

## Town of Oriental, North Carolina



### **Cross-Connection Control and Backflow Prevention Program**

Plumbing cross-connections, which are defined as actual or potential connections between a potable and non-potable water supply, constitute a serious public health hazard. According to the Environmental Protection Agency (EPA), there are numerous, well documented cases where cross connections have been responsible for contamination of drinking water, and have resulted in the spread of disease. The problem is a dynamic one, because piping systems are continually being installed, altered, or extended.

Control of cross-connections is possible, but only through thorough knowledge and vigilance. Education is essential, for even those who are experienced in piping installations fail to recognize cross connection possibilities and dangers. The successful promotion of a cross-connection control and backflow prevention program in a municipality is dependent upon the legal authority to conduct such a program. Below the municipality level, modern plumbing codes, such as the National Plumbing Code, ASA A40.8- 1955, or subsequent revisions thereof, govern backflow and cross-connections at the contractor level. At the municipal level the EPA requires that an ordinance shall establish a program of inspection for elimination of cross and backflow connections within the community. Additionally, the EPA states that all municipalities with Public Water Supply systems should have cross-connection control programs, which support the ordinance.

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## Cross-Connection Control Model Program

Town of Oriental

*Public Works Department*

Approved by: Jesse Burgess, BF&CC ORC

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## Town of Oriental Cross-Connection Control Program

### I. Purpose

A. To protect the public potable water supply served by the Town of Oriental Water Department from the possibility of contamination or pollution by isolating, within its customers internal distribution system, such contaminants or pollutants which could backflow or back-siphon into the public water system.

B. To promote the elimination or control of existing cross-connections, actual or potential, between its customers in-plant potable water system, and non-potable systems.

C. To provide for the maintenance of a continuing program of cross-connection control which will effectively prevent the contamination or pollution of all potable water systems by cross-connection.

### II. Authority

A. The Federal Safe Drinking Water Act of

1974, and statutes of the State of North Carolina NCAC 15A 18C and 18D indicate the Town of Oriental Public Water System as water purveyor with the primary responsibility for preventing water from unapproved sources, or any other substances, from entering the public potable water system.

B. North Carolina has long mandated the establishment of cross-connection programs for municipalities with public water system as well as established regulations for compliance with contracting codes below the municipality level. These authorities are found in the Rules Governing Public Water Systems, North Carolina Administrative Code (NCAC) Title 15A Department of Environment and Natural Resources (DENR) Subchapter 18C, Water Supplies, Public Water Supply Section (PWSS). Specifically:

*Section .0307(c)(5)(a) Engineer's Report, Water System Management Plan and Other Plans* requires that the system shall have a policy regarding cross-connection control.

*Section .0406 (b) Cross-connections* requires that:

(1) No potable water supply shall be connected by any means whatever to another source of water supply or to a storage facility unless such connection has been previously approved by the Division. No connection shall be made to any plumbing system that does not comply with the North Carolina State Building Code, Volume II, or any applicable local plumbing code.

(2) No person shall introduce any water into the distribution system of a public water supply through any means other than from a source of supply duly approved by the Department or its representatives, or make a physical connection

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between an approved supply and unapproved supply unless authorized in an emergency by the Department or its representative.

(3) In cases where storage capacity is used only for non-potable purposes and there is installed either an elevated tank or a ground reservoir, the following precautions shall be taken:

*When the reservoir or elevated tank is filled from a supply other than a public water supply and the public water supply is used as a supplemental supply, the pipeline from the public water supply shall be installed in such a manner that the water will be discharged over the top or rim of the reservoir or elevated tank. There shall be a complete physical break between the outlet end of the fill pipe and the top or overflow rim of the tank or reservoir of at least twice the inside diameter of the inlet pipe.*

*When the elevated tank or ground storage reservoir is filled entirely by water from a public water supply:*

If a covered ground reservoir or covered elevated storage tank is used, an approved reduced pressure back-flow preventer or an approved double check valve assembly may be used. DCVAs will be installed at least 12 inches and at most 36 inches above the ground. Installation in a pit or vault is allowed if the pit is not subject to flooding. **Pit installations are not recommended.** The DCVA shall include all necessary pressure gauges and drains for testing. shut-off valves shall be installed in the line at both ends of the back-flow prevention assembly.

If an uncovered ground reservoir or uncovered elevated storage tank is used, a complete physical break shall be provided between the reservoir or elevated tank and the public supply. The physical break between the inlet pipe and the

top or overflow rim of the reservoir shall be at least twice the diameter of the inlet pipe.

All cross-connections between potable water supplies and non-potable or unprotected supplies which are not specifically covered in these aforementioned categories will be considered as special problems and the protective devices required will be determined by the Department on the basis of the degree of health hazard involved.

Persons desiring to install non-potable water supplies in conjunction with a public water supply shall submit to the public water supply section, Division of Environmental Health, detailed plans and specifications in triplicate showing the non-potable water supply and its relation to the potable water supply. The Town of Oriental generally does not authorize such connections.

*Any such interconnection to a potable water system is subject to the approval of the Town of Oriental and shall not be made until authorized.*

No person shall fill special use tanks or tankers containing pesticides, fertilizers, other toxic chemicals or their residues from a public water system except at a location equipped with an over-the-rim free discharge of water or an approved reduced pressure backflow preventer properly installed on the public water supply. No supplier of water shall permit the filling of such special use containers except at locations so equipped.

Section .0406 (b), Appendix 2 to the Rules Governing Public Water Systems outlines those facilities which require installation of a backflow preventer and the approved list of devices by the State of North Carolina.

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These facilities include but are not limited to medical facilities, mortuaries, metal plating facilities, bottling plants, canneries, battery manufacturers, exterminators and lawn care companies, chemical processing plants, dairies, film laboratories, car wash facilities, dye works, laundries, swimming pools and waterfront facilities of various types.

North Carolina Code carries one additional specific requirement for municipal water systems. 15A NCAC 18D Water Treatment Facility Operators Section .206 (d) states that as of July 1, 2003 there must be an Operator in responsible Charge (ORC) for the cross-connection control facilities of the distribution system for all public water systems which have five (5) or more testable backflow prevention assemblies. The ORC must possess a valid Grade Cross-Connection Control certificate issued by the North Carolina Water Board. The Cross-Connection and Backflow ORC does not necessarily have to be the system ORC and in fact, DENR PWSS recommends that the positions remain separate for redundancy of personnel. The Town of Oriental shall maintain a qualification and training program. Recognizing that there may be times of personnel turnover, the Oriental Town Manager shall maintain a list of qualified personnel who may perform required inspections and serve as ORC in a temporary capacity as required.

In consonance with Federal and State requirements and for the purpose of providing safe drinking water, the Town of Oriental has long recognized the importance of identifying and controlling cross-connection within the Town limits and has incorporated the importance of backflow prevention in its standard operating procedures for existing and perceived needs.

The Town of Oriental has long stated that it reserves the right to refuse service unless customer lines or piping are installed in such a manner as to prevent cross connection and backflow.

If a deep-water drinking well is also on a property where the Town has long required that a backflow assembly be installed, the Town exercises the right to inspect and test those backflow assemblies that are testable. The Town of Oriental has established its Cross-connection and Backflow Program in Article IV Ordinance K (Water Service) of the Town General Ordinances under authorities derived from State and Federal regulations. The Town of Oriental Ordinance K was approved and adopted by Oriental's Board of Commissioners.

Further specifics of the Town of Oriental's Cross-connection Control Program are contained in the pages which follow.

### **III. Responsibility**

The Town Manager, the Director of Public Works and the Operator in Responsible Charge of Cross-Connection and Backflow Testing shall be responsible for the protection of the public potable water distribution system from contamination or pollution due to the backflow or back-siphonage of contaminants or pollutants through the water service connection. If, in the judgment of the Oriental Town Manager, an approved backflow assembly is required at the city's water service connection to any customer's premises, the Town Manager, or his delegated agent, shall give notice in writing to said customer to install an approved backflow prevention device at each service connection to his premises. The customer shall, within 90 days install such approved device, or devices, at his

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own expense, and failure or refusal, or inability on the part of the customer to install said device or devices within ninety (90) days, shall constitute a ground for discontinuing water service to the premises until such device or devices have been properly installed. Additionally, a fine of three hundred (\$300) will be levied against the customer.

## IV. Definitions

The following definitions apply to the Town of Oriental Public Water Supply and Cross Connection Control System:

*Approval and Acceptance* - Meeting or suitable for the proposed use, as decided by the Town Manager and responsible staff.

*Auxiliary Water Supply* - Any water supply, on or available, to the premises other than the Town of Oriental's approved public potable water supply.

*Backflow* - The flow of water or other liquids, mixtures or substances, under positive or reduced pressure in the distribution pipes of a potable water supply from any source other than its intended source.

*Backflow Preventer* - A device or means designed to prevent backflow or back-siphonage. Most commonly categorized as air gap, reduced pressure principle device, double check valve assembly, pressure vacuum breaker, atmospheric vacuum breaker, hose bibb vacuum breaker, residential dual check, double check with intermediate atmospheric vent, and barometric loop.

- Air Gap - A physical separation sufficient to prevent backflow between the free-flowing discharge end of the potable water system and any other system. Physically defined as a

distance equal to twice the diameter of the supply side pipe diameter but never less than one (1) inch.

- Atmospheric Vacuum Breaker: A device which prevents back-siphonage by creating an atmospheric vent when there is either a negative pressure or sub-atmospheric pressure in a water system.
- Barometric Loop: A fabricated piping arrangement rising at least thirty five (35) feet at its topmost point above the highest fixture it supplies. It is utilized in water supply systems to protect against back-siphonage.
- Double Check Valve Assembly: An assembly of two (2) independently operating spring loaded check valves with tightly closing shut off valves on each side of the check valves, plus properly located test cocks for the testing of each check valve.
- Double Check Valve with Intermediate Atmospheric Vent: A device having two (2) spring loaded check valves separated by an atmospheric vent chamber.
- Hose Bibb Vacuum Breaker: A device permanently attached to a hose bibb, which acts as an atmospheric vacuum breaker.
- Pressure Vacuum Breaker: A device containing one or two independently operated spring loaded check valves and an independently operated spring loaded air inlet valve located on the discharge side of the check or checks. Device includes tightly closing shut-off valves on each side of the check valves and properly located test cocks for the testing of the check valve(s).
- Reduced Pressure Principle Backflow Preventer: An assembly consisting of two (2) independently operating approved check valves with an automatically operating differential relief valve located between the two (2) check valves, tightly closing shut-off



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valves on each side of the check valves plus properly located test cocks for the testing of the check valves and the relief valve. This device must be installed above ground and enclosed to protect from weather.

- Residential Dual Check: An assembly of two (2) spring-loaded, independently operating check valves without tightly closing shut-off valves and test cocks. Generally employed immediately downstream of the water meter to act as a containment device.

*Refer to Appendix A: Backflow Prevention Device Specifications for detailed diagrams and specifications for various backflow prevention devices.*

The Town of Oriental strongly recommends that all new retrofit installations of reduced pressure principle devices and double check valve backflow preventers include the installation of strainers located immediately upstream of the backflow device. The installation of strainers will preclude the fouling of backflow devices due to both foreseen and unforeseen circumstances occurring to the water supply system such as water main repairs, water main breaks, fires, periodic cleaning and flushing of mains, etc. These occurrences may “stir up” debris within the water main that will cause fouling of backflow devices installed without the benefit of strainers.

*Backpressure* - A condition in which the owners system pressure is greater than the supplier’s system pressure.

*Back-siphonage* - The flow of water or other liquids, mixtures or substances into the distribution pipes of a potable water supply system from any source other than its intended source caused by the sudden reduction of

pressure in the potable water supply system.

*Commission* - The Town of Oriental Board of Commissioners

*Containment* – A method of backflow prevention which requires a backflow preventer at the water service entrance.

*Contaminant* - A substance that will impair the quality of the water to a degree that it creates a serious health hazard to the public leading to poisoning or the spread of disease.

*Cross-Connection* - Any actual or potential connection between the public water supply and a source of contamination or pollution.

*Department* – The Town of Oriental Water Department.

*Fixture Isolation* - A method of backflow prevention in which a backflow preventer is located to correct a cross connection at an in-plant location rather than at a water service entrance.

*Owner* - Any person who has legal title to, or license to operate or inhabit in, a property upon which a cross-connection inspection is to be made or upon which a cross-connection is present.

*Person* - Any individual, partnership, company, public or private corporation, political subdivision or agency of the State Department, agency or instrumentality or the United States or any other legal entity.

*Permit* - A document, issued by the Town of Oriental, which allows the use of a backflow preventer.

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*Pollutant* - A foreign substance, that if permitted to get into the public water system, will degrade its quality so as to constitute a moderate hazard, or impair the usefulness or quality of the water to a degree which does not create an actual hazard to the public health but which does adversely and unreasonably effect the aesthetic quality of such water for domestic use.

*Water Service Entrance* - That point in the owner's water system beyond the sanitary control of the Town of Oriental; generally considered to be the outlet end of the water meter and always before any unprotected branch.

## V. Administration

A. The Town of Oriental shall operate a cross-connection control program, to include the keeping of necessary records, which fulfills the requirements of the Town of Oriental Water Service Ordinance, the Water System Operating and Maintenance Plan and all Cross-Connection Regulations; and is approved by the Commission.

B. The Owner shall allow his property to be inspected for possible cross-connections and shall follow the provisions of the Town of Oriental's program and the Commission's Regulations if a cross-connection is permitted.

C. If the Town of Oriental requires that the public supply be protected by containment, the Owner shall be responsible for water quality beyond the outlet end of the containment device and should utilize fixture outlet protection for that purpose.

The Owner may utilize public health officials, or personnel from the Town of Oriental, or their

delegated representatives, to assist him in the survey of his facilities and to assist him in the selection of proper fixture outlet devices, and the proper installation of these devices as deemed necessary by the Town Manager.

## VI. Requirements

### A. Town of Oriental

1. On new installations, the Town of Oriental will provide on-site evaluation and/or inspection of plans in order to determine the type of backflow preventer, if any, that will be required, to issue the permit. The Town of Oriental requires 3<sup>rd</sup> party testing and inspections. In any case, a minimum of a dual check valve will be required in any new construction.

2. For premises existing prior to the start of this program, the Town of Oriental will perform evaluations and inspections of plans and/or premises and inform the owner by letter of any corrective action deemed necessary, the method of achieving the correction, and the time allowed for the correction to be made. Ordinarily, ninety (90) days will be allowed, however, this time period may be shortened depending upon the degree of hazard involved and the history of the device(s) in question.

3. The Town of Oriental will not allow any cross-connection to remain unless it is protected by an approved backflow preventer for which a permit has been issued and which will be regularly tested to insure satisfactory operation.

4. The Town of Oriental shall inform the Owner by letter, of any failure to comply, by the time of the first re-inspection. The Town of Oriental will allow an additional fifteen (15) days for the correction. In the event the Owner fails to comply with the necessary correction by the time

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of the second re-inspection, the Town of Oriental will inform the Owner by letter, that the water service to the Owner's premises will be terminated within a period not to exceed five (5) days. In the event that the Owner informs the Town of Oriental of extenuating circumstances as to why the correction has not been made, a time extension may be granted by the Town Manager; but in no case will that extension exceed an additional thirty (30) days; failure to comply shall result in a three hundred (\$300) dollar fine and/or water service termination.

The Town Manager, or his delegated representative within the Public Works Department, is invested with the authority and responsibility for the implementation of a cross-connection control program and for the enforcement of the provisions of the Ordinance and this Cross-Connection Control Program.

5. If the Town of Oriental determines at any time that a serious threat to the public health exists, the water service will be terminated immediately and not reinstated until the issue has been resolved and the water has been tested and meets the State requirements.

6. The Town of Oriental shall have on file, a list of 3<sup>rd</sup> party Private Contractors who are certified backflow device testers. All charges, if any, for these tests will be paid by the Owner of the building or property.

7. The Town of Oriental will begin initial premise inspections to determine the nature of existing or potential hazards, in the calendar year following the approval of this program by the Commission. Initial focus will be on high hazard industries and commercial premises.

### B. Owner

1. The Owner shall be responsible for the elimination or protection of all cross-connections on his premises.

2. The Owner, after having been informed by a letter from the Town of Oriental, shall at his expense, install, maintain, and test, or have tested, any and all backflow preventers on his premises, in a manner approved by the Town of Oriental. The installation shall only be performed by a licensed plumbing contractor who must make the application for and sign the initial permit as the individual performing the work.

3. The Owner shall at his expense correct any malfunction of the backflow preventer which is revealed by periodic testing.

4. The Owner shall inform the Town of Oriental of any proposed or modified cross-connections and also any existing cross-connections of which the Owner is aware but has not been found by the Town of Oriental.

5. The Owner shall not install a bypass around any backflow preventer unless there is a backflow preventer of the same type on the bypass. Owners who cannot shut down operation for testing of the device(s) must supply additional devices necessary to allow testing to take place.

7. The Owner shall install only backflow preventers approved by the Town of Oriental or the Commission.

8. Any Owner having a private well or other private water source, must have a permit if the well or source is cross-connected to the Town of Oriental's Public Water System. Permission to cross-connect may be denied by the Town of Oriental. The Owner may be required to install a backflow preventer at the service entrance, even



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if it is not cross-connected to the Town of Oriental's system and/or deemed necessary by the Town of Oriental.

9. The Owner shall not install plumbing to provide potable water for domestic purposes which is on the Town of Oriental's side of the backflow preventer.

10. The Owner shall be responsible for the payment of all fees for permits, annual device testing, re-testing in the case that the device fails to operate correctly, and second re-inspections for non-compliance with Town of Oriental's requirements. See fee schedule under VI. Requirements and Chapter S. Fee Schedule.

## VII. Degree of Hazard

The Town of Oriental recognizes the threat to the public water system arising from cross-connections. All threats will be classified by degree of hazard as outlined in NCAC 15A 18C Appendix B Figure 2 and will require the installation of approved reduced pressure principle backflow prevention devices or double check valves as appropriate.

## VIII. Permits

The Town of Oriental shall not allow a cross-connection within the public water supply system unless it is considered necessary and that it cannot be eliminated.

A. Cross-connection permits that are required for each backflow prevention device are obtained from the Town of Oriental. The form is available

at Town Hall or on the town website. A fee of fifty (\$50) dollars will be charged for the initial permit and ten (\$10) dollars for the renewal of each permit.

B. Permits shall be renewed every year and are non-transferable. Permits are subject to revocation and become immediately revoked if the Owner should so change the type of cross-connection or degree of hazard associated with the service.

C. Additionally, a permit is not required when fixture isolation is achieved with the utilization of a non-testable backflow preventer. Non-testable backflow preventers (e.g. residential dual check) do not require inspection.

## IX. Existing in-use backflow prevention assemblies

Any existing backflow preventer shall be allowed by the Town of Oriental to continue in service unless the degree of hazard is such as to supersede the effectiveness of the present backflow preventer, or result in an unreasonable risk to the public health. Where the degree of hazard has increased, as in the case of a residential installation converting to a business establishment, any existing backflow preventer must be upgraded to a reduced pressure principle assembly, or a reduced pressure principle assembly must be installed in the event that no backflow assembly was present.

## X. Periodic Testing

A. Reduced pressure principle backflow assemblies shall be tested and inspected annually.

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B. The Town of Oriental will require periodic 3<sup>rd</sup> party testing and inspections This testing will be done at the owner’s expense. Testing shall be recorded on an official Town Cross-Connection and Backflow Testing form and kept on file at Town Hall.

C. The testing shall be conducted during the Town of Oriental’s regular business hours. Exceptions to this, when at the request of the owner, may require additional charges to cover the increased costs to the Town of Oriental.

D. The 3<sup>rd</sup> party contractor responsible for testing (and repairs), shall ensure:

1. The testing meets all federal and state backflow prevention testing requirements.
2. That all reports are accurately completed, reviewed with the Oriental Town Manager, and filed (with the Town of Oriental and the State) within the deadlines, inclusive of all repairs made and parts used.
3. Any replacement parts are original manufacturer replacements.
4. Any repair does not alter the design of the “assembly” without prior approval of the Oriental Town Manager.

E. Any backflow preventer which fails during a periodic test will be repaired or replaced. When repairs are necessary, upon completion of the repair the device will be re-tested at owner expense to insure correct operation. High hazard situations will not be allowed to continue unprotected if the backflow preventer fails the test and cannot be repaired immediately. In other situations, a compliance date of not more than

thirty (30) days after the test date will be established. The owner is responsible for spare parts, repair tools, or a replacement device. Parallel installation of two (2) devices is an effective means of the owner insuring that uninterrupted water service during testing or repair of devices and is strongly recommended when the owner desires such continuity.

F. Backflow prevention devices will be tested more frequently than annually, in cases where there is a history of test failures and the Town of Oriental determines that due to the degree of hazard involved, additional testing is warranted. Cost of the additional tests will be born by the owner.

## **XI. Records and Reports**

### **A. Records**

The Town Hall of Oriental and/or the Administrative Office will initiate and maintain the following:

1. Master files on customer cross-connection tests and/or inspections.
2. Master files on cross-connection permits.
3. Copies of permits, and permit applications.
4. Copies of lists and summaries supplied to the Commission.

### **B. Reports**

The Town Manager shall submit the following to the Commission.

1. Initial listing of low hazard cross-connections.
2. Initial listing of high hazard cross-

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connections.

3. Annual update lists of low-hazard and high-hazard cross-connections.
4. Annual summary of cross-connection inspections.

## **XII. Fees and Charges**

The Town of Oriental will publish a list of fees or charges for the following services or permits:

1. Testing fees
2. Re-testing fees
3. Fee for re-inspection
4. After-hours inspections or tests.

**(Fees charged by contractors are regulated by their own fee structure and not subject to any regulation by the Town of Oriental.)**