

EXHIBIT 4

CROSS CONNECTION CONTROL PROGRAM

MONTGOMERY COUNTY PUBLIC SERVICE AUTHORITY

CROSS CONNECTION CONTROL PROGRAM

I. By Ordinance No. 2001-6 Adopted May 14, 2001

II. Administration

The Director shall administer and enforce this program under the supervision of the County Administrator.

III. 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 pollution 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 premise where containment is required.

IV. Procedures

A. General

- 1. Each consumer's water supply system will be accessed at least annually for cross connection hazards. Assessment may be performed by voluntary inspections, interviews or questionnaires. Interviews may be conducted on site or by phone.
- 2. The Director 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 identified in Section VII C. through FI, of the Ordinance.
- 3. The Director 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 Director 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 Director.
6. The Water Operations Supervisor or his/her 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 Director to the County Administrator for approval.

B. Assessment By Interviews

1. Interviews will follow a prepared questionnaire used to assess the need for cross connection control by containment.
2. The Water Operations Supervisor or his/her designee 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 Ordinance. 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 Director 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 Director for approval. Recommendations for isolation devices or separation in lieu of containment will also be submitted to the Local Building Official through the Director for approval.
10. For those facilities where phone interviews will be conducted by the Water Operations Supervisor or his/her designee, they will be conducted at least annually. A cross connection control questionnaire will be completed to reaffirm the degree of hazard and to assess the facility for new hazards. During these interviews, each installed device or separation will be evaluated 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 Director with violations noted and/or recommendations for repair, replacement of existing devices or separations and/or installation of additional devices.

C. Assessment by Questionnaires

1. Annual questionnaires will be sent to each consumer's water supply system owner except those premises where on site or phone interviews are being conducted.
2. The results of the annual questionnaire will be reviewed by the Director. Based on the response to the questionnaire, 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 Director after an initial interview at premises, including those identified in Section VII C. through F. of the Ordinance, 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 Water Operations Supervisor or his/her designee being notified.

D. Consumer Notification

1. The Director 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 IV.B. of the Ordinance 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 Building Official 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 of occupy. The initial testing of devices or verification of separations will be performed by the Water Operations Supervisor or his/her designee.
3. A follow up inspection of all premises except residential will be performed by the Water Operations Supervisor or his/her designee within 30 days of occupancy.

F. Existing Premises

1. All owners or representatives of existing premises identified in VII C. through F. of the Ordinance 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 replaced every 10 years.
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 Director, 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.
3. Annual assessments will be made to verify the maintenance of the separation. If an interview is denied, then the customer will be notified in accordance with Section IV D of the Program.

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 Director, not to be less than 10 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 Director.

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 the consumer's water supply system owner and Director.
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-isolations 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 Director, 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.

V. Records

- A. An up-to-date listing of all customers shall be maintained by the Water Operations Supervisor or his/her 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 nonpotable water systems and air gaps) installed shall be maintained by the Water Operations Supervisor or his/her 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 Water Operations Supervisor or his/her 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 B for the Interview Report form

D. Cross connection control testing reports shall be maintained by the Water Operations Supervisor or his/her 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
- probably cause of test failure
- preventive measures taken

See Appendix C For the Testing Report form

E. Questionnaires shall be maintained by the Water Operations Supervisor or his/her 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 D for the Questionnaire forms (residential & commercial)

- F. Residential containment device (ASSE #1024) overhaul or replacement reports shall be maintained by the Water Operations Supervisor or his/her 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 E for the Residential Containment Device Report form

VI. 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

See Appendix F for the Notification Letters

VII. 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:

Title, organization, phone number of the following: (complete as needed)

- County Administrator, chief administrative officer
- Local Building Official
- Waterworks Operator
- Virginia Department of Health, Office of Water Programs Field Office
- Local Health Department, Environmental Health Specialist

The Water Operations Supervisor or his/her 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 Abingdon - Field Office at (540)676-5650. 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.

VIII. 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

IX. 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 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 Ordinance
 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 Principal Pressure 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

- X. **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.

XI. 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 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.

XII. Backflow Prevention Device Tester List

See Appendix G.

XIII. Consumer Education Literature

See Appendix H.

XIV. Typical Installation Sketches

See Appendix I.

XV. 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 customer's water supply system owner and at the expense of the customer's water supply system owner.