

History of Charleston Water System's Cross-Connection Control Department

Charleston Water System (Commissioners of Public Works) has maintained a Cross-Connection Control Program in one form or another, for almost thirty-years. Our program practices Containment Protection as opposed to isolation or internal protection from backflow. This means that CWS requires a backflow prevention assembly, commensurate with the actual or potential degree of hazard to be installed behind our water meter, not multiple assemblies at each internal cross-connection. When the program was initiated, records of medical or industrial customers were kept in a loose-leaf binder under the care of a backflow technician. The only required training, at that time, was attending a two-hour presentation conducted by the South Carolina Department of Health and Environmental Control (DHEC). The technician was presented a DHEC Tester Certification Card. This card did not expire, and authorized the technician to install, repair and test backflow prevention assemblies.

During the latter 1980's, in addition to the Backflow Technician, CWS authorized a Backflow Supervisor, and a Backflow Specialist. By this time, detailed and accurate record keeping had been introduced. All records of survey inspections, account questionnaires, and test reports were filed and maintained for at least five-years. By this time, DHEC had lengthened its training to a two-day seminar. Participants were now required to pass a 100-question (open book) written examination. However, the DHEC Tester Certification expired after three-years and a tester could simply call DHEC and request another card, good for three more years.

CWS at this time was committed to improving the training of their Backflow Associates, and allocated training funds for each Associate to attend the University of Florida's **TREEO** Center. The **TREEO** Center (Training, Research, Education for Environmental Occupations) is recognized as a premier educational center for cross-connection control and backflow prevention. The Backflow Supervisor also attended the University of Southern California's Foundation for Cross-Connection and Hydraulic Research (USC-FCCC&HR) Specialist course in Los Angeles, California. During this same period of time, CWS's backflow staff was probably the most technically trained group of backflow practitioners in South Carolina. CWS also joined the USC Foundation and has since required USC approval for all backflow prevention assemblies within their distribution system. The USC-FCCC&HR approval process is the most rigorous and time-consuming approval process of any approval agencies in the USA.

In the summer of 1993, CWS published its first in-depth **CROSS-CONNECTION CONTROL PROGRAM MANUAL ON BACKFLOW PREVENTION**. This manual listed the requirements for the selection and installation of approved backflow prevention assemblies, specific guidelines for plumbers and testers, and illustrations of how assemblies were required to be installed. This manual was provided to area plumbers, testers, contractors and building officials. CWS assumed the position of the Administrative Authority for water quality within its water distribution system. The manual has been edited several times and now conforms to the recognized practices and standards of the American Water Works Association (AWWA), USC-FCCC&HR, the **TREEO** Center, the Standard Plumbing Code, and CWS's Water Rules and Regulations (Legal Ordinance).

Beginning in 1994, CWS's Cross-Connection Control staff took a step further in the education and training in backflow prevention by having each Associate complete the Backflow Prevention

Assembly Instructor course taught by the **TREEO** Center. CWS was the first water purveyor in South Carolina to have each Associate certified as an instructor in backflow prevention. In the fall of 1994, CWS signed a site agreement with the University of Florida **TREEO** Center to become a University of Florida **TREEO** Satellite Training Facility to provide training and recertification for U/F Certified Testers.

In the fall of 1995, CWS's Cross-Connection Control staff was invited by DHEC to sit on their backflow prevention advisory committee. The purpose of this committee was to edit the SC Primary Drinking Water Regulations to more closely conform to the changing technology in backflow prevention. CWS was also asked to be a DHEC Training Site, one of nine such sites in SC. These regional sites provide DHEC Recertification for all DHEC Certified Testers. Since 1995, each DHEC Tester must recertify and pass a written and proficiency hands-on examination in order to maintain their certification status.

In early 1996, CWS brought on line their proprietary backflow prevention software to manage and automatically track each customer account required to install and maintain an approved backflow prevention assembly. CWS considered purchasing canned tracking software from the several software vendors within the backflow community, but instead, decided to develop their own personalized software. It took almost four years to design and develop the parameters, create specific verbiage for twenty-two different customer notices, write the computer coding, and test the system in each account scenario. The results were incredible, and on February 6, 1996, our software was brought on line and made operational.

The program automatically sends Annual Test Notices thirty-days prior to the Annual Test Due Date, New Customer Questionnaires, Final Notices, and Shut-off Notices. As each letter is mailed, the program modifies the account status code, and starts a thirty-day clock. If the status code remains unchanged (assembly not installed, repaired, tested, etc.), the next letter in sequence is automatically mailed. Additionally, the program keeps track of multiple assemblies for each account and retains a database of all letters mailed to a customer. This program has enabled our staff to focus our work more on follow-up survey-inspections and to manage the daily operations of the Cross-Connection Control Program. DHEC has described CWS's Program as "the best in the state."

DHEC certified testers are required to attend a CWS Orientation Session before their names are added to "CWS's List of Approved Backflow Prevention Assembly Testers." During this orientation, they are provided a copy of the Manual, specific testing procedures required by CWS, and other relevant aspects of the program. If the tester fails to conform to our program policies and guidelines, demonstrates a lack of proficiency in testing, or falsifies a test report, the tester is removed from CWS's listing and is no longer allowed to test backflow prevention assemblies within CWS's distribution system.

CWS Management has supported the program efforts, and is determined to ensure the water distribution system is protected against backflow. Each Cross-Connection Associate is very active in the backflow industry, participating in professional organizations such as the AWWA, the American Backflow Prevention Association (ABPA), International Codes Council (ICC) and the Charleston Master Plumber's Association. The staff attends meetings and assists in the training with

new technology in the backflow community. Through the efforts of CWS's Cross-Connection Control Staff, the first SC-AWWA "**SYSTEM PROTECTION COMMITTEE**" was formed, and a CWS Associate was appointed Chairman of this new committee. All Cross-Connection Control Associates are active members of the ABPA (Carolina's Chapter and International), and one Associate is the Immediate Past President of the ABPA.

In 1998, CWS developed the Temporary Hydrant Usage Policy for contractors to lawfully use a CWS fire hydrant by applying for a permit. Hydrant use set-ups are permitted to contractors for temporary construction water. Each set-up consists of a hydrant ball valve, either a Double Check Valve Assembly or a Reduced Pressure Principle Assembly (depending on the degree of hazard presented by a particular contractors use). Permits are issued for periods from one week up to three months. Additionally, transient/mobile contractors with water tanks are issued an annual permit based on the number of gallons of water their tanks hold. Each such tank is required to have a code-approved AIR-GAP between the supply piping and the water vessel. This innovative program has been exceptionally beneficial in ensuring water quality compliance, as well as determining who is using CWS's fire hydrants. Utilities in South Carolina, North Carolina and Florida have drafted similar policies using elements of our program.

Another positive aspect in the practice of ensuring backflow is eliminated is the installation of residential dual check valves in residential water meter boxes. Since 1985, CWS has installed a dual check valve in all new services to prevent residential backflow into the public water distribution system.

During the period of 1979 to the current date, CWS has responded to only eight (8) suspected incidents of backflow. Through our investigation, it was determined that in each case, backflow occurred due to faulty or non-code approved plumbing fixtures, and was contained **WITHIN** the private property and **NEVER** reached the public water distribution system due to the placement of a containment backflow prevention assembly behind our water meter. This does not imply or suggest that backflow incidents have not occurred. However, CWS has had no documented reports of backflow or impaired water quality caused by backflow into the water distribution system since it has had a program in place, nearly thirty-years.

The growth experienced by CWS during the past ten years has been phenomenal! In 1990, the program was monitoring and tracking less than 3,000 accounts in the cross-connection database. As of June 2007, CWS's Cross-Connection Control Department is monitoring, tracking and ensuring compliance of more than 18,000 accounts in its database.

Dale Strong
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