



**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 K-Penalties, Page 79](#))*.
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:**

<b>4.1 Labor:</b>	<b>4.2 Equipment:</b>	<b>4.3 Materials:</b> CCC Program Manual; Water Rules & Regulations-Section H (including Exhibit K); <a href="#">Notification Protocol Document</a>
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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 for Cross-Connection Control and Hydraulic Research (USCFCCC&HR). All

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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.

## **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.

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**7. Related Documents:**

- 7.1**     [Cross-Connection Control Program Manual on Backflow Prevention](#)
- 7.2**     Water Rules and Regulations, Section H, including [Exhibit “K”](#)
- 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](http://www.charlestonwater.com/dev_contract_document_index.htm)

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# Notification Protocol

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 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.

- **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 CSW 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 USCFCCC&HR. 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.
- 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 performed.**

- **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 or similar pipe.

- **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 critical level 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).
- All Backflow Prevention Assemblies installed on CWS's distribution system shall be approved by the USCFCCC&HR. CWS neither recognizes nor approves the use of any detector-type DCVAs or RPDAs 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](http://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.

**EXHIBIT "K"**

**PENALTIES**

Unauthorized tap / by-pass (Effective 06/01/04) (Additional fees may be added depending on circumstances)	\$500.00
Unauthorized Water Distribution Construction and/or Tap Penalty	\$2,000.00 Each Incident, Per Day
Unauthorized Hydrant Use or Other Uses	\$500.00 Each Incident, Per Day
Unauthorized Use of Water From Fire Service	\$500.00
Willful violation of the Commissions' Cross-Connection Control Rules and Regulations, (Section H and/or Program Manual)	\$2,000.00 Each Incident, Per Day
Authorized Crimp Fee (Effective 06/01/04)	\$500.00

Tampering, etc. Fee

1st Offense (Effective: 06/01/04) .....	\$100.00
2nd Offense (Effective: 06/01/04).....	\$150.00
3rd Offense (Effective: 06/01/04) .....	\$400.00
4th Offense (Effective 06/01/04).....	\$600.00

Preventing the reading or terminating of a water service

1st Offense (Effective: 06/01/04) .....	No charge
2nd Offense (Effective: 06/01/04).....	\$ 50.00
3rd Offense (Effective: 06/01/04) .....	\$100.00
Towing Fee for Car Over Meter (Effective 06/01/04) .....	Actual cost paid by customer to the towing company. See Exhibit "K", Attachment A for example of Certified Towing Letter sent to customer.

Unauthorized turn-on of a water meter that was shut-off by CWS(Effective 06/01/04).....	\$50.00
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*The above penalties may be amended from time to time with a minimum of thirty (30) days notice.*