not own the customer's water system, "customer" shall also be construed to include the person who owns the customer's water system.

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- M. **HAZARD, DEGREE OF.** The term is derived from an evaluation of the potential risk to public health and the adverse effect of the hazard upon the public potable water distribution system.
- (1) **Hazard, Health.** An actual or potential threat to the water supply system and its operation which could create, or in the judgment of CWS, may create a danger to the health and well-being of the water consumer. An example of a health hazard is an actual or potential hazard to the public health through poisoning or through the spread of disease or other hazardous contamination.
 - (2) **Hazard, Plumbing.** A plumbing cross-connection in a consumer's potable water system that has not been properly protected by an approved backflow prevention assembly; in violation of plumbing codes.
 - (3) **Hazard, Non-Health.** An actual or potential threat to the physical properties of the water system or to the potability of the public or the consumer's potable water system, but which would constitute a nuisance or be aesthetically objectionable or could cause damage to the system or its appurtenances, but would not be dangerous to health.
 - (4) **Hazard, Lethal.** An actual or potential threat of severe damage to the physical properties of the public potable water distribution system, or the consumer's potable water system, or a contamination which would have a protracted effect on the quality of the potable water in the system.
- N. **INDUSTRIAL FLUIDS SYSTEM.** Any system containing a fluid or solution which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration such as would constitute a health, system, pollutional or plumbing hazard if introduced into an approved water supply. This may include, but not be limited to: polluted or contaminated waters; all types of process waters and "used waters" originating from the public potable water system which may have deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalies, circulated cooling waters 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 from wells, springs, streams, rivers, bays, harbors, seas, irrigation canals or systems, etc.; oils, gases, glycerin, paraffin's, caustic and acid solutions and other liquid and gaseous fluids used in industrial or other purposes or for fire-fighting purposes.
- O. **NOTICES.** Letters mailed depicting requirements for compliance.
- (1) **General Notice.** Letter mailed to existing accounts with no backflow prevention assembly installed.

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- (2) **Internal Inspection.** Letter mailed to existing accounts that CWS has conducted an internal inspection to determine the type of backflow prevention assembly to install.
 - (3) **Annual Test.** Letter mailed to existing accounts with backflow prevention assembly installed and are required to perform yearly backflow prevention assembly test.
 - (4) **Periodic Test.** Letter mailed to existing accounts with backflow prevention assembly installed and malfunctions after annual test has been performed.
 - (5) **Repair Notice.** Letter mailed to customer whose backflow preventer assembly failed its annual test, or has been installed incorrectly.
- P. **PLUMBING CODE.** The latest adopted version of the International Plumbing Code.
- Q. **POLLUTION.** The presence of any foreign substance (organic, inorganic, or biological) in water which tends to degrade its quality so as to constitute a non-health hazard or impair the usefulness or quality of the water to a degree which does not create an actual health hazard to the public health but does adversely and unreasonably affect such waters for domestic use.
- R. **WATER, POTABLE.** Any water according to recognized standards which is safe for human consumption.
- S. **WATER, NON-POTABLE.** Water which is not safe for human consumption or which is of questionable potability.
- T. **WATER PURVEYOR.** The term water purveyor shall mean the owner or operator of the public potable water distribution system supplying an approved water supply to the public. The utility shall be one that is operating under a valid permit from the South Carolina Department of Health and Environmental Control.
- U. **WATER, SERVICE CONNECTIONS.** The terminal end of a service connection from the public potable water distribution system, i.e., where CWS loses jurisdiction and sanitary control over the water at its point of delivery to the customer's water system at the outlet of the water meter. If a meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the meter. There should be no unprotected take-offs from the service line ahead of any meter or backflow prevention assembly located at the point of delivery to the customer's water system. Service connection shall also include water service connection from a fire hydrant and all other temporary or emergency water service connections from the public potable water system.

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- V. **WATER, USED.** Any water supplied by a Water Purveyor from a public potable water distribution system to a consumer's water system after it has passed through the point of delivery and is no longer under the sanitary control of the Water Purveyor.

- W. **THE WATER SYSTEM** shall be considered as made up of two parts: CWS's and the Customer's System.

- X. **THE UTILITY SYSTEM** shall consist of the source facilities and the distribution system; and shall include all those facilities of the water system under the complete control of the utility, up to the point where the customer's system begins.

- Y. **THE SOURCE** shall include all components of the facilities utilized in the production, treatment, storage, and delivery of potable water to the distribution system.

- Z. **THE DISTRIBUTION SYSTEM** shall include the network of conduits used for the delivery of water from the source to the customer's system.

- AA. **THE CUSTOMER'S SYSTEM** shall include those parts of the facilities beyond the termination of the utility distribution system which are utilized in conveying utility-delivered domestic water to points of use.

3. REQUIREMENTS

- A. No water service connection to any premises shall be installed or maintained by CWS unless the water supply is protected as required by Federal and State Laws and Regulations, and CWS's Cross-Connection Control Program Manual, the Environmental Protection Agency's Safe Drinking Water Act (1996), the SC DHEC Safe Drinking Water Act, Sect.44-55-40d, and the SC Primary Drinking Water Regulations, Sect. R.61-58.7 (F). Service of water to any premises that is required to have a backflow prevention assembly shall be discontinued by CWS if an approved backflow prevention assembly is not installed, tested and maintained per the Cross-Connection Control Manual, or if it is found that a backflow prevention assembly has been removed or bypassed, or if an unprotected cross-connection exists within the premises. Service will not be restored until such conditions or defects are corrected in conformance with the Cross-Connection Control Manual. This Manual is written and intended to provide the day-to-day operational provisions, rules, policies, illustrations, and installation guidelines for CWS's Cross-Connection Control Program for System Protection.

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- B. The customer's system will be open for inspection at all reasonable times to CWS's **CROSS-CONNECTION COMPLIANCE INSPECTORS** to determine whether cross-connections or other structural or sanitary hazards, including violations of these regulations, exist. When such a condition becomes known, CWS may deny or immediately discontinue service to the premises by providing for a physical break in the service line until the customer has corrected the deficiency in compliance with the Cross-Connection Control Program Manual. Should an inspection of the premise be refused, CWS will install, at the customer's expense, a reduced pressure principle backflow prevention assembly behind CWS's water meter. CWS will bill the customer the cost of all labor and materials.
- C. When required, an approved backflow prevention assembly shall also be installed on each service line to a customer's water system at or near the property line or immediately inside the building being served; but in all cases, before the first branch line leading off the service line.
- (1) Each backflow prevention assembly required by CWS must be installed in accordance with the installation requirements and provisions of the Cross-Connection Control Program Manual.
 - (2) Each backflow prevention assembly required by the Cross-Connection Control Program Manual must be functioning properly when installed. Each assembly must be tested after it is placed in service, after repairs of any type, and at least once annually, required by the Cross-Connection Control Program Manual. All Field Testing and Maintenance Reports for backflow prevention assemblies are entered into cross-connection control permanent database files. Reports received Monday thru Friday will be entered into their respective backflow accounts and Information Services Department will **(VIA RANDOM COMPUTER SELECTION)** list 10% of tests for a follow-up test. CWS System Protection personnel will perform these random tests during the following week at no cost to the customer. Example: A DHEC certified tester performs a test on a backflow prevention assembly on Monday, November 2nd. The latest date a CWS follow-up test can be made will be on Friday, November 13th. The earliest a CWS follow-up test would be Monday, November 9th. The test reports are entered the day they are received at CWS. Should a tester perform the required test and for some reason fails to send the test report to CWS for several weeks, the interval between the test and CWS's random test could be considerably longer. CWS System Protection personnel will log and date test results when they are received by CWS, **NOT** when they are tested.

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- (3) All backflow prevention assemblies installed on a new water service in a customer's water system must be tested within ten (10) days as outlined in the Cross-Connection Control Program Manual. Failure or refusal to comply with the requirements of the Cross-Connection Control Program Manual may result in discontinuance of water service.
- (4) If a customer does not wish for water service to be interrupted when a backflow prevention assembly is tested, repaired, or replaced, a parallel installation of an approved backflow prevention assembly may be made in accordance with the provisions of the Cross-Connection Control Program Manual.
- (5) Each backflow prevention assembly required by the Cross-Connection Control Program Manual must be foundation approved and installed in a manner that would make them **readily accessible** for in-line testing and in-line maintenance/repair. A partial list of approved backflow prevention assemblies is listed in the Cross-Connection Control Program Manual and is available to the general public. The 46-page complete list of approved assemblies is available in CWS's Cross-Connection Control Department and with the Department Secretary.
- (6) When a backflow prevention assembly is required to be installed, tested or repaired in a customer's water system, the customer will be notified of the requirement, in writing, by CWS. Each notice will have the following time period associated:

General Notice	30 days
Survey Notice:	30 days or (as deemed necessary by the Cross-Connection Manager or his designee)
Annual Test	30 days
Periodic Test	Depends on degree of hazard
Repair Notice	30 days

Notwithstanding the foregoing, CWS may require the installation of the required backflow prevention assembly immediately or within a shorter time period than specified above or in the Cross-Connection Control Program Manual in order to protect the public water system from hazards.

- (7) It is a violation of these rules for any person to submit or fail to submit **any record** to CWS which is required by these Rules and Regulations or the Cross-Connection Control Program Manual which is false or incomplete.

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- D. An approved backflow prevention assembly shall be installed on each service line as stipulated in the Cross-Connection Control Program Manual and/or manual of Cross-Connection Control by USC-FCCC & HR latest edition, and/or AWWA Manual M-14 latest edition. Although not all commercial or industrial services are required to install, test or maintain a backflow prevention assembly, **those services identified as not conforming to the latest plumbing code specifications may be required, for that reason only, to install and maintain an approved backflow prevention assembly until the provisions of the plumbing code are adhered to.**

In the case of premises having (1) internal cross-connection that cannot be permanently corrected and controlled, or (2) intricate plumbing and piping arrangements or where entry to all portions of the premises is not readily accessible for inspection purposes, making it impracticable or impossible to ascertain whether or not dangerous cross-connections exist, the public water system shall be protected against backflow from the premises by installing a backflow prevention assembly in the service line, appropriate to the degree of hazard behind the meter or service connection. If the **CONTAINMENT BACKFLOW PREVENTION ASSEMBLY** is not of a classification for the actual or potential degree of hazard for an "internal" or "isolation" cross-connection, CWS will require an internal or isolation backflow prevention assembly meeting that actual or potential degree of hazard to be installed, tested, and maintained within the customer's premises. Although this assembly would normally be considered an "**isolation/internal**" assembly, CWS will treat this assembly as a "**containment assembly.**" This shall apply to all known or existing services as well as those **services found during an internal survey inspection or other investigations by CWS.**

- E. The class of backflow prevention assembly required by Section D above shall depend upon the actual or potential degree of hazard, not the service class or sub-class. In the case where CWS determines that a customer's water system constitutes an imminent hazard without the appropriate backflow prevention assembly, water service may be terminated immediately. **CWS reserves the right to determine the actual or potential degree of hazard on all service connections.**

Degree of Hazard is classified as "**Non-Health Hazard**", "**Health Hazard**", and "**Lethal Hazard**".

Examples of "**Non-Health Hazards**" include but are not limited to the following: Heating equipment, hose bibs, carbonated drink machines, washing equipment, shampoo basins, auto dealerships and car lots (new/used), fire protection sprinkler system without antifreeze injection or aspiration of chemicals, pressure washers without aspiration, and restaurants.

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Examples of "**Health Hazards**" include but are not limited to the following: Hospitals, nursing homes, laboratories, petroleum processing facilities, commercial laundries/dry cleaners, plating and chemical plants, waterfront-marinas, docks and docking facilities, film laboratories, car wash and reclaimed water systems, connection to or make-up feed water to agriculture-livestock, farm or barn animal watering troughs (manual or automatic), boilers, condensers, cooling towers, saltwater cooling systems, lawn sprinkler irrigation systems, and industrial fluid systems.

Examples of "**Lethal Hazards**" include sewage treatment plants, sewer lift stations, radioactive material or substances, sanitary sewer trap primers, plants or facilities handling.

A comprehensive list of Cross-Connections and Degree of Hazard is illustrated in Chapters (4) and (5) of AWWA Manual M-14, and Sections (5) and (7) of the USC-FCCC and HR Manual of Cross-Connection Control.

- F. Any backflow prevention assembly required herein shall be of a model and size listed in the Cross-Connection Control Program Manual and shall be manufactured in compliance with the standards established by the American Water Works Association entitled:

AWWA C506-84 Standards for Reduced Pressure Principle Backflow Prevention Assemblies; Double Check Valve Assemblies; and Pressure Vacuum Breakers.

- G. The water service will not be activated until CWS has been provided with information necessary to determine any actual or potential degree of hazard associated with the customer's water system, and a determination has been made of the appropriate backflow prevention assembly which must be installed.
- H. No person may modify or permit to be modified a customer's water system in a manner which could affect the degree of hazard of such system, until CWS has been provided information necessary to determine the actual or potential degree of hazard and the appropriate backflow prevention assembly associated with the modifications. If a different backflow prevention assembly is required, it must be installed in accordance with provisions of the Cross-Connection Control Program Manual.
- I. A customer must immediately notify CWS if the customer's water system is contaminated or polluted or has a reason to believe that backflow has occurred from the customer's water system to the public water distribution system.

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- J. A written notice of violation will be given to any person who is found to be in violation of any provision of these Rules and Regulations and/or the Cross-Connection Control Program Manual. The notice will set forth the violation and time period to be corrected. The violation must be corrected within a reasonable time, not to exceed thirty (30) days from receipt of the notice. If CWS determines that the violation is occurring on a customer's water system and has created or contributed to a system hazard, the customer will be required to correct the violation immediately. Water service will be discontinued if the customer, after notification by CWS, fails in a timely manner to correct a violation.
- K. An administrative appeal may be requested whenever a violation or dispute of any of the requirements of these Rules and Regulations and/or the Cross-Connection Control Program Manual is determined, whether during construction or at the plan review stage, and the person wishes to appeal the decision of CWS staff. The first level of appeal will be made to the Cross-Connection Control Hearing Committee. All appeals must be in writing and will be heard within seven (7) days of receipt of the appeal by CWS. The Hearing Committee shall consist of the Cross-Connection Manager, Cross-Connection Compliance Inspector, and the Director of Engineering. Additional specialists or technical persons may be added for a particular appeal, at the discretion of the Capital Projects Officer or the Chief Executive Officer. Those customers who do not accept the decision of the Hearing Committee may appeal the Committee's decision to the CWS Board of Commissioners.
- L. All presently installed backflow prevention assemblies which do not meet the requirements of this section, but were approved or accepted at the time of installation, and which have been properly tested and maintained, shall be "Grandfathered" and accepted per these Rules and Regulations and/or the Cross-Connection Control Program Manual so long as CWS is assured that they will adequately protect the water distribution system. Whenever an existing assembly malfunctions, or fails to pass the prescribed annual, periodic, or random test, and that assembly is replaced, it must be replaced in a manner consistent with the Cross-Connection Control Program Manual and the most current version of the approved plumbing codes. Whenever the existing assembly is moved from the present location or requires more than minimum maintenance, or when CWS finds that the assembly for whatever reason no longer ensures adequate protection for the actual or potential degree of hazard present, the unit shall be replaced by a backflow prevention assembly meeting the requirements of the Cross-Connection Control Program Manual and/or these Rules and Regulations.

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- M. In order to be on CWS's **List of Certified Backflow Prevention Assembly Testers**, the individual tester must have successfully completed the tester certification requirements administered by the South Carolina Department of Health and Environmental Control and meet the requirements of Section H of this document, and the Cross-Connection Control Program Manual. Testers must also conform to CWS's Tester Ethics and Code of Conduct Policy, CC-023.

CWS shall have the absolute right to remove any certified tester found *falsifying records, making unauthorized repairs to a backflow prevention assembly, failing to demonstrate proper test procedures, or demonstrating a lack of knowledge and/or professionalism in testing, repairing, installing, and maintaining backflow prevention assemblies within CWS's distribution system.* Any certified tester habitually failing to comply with CWS's Cross-Connection Control Program Manual will also be removed from the list of certified testers. The SC DHEC Cross-Connection Control Program Manager will also be notified, in writing, of any tester CWS removes from this list.

- N. ***Thermal Expansion.*** There are several regulatory agencies, both state and federal, that require Charleston CWS to maintain a viable Cross-Connection Control Program. Backflow can occur from all industrial, commercial, irrigation, governmental, or residential water service connections. Since 1970, CWS has had in place, in one form or another, a Cross-Connection Control Program with backflow prevention assemblies installed on numerous service connections. In 1985, CWS began installing a residential dual check valve with every 3/4" and 1" water services. These practices continue today in an effort to prevent backflow from entering the public water distribution system.

Most water customers utilize heated water in their plumbing system within their business or home. When water is heated its physical characteristics change and it expands. This expanded water needs to occupy more space as it is heated. Before backflow prevention assemblies or residential dual check valves were installed on service lines, this expanded water was forced (backpressure) from the business or home and into CWS's water distribution system—a condition all plumbing codes and all regulatory agencies prohibit. This plumbing system is known as an **“open system.”** This phenomenon is no longer possible where a backflow prevention assembly, a residential dual check valve, or a Pressure Reducing Valve (PRV) is present. This type of plumbing system is known as a **“closed system.”** The condition of heated water expanding in a closed system is called **THERMAL EXPANSION.** Normally, thermal expansion will cause the water heater's Temperature and Pressure relief valve (T & P valve) to discharge excessive water pressure, usually at or above 150 PSI. Additionally, this pressure increase could cause damage to the internal plumbing fixtures (toilet ball cocks, kitchen faucets, and washing machine hoses).

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The three most popular methods of eliminating the effects of thermal expansion are:

- (1) Installing a Bladder-Type Thermal Expansion Tank
- (2) Installing a special Ball Cock in the water closet
- (3) Installing a Thermal Expansion Relief Valve.

CWS suggests you discuss these alternatives with a licensed master plumber. These methods may also be “do-it-yourself” projects if you choose. Current Plumbing Codes require installation of devices to relieve thermal expansion in **“closed-plumbing systems.”** **If the Thermal Expansion Relief Valve is selected, the factory setting for the relief valve opening point should be 85 PSI or less.**

CWS will make its best effort to continue to provide safe potable drinking water to all customers. Backflow prevention assemblies and residential dual-check valves are a necessary means to protect CWS’s water distribution system.

- O. ***Tester Practices and Code Of Conduct:*** As per our *Water Rules and Regulations*, Section H, of the Charleston Water System, located in the City of Charleston, has established a Cross-Connection Control Program for the benefit of its customers. The program is maintained to assure CWS exercises its responsibility to deliver safe drinking water to these customers. This program requires certain customers to install backflow prevention assemblies that need testing on a regular basis when notified by CWS. The CWS requires anyone wishing to test these backflow prevention assemblies for our water users within our jurisdiction to maintain as a minimum, a SC Department of Health and Environmental Control tester certification. In addition, CWS will require adherence to all Cross-Connection Control Program Rules and Policies, which are maintained and available for downloading at www.charlestonwater.com and included here by reference. In addition to the Cross-Connection Control Program Rules and Policies, CWS will now require all CWS-Approved Testers to adhere to the following Tester Practices and Code of Conduct. If a tester is found out of compliance with any Cross-Connection Control Program Rules, Policies or these Tester Practices they may be denied inclusion on the CWS List of Certified Testers and, as a result, any submitted test reports would not be recognized or accepted. CWS’s Tester Practices and Code of Conduct are as given below:

1. The CWS-Approved Tester shall only record data and sign test forms of assemblies they have tested. A tester shall not falsify any data or results obtained from the field-test and reported on the Field Test and Maintenance Form. All data shall be legibly submitted.

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2. The CWS-Approved Tester shall not make any **UNNECESSARY** repairs and or replacement of parts or assemblies.
3. When backflow prevention assembly repairs are necessary, the CWS-Approved Tester shall only utilize original factory repair parts as manufactured for the assembly.
4. The CWS-Approved Tester shall not circumvent the installed backflow prevention equipment by removal or alteration of the assembly or any of its components. In extreme cases such as severe freeze damage and when no immediate replacement is available, this **MAY** be allowable if approval by CWS is granted, and will be determined on a case-by-case basis.
5. The CWS-Approved Tester shall perform only CWS-Specified Field Test Procedures on a backflow prevention assembly. A copy of the test procedures and needed equipment are available on the CWS web site. When testing an assembly the tester shall assure all components and accessories of the assembly are present for field-testing. Any discrepancies shall be listed in the comments section of the Field Testing and Maintenance Report.
6. The CWS-Approved Tester shall submit the appropriate **Passing or Failing** Field Testing and Maintenance Report to CWS within seven (7) calendar days of performing the field test. If a test report is received after this time period, the test will not be accepted and the tester will be required to re-test the assembly in question at their own expense and submit the test form within seven (7) days of the subsequent field test. The tester shall provide a copy of the completed Field Testing and Maintenance Report to the water user upon completion of the field test procedures.
7. The CWS-Approved Tester shall only test backflow prevention assemblies with a properly working test kit. The tester shall only use equipment that is in proper working order and within factory accuracy specifications. This test kit shall be checked for accuracy at least once a year or when in need of calibration. A copy of the annual calibration report and any subsequent reports of each test kit shall be submitted to CWS for our records. Field Test and Maintenance Reports submitted using differential pressure gauges that have not been checked for accuracy within one (1) year or are out of factory accuracy specifications, will not be accepted by CWS and will be returned to the tester.

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8. The CWS-Approved Tester shall confirm **ALL DATA** (make, model, size, serial number, meter number, etc.) on the Field Testing and Maintenance Form is correct for the assembly being tested.
9. The CWS-Approved Tester shall observe existing installations of backflow prevention assemblies to assure the assembly is the correct type of protection for the degree of hazard present and properly installed as per CWS installation requirements. If the assembly is not the correct type of protection, or installation requirements are not proper, the tester shall proceed with the field test and note the discrepancy on the Field Test and Maintenance Report.
10. The CWS-Approved Tester shall comply with CWS Cross-Connection Control Officials in the exercise of their duties as covered by the rules and practices. The tester shall supply any requested information and or appear on the site of the assembly when requested.
11. The CWS-Approved Tester has neither the responsibility nor the authority to represent or enforce CWS's Cross-Connection Control program. Enforcement lies solely with CWS and its appointed officials.
12. All new installations and or change outs of existing backflow prevention assemblies shall be installed in conformance to CWS's Cross-Connection Control Program Manual.
13. The CWS-Approved Tester **MAY NOT** withhold submission of the Field Testing and Maintenance Report to CWS until payment is made by the customer to the Tester. While it is understood that some customers are late in making payment for Tester services, or in the past have refused to make payment, the Small Claims Court is the appropriate avenue to pursue compensation. Testers failing to submit test results based on these circumstances **will be subject to removal from CWS's List of Approved Testers.** Once you have performed the test, you are **REQUIRED** to submit your passing or failing Field Testing and Maintenance Report to the Administrative Authority within the prescribed time period and without exception.
14. All CWS-Approved Testers desiring to remain on our List of Approved Testers **SHALL** participate in the Recertification process at **CWS's Recertification Site ONLY** at least once every three years – **NO EXCEPTIONS.** Additionally, CWS-Approved Testers will

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have their test equipment examined at least once every three (3) years (differential pressure gage with calibration certificate, short tube, vertical sight tube, and compensating tee/bleed valve) to ensure the equipment meets industry, SC-DHEC and CWS standards, rules and policies.

Any CWS-Approved Tester failing to comply with CWS's Tester Practices & Code of Conduct and all Cross-Connection Control Program Rules and Policies, shall be subjected to loss of recognition of Test Reports and removed from the list of testers within CWS's area of authority. CWS will establish a notice system of non-compliance to Tester Practices & Code of Conduct and Cross-Connection Control Rules and Policies that shall operate as follows:

FIRST OFFENSE – Verbal warning and consultation with a CWS Compliance Inspector or Cross-Connection Manager.

SECOND OFFENSE – Written Warning and/or Suspension of testing privileges for up to thirty (30) days within the Charleston CWS distribution system, depending on the frequency and severity of the offense.

THIRD OFFENSE – Revocation of testing privileges within the Charleston CWS distribution system.

CWS's Required Field Test Procedures, Program Ordinance, Program Manual, Field Testing and Maintenance Report, Clarification Statements and other related documents are available for downloading in Adobe Acrobat Reader format at <http://www.charlestonwater.com/>. Go to the link entitled "Developers/Contractors" for the link to the Cross-Connection page. **PERIODIC UPDATES ARE MADE TO OUR WEB SITE AND IT SHALL BE THE RESPONSIBILITY OF ALL CWS-APPROVED TESTERS TO VISIT OUR WEB SITE AND ENSURE THEY HAVE THE MOST CURRENT MATERIAL OR DOCUMENTS.**

A copy of the Clarification Statement is included with this Policy.

THE CHARLESTON WATER SYSTEM

Dale Strong _____
CWS Cross-Connection Manager

Kin Hill, P.E. _____
CWS Chief Executive Officer

CC-023 Tester Ethics and Code of Conduct-Rev 6-5-2007.doc

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Tester Affidavit: Please complete all information and return this page to CWS within ten (10) days.

I hereby certify that I have thoroughly read and understand the above verbiage and agree to fully conform to the provisions of this CWS Backflow Prevention Assembly Tester Practices and Code of Conduct Policy.

PLEASE PRINT LEGIBLY:

Tester Name _____ DHEC Certification Number _____

Company Name _____

Company Address _____

City _____ State _____ Zip Code _____

Home Address _____

City _____ State _____ Zip Code _____

Home Telephone _____ Work Telephone _____

Fax Number _____ Pager _____ Cell Phone _____

Signature: _____ Date _____

Email Address: _____

**This document will be maintained and archived by CWS. Failure to return this affidavit portion will be construed as a CWS-Approved Tester's unwillingness to conform to these provisions. Accordingly, that Tester's name will be removed from our List of Approved Testers.

Received by CWS Inspector _____ Date _____

CC-023 Tester Ethics and Code of Conduct-Rev 6-5-2007.doc

Environmental Management System - Standard Operating Instruction

Purpose/Scope: This form is used to prepare Standard Operating Instructions (SOIs) for use by associates who perform operational control and maintenance management tasks where EMS requirements are in place. The department head (or designee) is responsible for the approval, revision, and issuance of SOIs and ensuring that associates have the necessary training to perform the job.

Instructions: Complete each section below prior to placing new or modified monitoring or control equipment in service. The department head (or designee) shall ensure the maintenance documents are available and controlled at all appropriate locations. Note: This form may be replicated on a computer or duplicated on a photocopier. The computer copy must look similar to this document and contain the same information.

Prepared by: Dale Strong, CPM

Approved by: S/ Kin Hill, CEO **Date:** 5-31-07
(Signature on file)

Title: Standard Operating Instructions (SOI) for Contractors (Fire, General, Lawn-Landscape-Irrigation), Plumbers and Testers to notify Charleston Water System (CWS) of ALL Installed/Replaced/Relocated Backflow Prevention Assemblies.

1. **Purpose:** Step-by-step instructions for ALL Contractors, Plumbers and Testers to notify CWS when backflow prevention assemblies are installed, replaced or re-located. Such procedures are detailed in **Cross-Connection Control Program Manual on Backflow Prevention, Water Rules and Regulations-Section H (including EXHIBIT N Penalties, Page 47 of Section H)**.
2. **Scope:** This SOI applies to timely and proper notification protocol.
3. **Responsibility and Authority:** Contractors, Plumbers, Testers and all other parties involved in the installation and or testing of backflow prevention assemblies are required to conform with and follow the detailed procedures for installation and notification of any backflow prevention assembly within the CWS water service area. Documents referenced above in Step 1 are Board-Approved and represent a legal Ordinance.
4. **Work Preparation:**

4.1 Labor:	4.2 Equipment:	4.3 Materials: CCC Program Manual; Water Rules & Regulations-Section H (including Exhibit K); Notification Protocol Document
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5. **Work Steps:** CWS reserves the right to determine the actual or potential degree of hazard (health, non-health or lethal hazards) and the type of backflow protection required to be installed and maintained. Typically, health hazards require an approved Reduced Pressure Principle backflow prevention assembly (RP) and non-health hazards require an approved Double Check Valve Assembly (DCVA). Lethal hazards require a physical AIR-GAP separation or an approved RP assembly. Lawn irrigation sprinkler systems (residential or commercial) require an approved RP or Pressure Vacuum Breaker (PVB) assembly.
- 5.1 All backflow prevention assemblies to be installed in the CWS service area shall be approved by the USC-Foundation. All required installations shall be completed in such a manner as to allow for easy access for maintenance and testing. It is recommended that prior to selecting an assembly for installation, the Contractor should contact CWS to verify if a particular make, model and size of assembly is approved for installation in the CWS system. Additionally, it is the Contractor's responsibility to verify if a potential assembly has been approved by CWS for a vertical orientation.
- 5.2 All backflow prevention assembly installations must be completed before the water service is activated. The installer – **NOT THE CUSTOMER** – is required to notify CWS when an assembly has been installed, re-located or replaced. The installer shall make this notification within two (2) working days and such notification shall include the make, model, size, serial number, water meter number and location of the assembly. **THIS NOTIFICATION MUST BE MADE REGARDLESS OF THE EXISTENCE OF THE PERMANENT SERVICE TAP.** In the event where installation discrepancies are discovered, it is the responsibility of the Developer to schedule ample time for discrepancies to be corrected before seeking a Certification of Occupancy or scheduling the opening of a business. The installer shall notify CWS of all new installations, regardless of whether or not a meter vault has been installed. State DHEC Primary Drinking Water Regulations require that all assemblies must be tested when placed in service, after repairs of any kind are made to the assembly, and at least once annually. Completed Field Testing and Maintenance Reports shall be received by CWS no later than seven (7) days from the date of the field test. Test reports older than seven (7) days will not be entered for account compliance and the tester must re-test the assembly at their own cost.
- 5.3 To ensure a rigid and stable installation, 2-feet of copper, brass, bronze, ductile iron or stainless steel pipe is required in the inlet and outlet side of the assembly. In the case of aboveground **INTERIOR ONLY** installations, as long as the piping material is not exposed to direct sunlight, PVC/CPVC may be used as long as it is braced securely with wall or floor brackets at the inlet and outlet sides of the shutoff valves. **Under no circumstances shall black steel or galvanized steel pipe be used between the CWS water meter and the inlet side of any backflow prevention assembly-NO EXCEPTIONS.** Detector-type assemblies (DCDA or RPDA) are neither recognized nor approved for use within the CWS distribution system.

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6. Non-Conformance:

- 6.1** This SOI provides specific conformance requirements to several CWS policies, documents and ordinances. When it is found and documented that any party installing, replacing or relocating backflow prevention assemblies fails to follow these procedures, they will be notified, in writing, of said discrepancies and informed of how to resolve the discrepancies. A copy of this written notice will be archived for future reference.
- 6.2** A second or any subsequent non-conformance to this SOI **MAY** result in a civil penalty of up to two thousand dollars (\$2,000.00) per incident, per day. If the individual or company is on CWS Approved Contractors List or the Tester is listed on CWS Approved List of Testers, they will be removed from those CWS approved lists.

7. Related Documents:

- 7.1** Cross-Connection Control Program Manual on Backflow Prevention
- 7.2** Water Rules and Regulations, Section H, including Exhibit “N”
- 7.3** Notification Protocol Document

All relative documents can be accessed, downloaded and printed from our web site found at www.charlestonwater.com/dev_contract_document_index.htm

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April 4, 2007

Proper protocol for the installation, identification and notifying Administrative Authority of new/change out Backflow Prevention Assemblies (excerpts from CWS CCC Manual on Backflow Prevention, rev. 9-2005).

- The Charleston Water System (CWS) implemented a Cross-Connection Control Program in 1970. This program was established to protect the CWS potable water system from contamination of backflow. Depending on the degree of hazard, selected commercial, all irrigation (with an in-ground sprinkler system or soaker hoses), and all fire sprinkler customers will be required to install, test, and maintain a Backflow Prevention Assembly on their water service.
- Backflow Prevention Assembly installations must meet requirements specified by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USCFCCC & HR), South Carolina Department of Health and Environmental Control (SC-DHEC), International Codes Council (ICC) (International Plumbing Code Current Version), and CWS.

We strongly recommend contacting one of CWS's Cross-Connection Control Department Associates: Dale Strong, Cross-Connection Manager; Randy Hunt, Cross-Connection Compliance Inspector; Don Sondles, Cross-Connection Compliance Inspector; or the Administrative Secretary to verify a particular assembly is approved for use before its purchase and installation.

In response to the changes in water safety regulations and industry technology, CWS Cross-Connection Control Department requirements are subject to change. These requirements are updated periodically and it is the owners' responsibility to possess the most current revision of these requirements.

- **Have an approved Backflow Prevention Assembly** installed to meet all CWS requirements. Installation must be completed prior to water service being activated.

Installer (NOT CUSTOMER) notifies a CWS Cross-Connection Control Associate of the installation of a Backflow Prevention Assembly and schedules an inspection by calling 727-6980, 727-7105, 727-7148, or 727-6981. **Installer shall make notification within two (2) days and shall include the water meter number, make, model, size, serial number, and physical location of the Backflow Prevention Assembly installed. THIS NOTIFICATION MUST BE MADE REGARDLESS OF THE EXISTENCE OF THE PERMANENT SERVICE TAP OR NOT.**

If repairs or discrepancies are noted, have the installer make any necessary repairs or corrections to the Backflow Prevention Assembly to meet all CWS requirements and call for a repeat inspection within 48 hours.

CWS will turn on the water service only if the Backflow Prevention Assembly meets all requirements. If the assembly does **not** meet requirements, corrections must be made **prior** to CWS activating the water service.

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- **BACKFLOW PREVENTION ASSEMBLIES INSTALLATION REQUIREMENTS**

Not all commercial services will be required to install a Backflow Prevention Assembly. It is recommended, however, that the plumbing contractor leave approximately two (2') feet of copper or cement-lined ductile iron pipe exposed from the wall or floor, twelve (12") inches to thirty-six (36") inches in height, prior to any water connections. This will provide an area to install a Backflow Prevention Assembly should the customer's water use change, and CWS requires a Backflow Prevention Assembly in the future. **Installations in a ceiling, or difficult to access spaces, will not be approved.**

Only copper, bronze, CL-900, stainless steel or cement-lined ductile iron pipe is acceptable for Backflow Prevention Assemblies piping installation. **The use of black iron/black steel pipe, galvanized steel pipe in the upstream piping of any Backflow Prevention Assembly is a plumbing code violation or CWS piping violation, and will not be accepted.**

Backflow Prevention Assemblies must be rigid and stable to provide maximum longevity and safety during testing, maintenance, and inspection. Appropriate thrust restraint measures, mechanical supports, and concrete slab dimensions are to be determined by the owner/installer to provide rigid and stable support. CWS reserves the right to require appropriate support and restraint measures as needed on a case-by-case basis.

A minimum of two (2') feet of copper, bronze, or cement-lined ductile iron pipe must be extended on inlet and outlet sides of Backflow Prevention Assemblies for rigid stability (see pages 26, 27, 28, 29, and 30) and related Clarification Statement on page 33.

The Pressure Vacuum Breaker must be installed vertically, and at least 12" higher than the highest downstream irrigation head, hose bib or piping. See page 30 for detailed installation diagram.

- All Backflow Prevention Assemblies used within CWS's service area must be approved by the University of Southern California (USC) Foundation. If in doubt whether a particular assembly is approved, please call before ordering or installing the assembly. All assemblies larger than two-inches (2") are required to be installed **ABOVE GROUND**. Assemblies two-inch (2") and smaller may be installed below ground in an appropriate sized enclosure, with adequate clearance on all sides of the assembly. See the illustration in CWS's Manual. **CWS SERIOUSLY ENCOURAGES FREEZE-PROTECTION FOR ALL ASSEMBLIES.** There are several ways to protect against freezing: insulated enclosures, freeze-protection valves and flexible, padded wraps.
- All lawn irrigation sprinkler systems (commercial and residential) are required to have an approved RP or PVB Backflow Prevention Assembly only – **NO EXCEPTIONS**. If the irrigation system utilizes a booster pump, has the ability to introduce or aspirate fertilizer, herbicides or pesticides, an approved RP is required. **CWS RESERVES THE RIGHT TO DETERMINE WHICH TYPE OF ASSEMBLY (RP OR PVB) FOR ALL IRRIGATION SPRINKLER SYSTEMS.** If the system is water-only without pumps or induction/aspiration, an approved Pressure Vacuum Breaker (PVB) is required. The PVB must be installed so that the critical level is at least twelve inches (12") above all downstream irrigation piping. If a RP is used, its **RELIEF VALVE VENT** must be at least twelve inches (12") above the finished grade.

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- All Backflow Prevention Assemblies must be tested by a CWS-Approved Certified tester immediately after installation and/or being placed in service, after repairs of any kind are made to the assembly and a minimum of once annually. This specifically applies to any commercial and residential lawn sprinkler irrigation Backflow Prevention Assemblies. CWS reserves the right to require more frequent testing, depending upon the degree of hazard.
- All Backflow Prevention Assembly installers must notify CWS's Cross-Connection Control Department, by telephone, whenever they change-out a Backflow Prevention Assembly. **This notification must be made by the individual performing the change-out within two (2) days and shall include the make, model, size, serial number and physical location of the new Backflow Prevention Assembly. IT MUST ALSO BE TESTED AFTER THE CHANGE-OUT.** CWS Cross-Connection Control Department Personnel will then inspect the change-out for conformance and to record/verify the Backflow Prevention Assembly make, model, size, serial number and physical location. **CWS will make an inspection within two (2) days.** All new and change-out inspections are digitally photographed by CWS and archived for account database verification purposes. ****Permission to downgrade an assembly must be obtained from a CWS Cross-Connection Control Department Associate before work can be done.**

Clarification On The Two-Foot Copper Requirement

(Cross-Connection Control Program Manual Chapter II, 2.1.6 and 2.1.7 — page 5)

There has been much debate on exactly what is meant by the Program Manual's Specification of having two-feet (2') of copper pipe on the inlet and outlet side of a Backflow Prevention Assembly. In order to clarify any misconception or misunderstanding regarding this requirement, the following information should be considered:

The 2-foot requirement was implemented in 1992 to ensure the rigid, stable installation of a Backflow Prevention Assembly, whether installed above ground or in a below-ground enclosure. In the case of a 2-inch or smaller DCVA, the 2-feet of copper pipe on the inlet and outlet sides allow the "mouse holes" of the enclosure to rest on piping material considerably more stable than PVC or similar pipe. The transition from PVC pipe to copper pipe must be made at least 2-feet from the inlet side of a DCVA, and the transition from copper pipe to PVC pipe must be made at least 2-feet from the outlet side of a DCVA in a below ground enclosure.

When an above-ground DCVA or RP is installed, the same requirements will apply. However, in addition to the horizontal, buried 2-feet of copper pipe on the inlet side (described in the paragraph above), the remaining piping material including the 90-degree bend, the vertical-up pipe on the inlet side of the assembly, the vertical-down pipe on the outlet side of the assembly, the 90-degree bend and 2-feet more of horizontal, buried pipe on the outlet side must also be copper pipe before transitioning back to PVC of similar pipe.

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- **Clarification On Installation**

(Cross-Connection Control Program Manual Initial Installation, Item 6 — page 2, and Chapter IV, 4.2 — page 11)

Installers are required to **CALL** CWS to report the installation and provide the make, model, size, serial number and location of the assembly. Frequently we receive a Field Test And Maintenance Report for a new installation or a change-out installation several days after the fact. CWS expects a telephone call from the Installer with the installation and/or change-out details.

- **Clarification On Testing After Repairs**

(Cross-Connection Control Program Manual Chapter III, 3.5 — page 10)

CWS requires all Backflow Prevention Assemblies to be tested after **REPAIRS OF ANY TYPE** are made to the assembly or if water service is interrupted or shut off, even temporarily for maintenance. This includes, but is not limited to, replacing test cocks, replacing a disc, etc.

- **Clarification On Assemblies Found To Be In Non-Compliance**

(Cross-Connection Control Program Manual Chapter IV, 4.1 — page 10)

Whenever an existing assembly (which does not meet the current provisions of the Manual) fails the annual test, and it becomes necessary to replace the assembly, it must be replaced and installed in a manner consistent with the Program Manual requirements in effect at that time. CWS Approved Testers are expected to notify CWS at any time they encounter **ANY** assembly installed in a manner that does not comply with existing CWS Cross-Connection Control Program Manual on Backflow Prevention. CWS will not identify the tester during communications with the affected customer account found to be in non-compliance.

- All lawn irrigation sprinkler systems (residential or commercial) are required to have an approved Backflow Prevention Assembly. If the irrigation system utilizes a booster pump, has the ability to induce or aspirate fertilizer, herbicides or pesticides, an approved RP is required. If the system is water-only without pumps or induction/aspiration, an approved Pressure Vacuum Breaker (PVB) is required. The PVB must be installed so that the canopy (top cover) is at least twelve inches (12") above the highest pop-up irrigation head or irrigation piping. If a RP is used, its RELIEF-VALVE VENT must be at least twelve inches (12") above the finished grade.
- CWS reserves the right to determine the actual or potential degree of hazard (health, non-health or lethal hazards), and which type of backflow protection we require to be installed and maintained. Typically, health hazards will require an approved Reduced Pressure Principle Backflow Prevention Assembly (RP); non-health hazards will require an approved Double Check Valve Assembly (DCVA). Lethal hazards will be required to maintain a physical AIR-GAP separation or an approved RP. Lawn irrigation sprinkler systems (residential or commercial) require an approved RP or Pressure Vacuum Breaker (PVB).

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- All Backflow Prevention Assemblies installed on CWS's distribution system shall be approved by the USC-Foundation for Cross-Connection Control and Hydraulic Research. CWS neither recognizes nor approves the use of any detector-type DCVAs or RPDA's within our distribution system.
- All approved Backflow Prevention Assemblies shall be installed per manufacturer's specifications and to the installation requirements defined and illustrated in **"CWS's Cross-Connection Control Program Manual on Backflow Prevention."**

If doubts or questions are encountered, the contractor is encouraged to contact the Cross-Connection Control Department at 727-6980, 727-7105, 727-7148 or 727-6981. The majority of CWS's Cross-Connection Control requirements, lists of approved assemblies, listing of CWS-Approved Testers and clarification statements can be found on our website at www.charlestonwater.com (Developers & Contractors link, then Cross-Connection sub-link). More detailed information relative to backflow prevention and Cross-Connection Control may be found in Section H. of CWS's Water Rules and Regulations.

Please feel free to contact one of the Department Associates: Randy Hunt, Cross-Connection Compliance Inspector; Don Sondles, Cross-Connection Compliance Inspector; or Dale Strong, Cross-Connection Manager. Our Department Administrative Secretary's telephone number is 727-7148.