

Campbell County Utilities and Service Authority

CROSS CONNECTION CONTROL PROGRAM

I. Administration

CCUSA shall administer and enforce this program under the supervision of the **Administrator**.

II. Purpose

- A. Preventing backflow of pollution or contamination into the waterworks from a consumer's water supply system by installing an appropriate backflow prevention device or by backflow prevention by separation at the service connection. Containment has the highest priority.
- B. Preventing backflow of pollution or contamination into the consumer's water supply system by informing the owner of the shared responsibility for water quality and providing assistance where requested in determining the degree of hazard and recommending appropriate backflow prevention devices or separations at each point-of-use beyond the service connection which may be a health or pollutional hazard. Informing owners of the need for isolation beyond the service connection will be a continuing effort.
- C. Preventing backflow of pollution or contamination into the waterworks and into the consumer's water supply system, where it is not intricate or complex, by application of point-of-use isolation in lieu of containment. The alternative of isolation in lieu of containment will be evaluated at each premises where containment is required.

III. Procedures

A. General

1. Commercial and Industrial establishments will be given the highest priority. Each of these water supply systems will be accessed at least annually for cross connection hazards.

Residential customer assessments may be performed by voluntary inspections, interviews or questionnaires. Interviews may be conducted on site or by phone.
2. The **Administrator**, or his designee, will arrange to have trained personnel conduct an on site interview with the owner or owner's representative of each consumer's water supply system.
3. The **Administrator**, or his designee,, or his designee, will arrange to have a questionnaire sent to each remaining consumer's water supply system owner or have the questionnaire completed by phone interview, including residential.
4. The **Administrator**, or his designee, will route all new plans for service connections to serve fire service connections and lawn sprinkler or irrigation systems and will route backflow prevention recommendations beyond the service connection through the Local Building Official.
5. The Local Building Official will coordinate cross connection control requirements at new premises, premises where usage has changed, premises where booster or fire pumps are used, and all others where plumbing modifications occur, with the **Administrator**, or his designee,.
6. The **Operations Superintendent**, or his designee, will review and track the cross connection control operational verification reports and notify the consumer's water supply system owner in writing as to any testing, inspecting, and overhauling requirements 60 days prior to their annual due date.

7. Enforcement action recommendations will be submitted by **the Operations Superintendent**, or his designee, to the **Administrator**.

B. Assessment By Interviews

1. Interviews will follow a prepared questionnaire used to assess the need for cross connection control by containment.
2. The **Inspector** will conduct a cross connection control and backflow prevention on site interview with each consumer's water supply system owner or representative identified in Section VII C. through F. of the Policy. During these interviews, each installed device or separation will be inspected for appropriateness, proper installation and general appearance. Point-of-use isolation protection will be discussed with the owner. A report will be filed with the **Operations Superintendent**, or his designee, with violations noted and/or recommendations for repair, replacement of existing devices or separations and/or installation of additional devices.
3. Available information about the premises to be surveyed will be gathered prior to the interview.
4. The reasons for cross connection control and backflow prevention will be explained to the consumer's water supply system owner or representative.
5. Water uses after it enters the premises will be questioned.
6. Plans for future expansion and possible additional protection requirements will be discussed.
7. An inspection of the premises will be requested to determine if point-of-use isolation should be installed for the protection of the consumer's water supply system users or considered for substitution for containment.
8. All information will be recorded on the prepared questionnaire. This will include water uses, assessment of degrees of hazard and diagrams.
9. The results of the interview with recommendations for containment devices, separations and point-of-use isolation will be submitted to the **Operations Superintendent**, or his designee, for approval. Recommendations for isolation devices or separation in lieu of containment will also be submitted to the Local Building Official through the **Operations Superintendent**, or his designee, for approval.

C. Assessment by Questionnaires

1. Annual questionnaires will be sent to each consumer's water supply system owner except those premises where on site interviews are being conducted.
2. The results of the annual questionnaires will be reviewed by the **Inspector**. Based on the response to the questionnaires, cross connection control interviews will be scheduled and appropriate devices or separations required to provide containment and/or point-of-use isolation where appropriate. No response to the questionnaire will prompt an on site interview. Refusal of access for inspection or provision of pertinent information shall prompt the requirement to install a high hazard containment device.
3. Questionnaires can be repeated annually at the discretion of the **Operations Superintendent**, or his designee, after an initial interview at premises, except those identified in Section IV, A, 1, where devices or separations are installed and the results of the initial interview are not expected to change. These premises would be where the plumbing is not intricate or complex and not expected to be modified and no unexpected change in use of the premises would occur without the **Operations Superintendent**, or his designee, being notified. Acceptable annual reports will be required from those identified in Section IV, A, 1.

D. Consumer Notification

1. The **Inspector** will notify the consumer's water supply system owner in writing as to the required location of any device or separation; type of device or separation, including applicable University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC), American Society of Sanitary Engineering (ASSE), and American Water Works Association (AWWA) approvals or standards; installation requirements; and the deadline for completing the installation - usually 15 days.
2. If the consumer's water supply system owner fails to install any required device or separation within the deadline or fails to complete testing, inspecting or overhauling as required, a Notice of Violation shall be prepared in accordance with Policy section IV.B. and shall include a notification of termination of water service unless compliance is obtained within 30 days.

E. New Premises

1. All building permit applications shall be reviewed and approved by the **Inspector** for cross connection control requirements prior to issuance of a building permit.
2. Required devices or separations shall be operational prior to issuance of a certificate to occupy. The initial testing of devices or verification of separations will be performed by a **Qualified Contractor**.
3. A follow up inspection of all premises, except residential, will be performed by a **Qualified Contractor** after 30 days of occupancy and a report submitted within 30 days to the **Operations Superintendent**, or his designee.

F. Existing Premises

1. All owners or representatives of existing premises identified in VII C. through F. of the Policy will be interviewed and owners notified in writing of any backflow prevention requirements.
2. All remaining owners will initially be interviewed or mailed questionnaires.

G. Premises With Residential Containment Devices

1. Residential containment devices, such as those devices consisting of dual, independent check valves (ASSE # 1024), (shall be tested every 2 years) and shall be overhauled as needed.
2. Annual assessment by questionnaires shall be conducted and results reviewed as noted above.

H. Premises With Individual Water Supplies

1. Premises requesting a new service connection or reconnection to the waterworks must be assessed by on site interview for cross connection hazards and the appropriate separation installed, inspected, and operational prior to making the service connection.

2. Premises with individual water supplies, i.e., an auxiliary water system, may, upon approval of the **Operations Superintendent**, or his designee, maintain the water supply on the premises if a separation from the consumer's water supply system is provided and maintained and access is granted for inspections. A written request must be made and the Local Building Official concurs. The property owner must submit a signed statement annually verifying compliance of the separation. Failure to do so may result in disconnection of service and/or penalties as described in the Policy section IV.

I. Premises With Booster or Fire Pumps

1. Premises having booster pumps or fire pumps connected to the waterworks shall have the pumps equipped with a pressure sensing device to shut off or regulate the flow from the booster pump when the pressure in the waterworks drops to a minimum pressure as determined by hydraulic analysis and approved by **the Operations Superintendent**, or his designee, not to be less than 20 psi gauge at the service connection.
2. Annual assessments will be made to verify the maintenance of the pressure sensing device. If an interview is denied, then the customer will be notified in accordance with Section IV D of the Program.

J. Backflow Prevention Device Testers

1. The tester is responsible for making competent inspections and for repairing or overhauling backflow prevention devices and making reports of such repair to the consumer's water supply system owner on forms approved by the **Operations Superintendent**, or his designee.
2. The tester shall include the list of materials or replacement parts used and insure that parts used in the repair of the backflow prevention device meet the manufacturer's recommendations and the University of Southern California, Foundation for Cross Connection Control and Hydraulic Research (USC).
3. The tester shall not change the design or operational characteristics of a device during repair or maintenance without prior written approval of **CCUSA's** designated representative
4. The tester shall be equipped with and be competent in the use of all the necessary tools, gauges, manometers and other equipment necessary to properly test, repair and maintain backflow prevention devices.

K. Point-of-use Isolation Protection

1. Any premises, residential, commercial, or industrial, where all actual or potential cross connections can be easily correctable at each point-of-use and where the consumer's water supply system is not intricate or complex, point-of-use isolation protection by application of appropriate backflow prevention devices or separations may be used in lieu of installing a containment device at the service connection if the following conditions are met:
 - a. The method of protection provided shall be, in the judgment of the **Operations Superintendent**, or his designee, the method which best provides protection; and
 - b. The consumer's water supply system owner grants access for inspections; and makes a request in writing for point-of-use isolation protection; and
 - c. The Local Building Official concurs.
2. Devices installed under this section shall be selected from the Isolation Device Application table in Appendix A.

IV. Records (Note 9)

- A. An up-to-date listing of all customers shall be maintained by the **Operations Superintendent**, or his designee. The list will contain.
- owner of premises
 - tenant
 - name of premises
 - service address
 - phone number
 - contact person
 - number of service connections
 - size of service connection
 - annual assessment by: (Interview) (mailed questionnaire)
- B. An up-to-date listing of consumer's water supply system owners who have cross connection control devices (including pressure sensing devices) or separations (including separations from auxiliary or non-potable water systems and air gaps) installed shall be maintained by the **Operations Superintendent**, or his designee. The list will contain:
- owner of premises
 - tenant
 - name of premises
 - service address
 - phone number
 - contact person
 - location of device or separation
 - device manufacturer
 - device model number
 - device serial number
 - device size
 - device ASSE number
 - cross connection or pressure sensing device tested (annually) (semi annually) (quarterly)
 - pressure sensing device manufacturer
 - pressure sensing device model number
 - pressure sensing device serial number
 - pressure sensing device pressure set point
 - type of separation
 - air gap
 - physical disconnection
 - separation verified (annually) (semiannually) (quarterly)
 - type of protection
 - containment
 - containment and isolation
 - isolation in lieu of containment
 - access (granted) (denied) (not necessary)

C. Cross connection control interview reports shall be maintained by the **Operations Superintendent**, or his designee, for 10 years. The report will contain:

- inventory information as noted in section V.A. & B. above
- an assessment of:
 - degree of hazard
 - appropriateness of device or separation
 - installation acceptable
 - general condition of device or separation
 - repair/replacement recommendations
 - new/additional device or separation recommendations
 - any indication of thermal expansion problems

See Appendix ___ for the Interview Report form

D. Cross connection control testing reports shall be maintained by the **Operations Superintendent**, or his designee, for 10 years. The report will contain:

- inventory information as noted in section V.A. & B. above
- line pressure
- results of testing
- test method used
- date and signature of device tester

If repairs were made, the test report will contain:

- which parts replaced
- replacement parts used
- probable cause of test failure
- preventative measures taken

See Appendix ___ for the Testing Report form

E. Questionnaires shall be maintained by the **Operations Superintendent**, or his designee, for 10 years. The questionnaire will contain:

- owner and address of residence
- occupant if different from owner
- phone number
- brief explanation of the program
- brief explanation of causes of backflow and control measures
- some likely cross connections:
 - a garden hose with its outlet submerged
 - kitchen sink spray hose with its spray head submerged
 - hand-held shower massager with its head submerged
 - garden hose used as an aspirator to spray soap or garden chemicals
 - spring, hot-tub, cistern, or swimming pool connected to the house plumbing system
 - water softeners improperly connected

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

See Appendix ___ for the Questionnaire forms (residential & commercial)

- F. Residential containment device (ASSE #1024) overhaul or replacement reports shall be maintained by the **Operations Superintendent**, or his designee, for 10 years

The report will contain:

- inventory information as noted in section V.A. above
- overhaul/replacement action
- date of action

See Appendix ___ for the Residential Containment Device Report form

V. Notification Letters

- A. On Site Interview
- B. Device Testing Due
- C. Device Repair Needed
- D. Test Results
- E. Device Required
- F. Violations
- G. Termination of Service
- H. Questionnaire Transmittal Letter

- I. Thermal Expansion Possible
- J. Verification of Individual Water Supply Separation Due

VI. Reporting Contamination or Suspected Contamination.

The consumer's water supply system owner, **Local Building Official**, device tester or any other person should report contamination or the suspicion of contamination to any one or all of the following:

- Administrator, CCUSA – 434-239-8654
- Operations Superintendent, CCUSA – 434-239-8654
- County Administrator, Campbell County – 434-332-9525
- Local Building Official, Campbell County – 434-332-9596
- Chief Waterworks Operator, CCUSA – 434-821-8611
- Virginia Department of Health, Office of Water Programs Field Office, Danville, VA - 434-846-8461
- Local Health Department, Environmental Health Specialist, Rustburg, VA – 434-332-9550

The **Operations Superintendent**, or his designee, will be responsible for investigating reports of contamination or suspected contamination and will be responsible for notifying the appropriate Virginia Department of Health, Office of Water Programs **Danville** Field Office at Phone **434-846-8461**. A written report will be submitted by the 10th day of the month following the month during which backflow occurred addressing the incident, its causes, affects, and preventative or control measures required or taken.

VII. Device Selection Guidelines

- A. Virginia Cross Connection Control Association — Recommended Best Practice
- B. International Plumbing Code and its Commentary
- C. EPA *Cross-Connection Control Manual*
- D. Virginia *Waterworks Regulations*
- E. AWWA M-14 Cross Connection Control Manual
- F. University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research

See Appendix A for the Isolation Device Application table

VIII. Examples - Types of facilities, probable degree of hazard and type of containment device required. All containment devices shall comply with AWWA Standards and be approved for containment by USC. In high hazard situations subject to backpressure, backflow prevention by separation should be the method of choice wherever practical.

1. Hospitals, mortuaries, clinics, veterinary establishments, dental offices, nursing homes, and medical buildings: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
2. Laboratories: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
3. Piers, docks, waterfront facilities: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
4. Sewage treatment plants, sewage pumping stations, or storm water pumping stations: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013

5. Food and beverage processing plants: Generally, a moderate hazard, Double Gate—Double Check Valve Assembly (DG—DC) ASSE #1015; Use of toxics, etc., in processing: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
6. Chemical plants, dyeing plants and pharmaceutical plants: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
7. Metal plating industries: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
8. Petroleum processing or storage plants: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
9. Radioactive materials processing plants or nuclear reactors: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
10. Car washes and laundries: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
11. Lawn sprinkler systems, irrigation systems: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013 or Atmospheric Vacuum Breakers (AVB) ASSE #1001 or Pressure Vacuum Breaker (PVB) ASSE #1020, see Appendix A, depending on method of backflow and pressure or flow conditions
12. Fire service systems: See Section VII D and F of the Policy
13. Slaughter houses and poultry processing plants: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
14. Farms where the water is used for other than household purposes: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
15. Commercial greenhouses and nurseries: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
16. Health clubs with swimming pools, therapeutic baths, hot tubs or saunas: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
17. Paper and paper products plants and printing plants: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
18. Pesticide or exterminating companies and their vehicles with storage or mixing tanks: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013 at service connection and on vehicles
19. Schools or colleges with laboratory facilities: High hazard, Reduced Pressure Principle Device (RPZ) ASSE #1013
20. High-rise buildings (4 or more stories): Unless otherwise covered, Moderate hazard, Double Gate—Double Check Valve Assembly (DG—DC) ASSE #1015
21. Multiuse commercial, office, or warehouse facilities: Unless otherwise covered, Moderate hazard, Double Gate-Double Check Valve Assembly (DG - DC) ASSE #1015

IX. Device Selection - shall depend on the degree of hazard which exists or may exist. Backflow prevention by separation gives the highest degree of protection and shall be used whenever practical to do so in high hazard situations subject to backpressure. See Appendix A for the Isolation Device Application table.

X. Device Testability/Serviceability

1. Containment or isolation devices used within the consumer's water supply system that are capable of being tested and repaired in-line include the Reduced Pressure Principle Device (RPZ), Double Gate—Double Check Valve Assembly (DG—DC) & Pressure Vacuum Breaker (PVB).
2. Residential Dual Checks without an intermediate atmospheric vent and Boiler Dual Checks with an intermediate atmospheric vent are testable but most of these ASSE approved devices must be removed for testing. Some can be overhauled in-line.
3. Generally, a visual inspection is the only means to inspect most Hose Bibb Vacuum Breakers (HBVBs) since they cannot be removed if installed in accordance with the manufacturer's instructions. Some manufacturers do provide wall hydrant type HBVB with removable vacuum breakers which can be easily removed for inspection and replacement.
4. Pipe connected Atmospheric Vacuum Breakers (AVBs) can be inspected by removing the top cover.
5. Air gaps and physical disconnection require only a visual inspection.

XI. Thermal Expansion

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

The temperature and pressure (T&P) relief valve is an emergency relief valve, not an operating control valve. If the T&P relief valve is used frequently, its useful life will be shortened and it could cease to function.

Thermal expansion can cause damaging stress and strain to water heaters, solenoid valves, O-rings, float valves, pump seals, and plumbing fixtures or fittings.

Generally, 80 psi for a short period of time is the maximum pressure under no flow conditions most fixtures, appliances or appurtenances should be subjected to.

Where thermal expansion is a problem the following devices could be installed:

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

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

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

Appendix A

Isolation Device Application

(See: Swimming Pools and Hot Tubs - CCUSA Recommended Cross-Connection Control Devices)

Degree of hazard	Method of backflow	Pressure or flow conditions	Device	ASSE #
High	BP or BS	Continuous	RPZ	1013 & 1047
	BS only	Non-continuous	Pipe applied AVB	1001 & 1035
		Non-continuous	Hose bibb AVB	1011 & 1052
		Non-continuous	Wall Hydrant w/AVB	1019
		Continuous	PVB	1020 & 1056
Moderate	BP or BS	Continuous	DG-DC	1015 & 1048
Low	BS only		Dual Check:	
		Continuous	w/o vent	1024 & 1032
		Continuous	w/vent	1012

NOTES:

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

INFORMATION:

- Yard hydrants which are frost-proof and drain the water in the barrel through a weep hole when not in use will not drain automatically when fitted with a hose bibb AVB. Weep holes must not be subjected to contamination.
- Some wall hydrants will not drain if the hose is left connected.