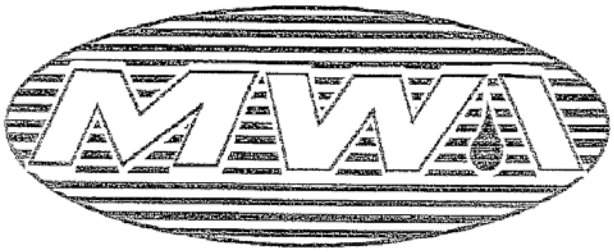
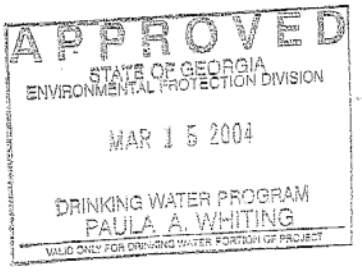


Macon Water Authority

Manual of Backflow Prevention and Cross-Connection Control And Emergency Response Program



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Revised 11/12/03
Revised 1/27/04
Revised 3/10/04
Revised 8/1/11
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Revised 12/7/16
Updated 8/1/19
Updated 7/20/21

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SECTION I

INTRODUCTION

SCOPE AND PURPOSE

The Georgia Environmental Protection Division (EPD) requires the Macon Water Authority to have a Backflow Prevention Program for the elimination and prevention of all *cross connections* to the public water system in accordance with The Georgia Rules for Safe Drinking Water, Chapter 391-3-5-13(4).

This program has the following purposes:

- To administer a backflow prevention program by a policy of **containment** at the service connections.
- To prevent and correct all potentially hazardous cross-connections and backflows to the Authority's system and from the possibility of degradation by "containing" within the customers premises any contamination or pollutants which could backflow or backsiphonage through the Authority's water service connections into the public water system.
- To identify the policies and procedures for implementing and conducting a program of containment.
- To identify the type of customers and relative risks of each customer for a potential cross connection.
- To maintain a record of the customers, who have backflow protection devices and who are at risk of potential cross-connection.
- To document a procedure for the isolation of portions of the distribution system in the event a backflow occurs and carries contamination into the system.
- To assure that proper backflow protection devices are installed and maintained properly.

DEFINITION OF CROSS CONNECTION

A **cross connection** is an "unprotected" actual or potential connection or structural arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, non-potable fluid, non-potable water, gas, or substance other than the intended potable water with which the system is supplied.

In general, all cross connections represent a risk hazard to the potable water system. It may be considered as either a *low hazard risk* or a *high hazard risk.*

A **low hazard risk** is that which may introduce a *pollutant* into the potable water system.

A **high hazard risk** is that which may introduce a *contaminant* into the potable water system.

A **pollutant** is any foreign substance in water that tends to degrade its quality so as to constitute a non-health hazard or impair the usefulness of the water.

A **contaminant** is any foreign substance introduced into a water supply that degrades the quality and creates a health hazard.

A public hazard exists if there is any possibility and/or opportunity for a *backflow or backsiphonage* situation to occur through a cross connection.

Eliminating all cross connections is the best way to prevent the possibility of system contamination, caused by a backflow.

SECTION II

WATER CUSTOMERS RESPONSIBILITY

Commercial, industrial and water customer required to have a backflow prevention device (Risk Groups I, II, and III) shall be responsible for the installation, maintenance and testing of the backflow device or devices at his or her own expense. The following steps will be implemented when failure, refusal, or inability on the part of the customer to install or test the said device(s):

1. 1st letter requiring installation and/or testing within 30 days of date on letter.
2. 2nd letter requiring written or verbal response within 15 days of date on letter.
3. 3rd letter requiring written or verbal response within 7 days of date on letter before subjected to a compliance charge of $100 per day and/or termination of customer's water service.

All backflow prevention devices shall be tested annually within 30 days of the renewal date, and a copy of the test result shall be mailed to 537 Hemlock St., Macon, GA 31202 or emailed to backflow@maconwater.org to the attention of the MWA Backflow Prevention Coordinator.

SECTION III

BACKFLOWS, CROSS CONNECTION AND BACKFLOW PREVENTION DEVICES

THE BASICS OF BACKFLOW

Containment is accomplished by placing a Backflow Prevention Device on the downstream side of the customer's meter, as close to customers meter as possible, with no connections between the water meter and the Backflow Prevention Device.

The term **backflow** means the undesirable reversal of flow in a potable water distribution system as a result of a cross connection. A *backflow prevention device* (BFP) is just what the name implies. It is a device, or assembly, that prevents water, or any liquid, from flowing backwards or against the direction of which it was intended.

Backflow occurs due to one of two conditions being present at a cross connection. They are *backpressure* and *backsiphonage.*

Backpressure is a pressure, higher than the supply pressure, caused by a pump, elevated tank, boiler, air/steam pressure, or any other means, which may cause backflow.

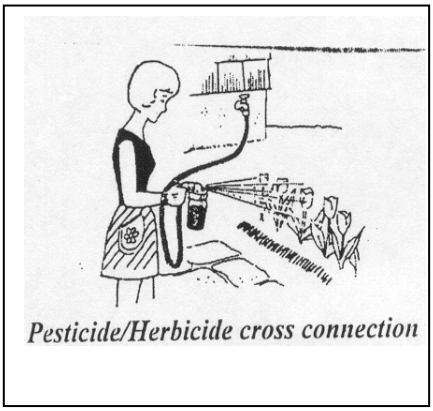
Backsiphonage is caused by negative or reduced pressure in the supply piping.

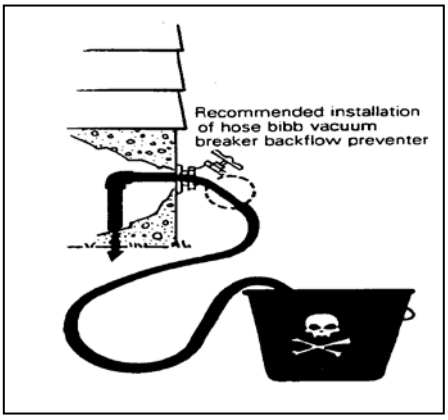
Backflow prevention devices are designed to eliminate cross connections and backflow due to backpressure and/or backsiphonage. Some are designed for *high hazard risks*. Some are designed for only *low hazard risks*. Some are designed to eliminate all types of backflow, and some are designed to eliminate only some types of backflow. **When installing a backflow prevention device, it is important to use the appropriate device for its designed application only.**

TYPICAL CROSS CONNECTION

The following are examples of some typical cross connections, illustrating both backpressure and backsiphonage:

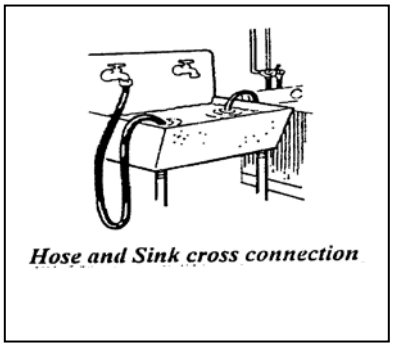
- The most typical cross connection occurs when an end-of-hose sprayer is dropped into a bucket to dilute a pesticide or herbicide.

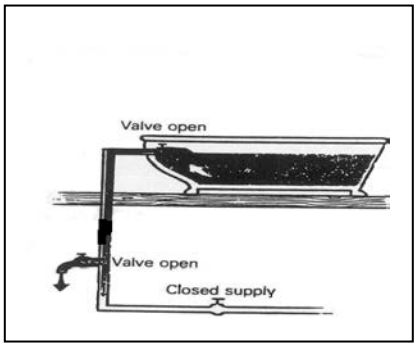




This is an example of a cross connection that can cause system contamination if a "backsiphonage" should occur due to the existence of a negative pressure. Such pressure drops frequently occur when a nearby fire hydrant is opened or during a water main break. Although harmless in appearance and localized in effect, these cross connections may possibly result in serious illnesses and deaths.

- The industrial equivalent of the example below is a tank, bath or sink that has a potable water inlet installed above the water surface to prevent splashing, That has been modified with the addition of a short section of hose which creates a submerged inlet. As with the first example, the development of a low-pressure area "up stream" can created a dangerous backflow situation due to "backsiphonage".





- Occasionally it is desirable to have a submerged inlet and an overflow discharge. Examples include restaurant dish washing sinks, electroplating baths, and swimming pools.

- Another frequent cross connection involves an inline chemical feed system. Examples include chemical addition to boiler or cooling tower systems for corrosion or slime control, chemical or medication addition to livestock water supplies, and chemical additions at the municipal water treatment facilities. The latter of these cannot be avoided. Thus, extreme vigilant care must be exercised to prevent the overdosing of chlorine, fluoride, or other chemicals.

- The final example of a cross connection to be given here is the connection of a municipal water system to a second water system of lower quality such as a well or lake. The most typical occurrence is an industry with both a well and a municipal water system connected to a sprinkler or boiler water system. The well pump could create a pressure higher than the municipal system. The "backpressure" could then force non-disinfected water into the municipalities potable water system.

BACKFLOW PREVENTION DEVICES

REQUIREMENTS:

Cross connections should be avoided, or eliminated, at all times. *Contaminants* and *pollutants* should never come in contact with the potable water system.

A cross connection can be effectively eliminated by the installation of an approved backflow prevention device.

The best method for elimination of a cross connection is the use of an **air gap**.

However, where an air gap is not possible, the influent line should be equipped with an approved *Double Check Valve Assembly* (DC) or a *Reduced Pressure Zone* (RP) backflow prevention assembly as specified in the International Plumbing Code 2012.

Generally, any cross connection that is deemed to be a *high hazard* (**Risk Group I**) must be protected by the installation of a RP except where a sufficient *air gap* has been provided. All other cross connections that are deemed to be a *low hazard* (**Risk Groups II, III**), must have a DC installed downstream of the customer's meter.

APPROVAL OF DEVICES

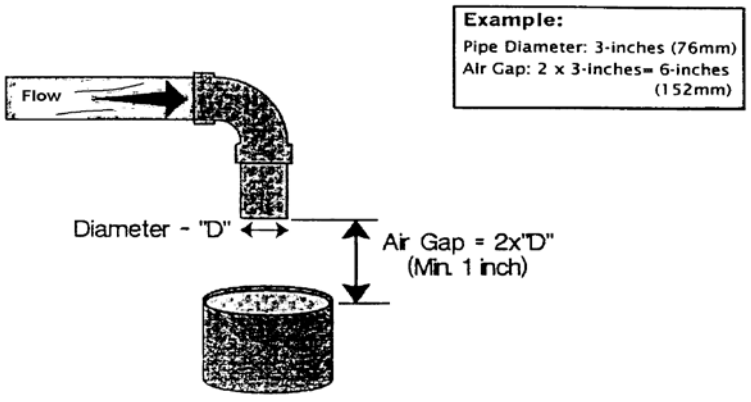
The backflow preventors shall meet or exceed the requirements of the American Society of Sanitary Engineers (ASSE), American Water Works Association (AWWA), and or University of Southern California Foundation for Cross Control (USCFCC). (Macon Water Authority Standards for Design and Construction specifications for Water Distribution and Wastewater Collection, section 2.2, page 5.) See pages **14 & 15** of this manual for a list of approved manufacturers of backflow prevention assemblies provided by the Georgia Department of Environmental Protection Division.

Ultimately, the Director or the Backflow Program Coordinator will issue final approval on acceptable backflow prevention devices.

DESCRIPTIONS

AIR GAP

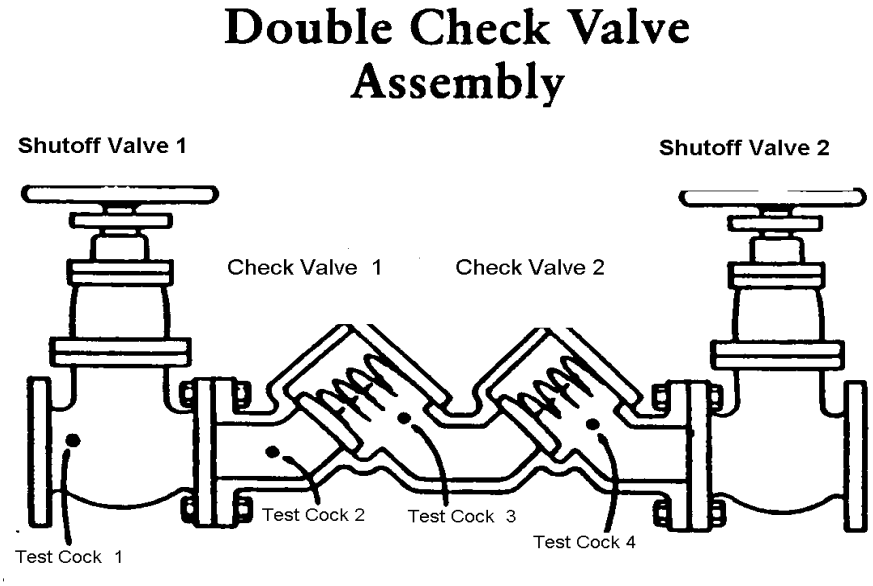
For this discussion, the *air gap* is a physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressurized receiving vessel.



AIR GAP

"An approved air gap is the unobstructed vertical distance through free atmosphere between the lowest point of a water supply outlet and the flood rim of the fixture or assembly into which the outlet discharges. These vertical, physical separations must be at least twice the diameter of the water supply outlet, but never less than 1 in. (25 mm)." (AWWA M14)

The air gap is the best form of backflow prevention available. It is acceptable for use under all hazard conditions and is the ONLY device approved for the backflow prevention of sewage and radioactive material.



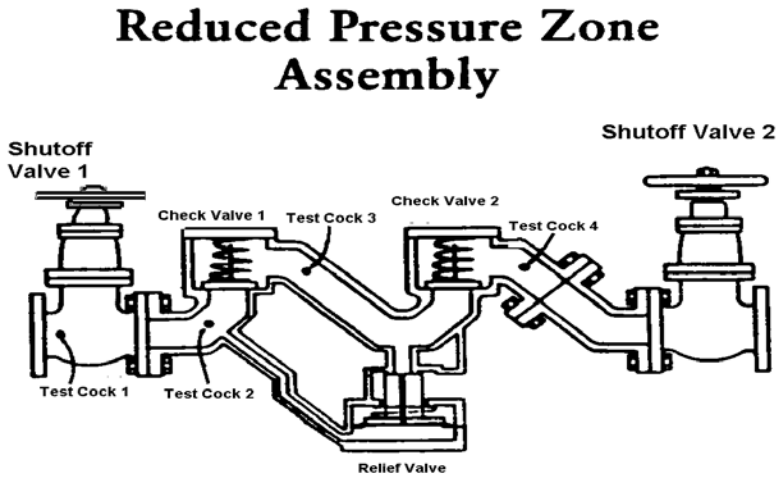
DOUBLE CHECK VALVE ASSEMBLY

The **Double Check Valve Assembly (DC)** is composed of two independent acting, approved check valves, and including tightly closing resilient-seated shutoff valves located at each end of the assembly and fitting with properly located resilient-seated tests cocks. This assembly shall only be used to protect against a non-health hazard (that is, a pollutant).

The DC is the minimum backflow prevention requirement for all commercial, irrigation and industrial customers of the Macon Water Authority. Additional prevention may be required as indicated by the University of Southern California Manual of Cross Connection Control, Tenth Edition and/or the current Macon Water Authority Backflow Prevention and Cross Connection Control Manual.

REDUCED PRESSURE ZONE BACKFLOW ASSEMBLY

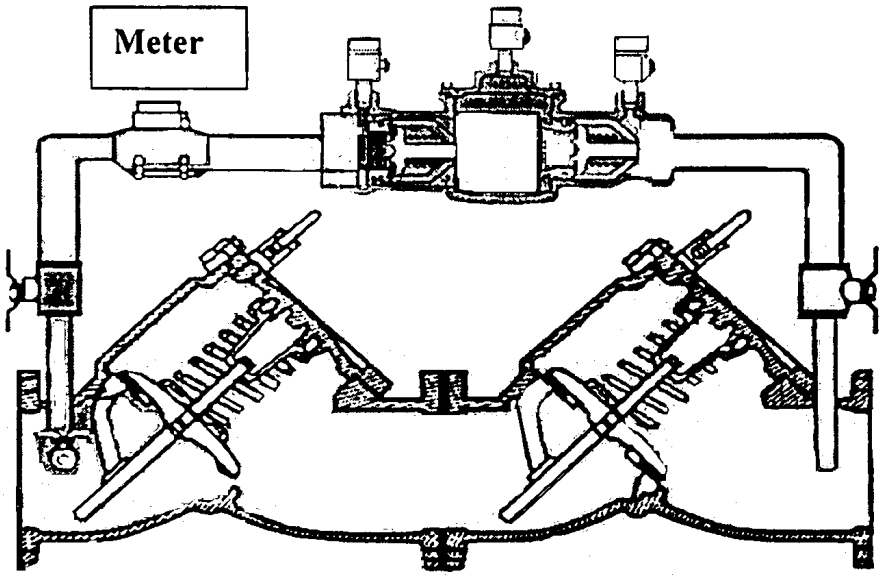
The **Reduced Pressure Zone Assembly**, or the **RP**, as it is more frequently called, consists of two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between two tightly closing resilient-seated shutoff valves as an assembly and are equipped with properly located resilient-seated tests cocks.



The RP is the second-best backflow prevention device available. It is approved for all hazards EXCEPT sewage and radioactive material.

DOUBLE CHECK DETECTOR CHECK ASSEMBLY BACKFLOW PREVENTION ASSEMBLY

The term **Double Check Detector Check Assembly (DCDA)** refers to a specially designed assembly composed of a line-size approved double check valve assembly with a by pass containing a specific water meter and an approved double check valve assembly. The meter shall register accurately only very low rates of flow up to 3 g.p.m. and shall show a registration for all rates of flow.



This assembly shall be used to protect against a non-health hazard (i.e., pollutant) and is composed of two independently acting, approved check valves, including tightly closing resilient-seated shutoff valves located at each end of the assembly and fitting with properly located resilient-seated test cocks health hazard (i.e., contaminant). **The DCDA is primarily used on low hazard fire-sprinkler systems.**

"RPDA" FOR FIRE-SPRINKLER SYSTEMS

The Macon Water Authority does not make any engineering policies concerning the installation or maintenance of fire sprinkler systems. However, due to the various options available for systems, (i.e., sizes, sources, reserves, boosters and additives) it will be necessary to install a **Reduced Pressure Zone-Detector Backflow Assembly** on high hazard fire-sprinkler systems.

INSTALLATION AND LOCATION

A Reduced Pressure Zone (**RP**) or a **(RPDA**) shall be installed in accordance with the following installation procedures, the Georgia State Plumbing Code, the manufacturer specifications and the AWWA M14 fourth edition or latest edition.

An **RP** shall be installed with adequate space to facilitate maintenance and testing. Ideally, the installation should not require platforms, ladders, or lifts for access. The area shall be dry and free of electrical hazards.

RPs need to be protected from extreme heat and freezing temperatures. Consult manufacture's specifications for recommendations. An **RP** shall not be installed in a pit below ground level. Semi-buried pits are acceptable if the RP is installed above the ground or the maximum flood level with an approved air gap between the relief valve port and the daylight drain. If the relief valve port is submerged in groundwater, a cross connection is created that maybe more serious than the hazard that the assembly isolates.

RPs shall be located downstream of the service meter with no connections or tees between meter and backflow assembly. Directly behind the meter will be the required location for most devices.

If the **RP** is located inside a building, it is recommended that a drain be provided to receive spillage from the relief valve port. The relief valve port must always have an approved air gap between it and the drain or maximum flood level, whichever is highest.

An **RP** must be installed in a horizontal position, "in line" and at least 12" inches above ground or floor level.

A Double Check Valve (**DCV**) or a (**DCDA**) shall be installed in accordance with the following installation procedures, the Georgia State Plumbing Code, the manufacturer specifications and the AWWA M14 second edition or latest edition.

A **DC** shall be installed with adequate space to facilitate maintenance and testing. Ideally, the installation should not require platforms, ladders, or lifts for access. The area shall be free from electrical hazards and one that provides a safe working environment for testing and maintenance. **DC**s shall be installed in a box design to hold the device and provide adequate space for testing.

DCs shall be located downstream of the service meter with no connections or tees between meter and backflow assembly. Directly behind the meter will be the required location for most devices.

A **DC** must be installed "in line" and in a horizontal position unless designed differently by the manufacturer.

TESTING

A Georgia Certified Backflow Prevention Assembly Tester must perform testing of all backflow prevention devices. Test procedures for all backflow prevention devices shall be as outlined in the **UNIVERSITY OF SOUTHERN CALIFORNIA: FCCCHR; MANUAL OF CROSS-CONNECTION CONTROL, SECTION 9. (SEE APPENDIX A) A** test and maintenance report for each device used in the containment concept shall be maintained by the consumer. Following each test, a report must be sent to the Backflow Coordinator for Macon Water Authority and must include the following: (a) Date of test and location (b) manufacturer's name, model, and serial number. (c) Name of certified tester and certificate number. (d) Test results (e) Description of repairs or servicing required (f) Date of repair. In addition to testing annually, testing must be done upon installation and after any repairs, modifications, or upgrades.

MANUFACTURES OF APPROVED ASSEMBLIES

The list of manufacturers found below was provided by the Environmental Protection Division.

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Manufacturers of Approved Assemblies

Ames Company
1485 Tanforan Avenue
Woodland, CA 05605
916/666-2493

Arrowhead Brass
5142 Alhambra Avenue
Los Angeles, CA 90032
213/221-9137

Buckner, Inc.
4381 N. Brawley Avenue
Fresno, CA 93722
209/275-0500

Champion Brass Manufacturing Co.
1460 N. Nuad Street
Los Angeles, CA 90012
213/221-2108

Cla-Val Company
P O Box 1325
Newport Beach, CA 92659-0325
714/722-4800

Conbraco Industries
P O Box 247
Matthews, NC 28105
704/847-9191

Febco Division of CMB Industries
P O Box 8070
Fresno, CA 93747
209/252-0791

Flomatic
P O Box 100
North Hoosick, NY 12133-0100
800/833-2040

Hardie Irrigation
788 Fairview Drive
Carson City, NV 89701-5456

Hershey/Grinnell
Research and Development Center
1467 Elmwood Avenue
Cranston, RI 02910

Kennedy Valve
P O Box 931
Elmira, NY 14902-0931
6077/734-2211

Orion Industries
613 N 5th Street
Kansas City, KS 66110
813/342-1653

Rain Bird Sales, Inc.
145 North Grand Ave.
Glendora, CA 91740
818/963-9311

Strahman Valves, Inc.
13 Vreeland Road
Florham Park, NJ 07932
201/377-4900

Toro Company
5825 Jasmine Street
Riverside, CA 92504
714/688-9221

Viking Corporation
210 North Industrial Park Road
Hastings, MI 49058
616/945-9501

Watts Regulator Company
815 Chestnut Street
North Andover, MA 01845
508/688-1811

Wilkins Regulator Company
1747 Commerce Way
Paso Robles, CA 93446

SECTION IV

RISK GROUPS

POTENTIAL CROSS CONNECTIONS

To be effective, the cross-connection program must be enforced at specific industries, commercial and private establishments, and other miscellaneous buildings or locations where taps are made to the water system. To be efficient, the program must concentrate on businesses where the greatest probability of cross connection exists. The identification of the most likely source involves a review of the literature, case histories, and judgment of Macon Water Authority officials. The resulting list was divided into three risk categories or groups.

Risk Group I designates the water use sites considered most likely to have cross connection problems, or those firms which would create a serious health hazard if a backflow occurred. All customers who handle *contaminants* in their processes should be included in this group. These firms should be the first and principal concerns in the cross-connection control program. This group requires an **Air Gap or a Reduced Pressure Zone Backflow Device.**

Risk Group II has the probability of creating a non-health hazard. The occurrence of a backflow at these firms would create a *pollutant* (taste and/or odor) problem rather than a health hazard, and hence is of secondary concern in program implementation. This group requires a **Double Check Valve Backflow Device or equal**.

Risk Group III has low risk of backflow and would create taste and odor problems. These firms should be inventoried by inspection after program adoption. This group requires a **Double Check Valve Backflow Device or equal**.

These Risk Groups relate to potential risks that are dependent upon internal processes, rather than the general category of the business or industry. The Engineering Department of the Macon Water Authority will make this determination. The following are compositions of each risk group and descriptions of the potential hazards:

Risk Group I

1. Food Processors and Food Related Industries (Bakery, Candy, etc.)
2. Textile Companies, Industrial Firms Subject to Wastewater Pretreatment Rules
3. Hospitals, Doctors and Dentist Offices and Other Medical Related Facilities
4. Nursing Homes - Assisted Living Homes – Orphanages (Children's Homes)
5. Veterinary Hospitals
6. Funeral Homes
7. Laboratories (Chemical & Biomedical)
8. Sewage Plants
9. Water Plants
10. Pest Control & Lawn Care Companies
11. Dry Cleaning and Laundry Mat Facilities

12. Colleges, Schools, and Apartment complexes (*defined as 3 or more units served by a single service connection; Some exclusions apply: Single structure residential dwellings, such as the case with historic homes divided into multiple leased units, are considered exempt from the backflow prevention program.*
13. Prisons, Jails, & Work Camps
14. Airport Facilities
15. Brick Companies
16. Country Clubs
17. Car Washes
18. Chemicals - Handling, Manufacturing, Storage
19. Concrete & Concrete Products
20. Electrical Controls, Machinery
21. Furniture Manufacturers (Where contaminants are used)
22. Hotels, Motels, & Mobile Home Parks
23. Department Stores (where food services are provide on premises)
24. Multi-Story Buildings
25. Machine Shops, Metal Fabricators, Manufacturers (Water-Based Industries)
26. Recreation Parks & Fountains
27. Printing Companies - General News
28. Paper Products, Packaging, etc.
29. Gas and/or Service Stations
30. Ice Cream Manufacturers and Ice Manufacturers
31. Wells, ponds and other auxiliary water supplies.
32. Irrigation systems that inject chemical into sprinkler system

Food Processing Companies, including beverage bottling plants, may have cross connections occur in association with steam connected facilities; washers, cookers, tanks, lines and flumes; reservoirs, cooling towers, and circulating systems; industrial fluid systems and water-cooled equipment which may be sewer connected.

Textile Industries may contaminate public water lines as a result of *backsiphonage* from dye vats that use toxic chemicals and dyes. Other potential cross connections include shrinking, bluing, and dyeing machines with direct connections to circulating systems or retention and mixing tanks outfitted with transfer pumps.

Several **industrial facilities**, not falling in a specific category, but which are subject to industrial wastewater pretreatment program rules, were included in this study, due to the nature of the materials they handle. These toxic materials could enter the public potable water system due to several sources:

a) Tanks. lines, valves, fittings, and other equipment such as pumps, rams and pressure cylinders being subjected to hydraulic tests;
b) Hydraulically operated equipment where Macon Water Authority water system water pressure is indirectly used; or
c) Conventional cross connection situations such as potable water inlets located below the fluid level in a tank.

In **hospitals**, cross connections may occur in contaminated, or sewer connected equipment, such as bed pan washers, flush valve toilets and urinals, autoclaves, specimen tanks, sterilizers, pipette tube washers, cuspidors, aspirators, autopsy equipment and X-ray machines.

Nursing Homes and Veterinary hospitals have cross connection problems similar to those of a hospital because they both utilize a lot of the same type of equipment, but to a lesser extent.

Funeral Homes and Laboratories are most likely to incur a cross connection as a result of improper use of water-jet aspirators or other mortuary and laboratory equipment. Materials of concern in funeral homes include blood and embalming fluids. In the laboratory it is chemicals of almost every description.

At **Water Treatment Plants**, cross connections may occur in the process of addition of chemicals (especially compound feeders), scale and corrosion control, water filtration, water softening, and filter backwash systems.

Pest Control Companies are not likely to produce a cross connection, but due to the extreme toxicity to Macon Water Authority water system of the chemicals handled; they have been included on the list. The most likely cross connection is from the use of water operated spraying equipment. **Lawn-care companies** present a similar hazard through dealings with fertilizers and herbicides rather than pesticides.

Laundries having washing machines with under rim or bottom inlets may allow the *backsiphonage* of cleansing chemicals or dirt, grease, and other pollutants into the public water system. Another potential cross connection is a wash water storage tank equipped with pumps and recirculating systems

Potential sources of cross connections at **Apartment Complexes, Schools and Colleges** include inadequately protected flush valve toilets, urinals, aspirators, retorts, and pipette tube washers, laboratory equipment which may be chemically or bacteriologically contaminated; steam generating facilities and lines; water-cooled equipment which is sewer connected; and irrigation systems. Large tanks and swimming pools may also present a hazard.

Irrigation Systems present a potential for cross connections, especially if equipped with pumps, injectors, pressurized tanks or vessels, or other facilities for injecting into the irrigation system agricultural chemicals, such as fungicides, pesticides, and fertilizers. Irrigation systems are also subject to contamination from submerged inlets, auxiliary water supplies, ponds, and reservoirs.

Any **building** containing **cooling towers** or **water tanks** is potentially subject to cross connection. A cross connection can occur when a potable water connection is made at or below the fluid level of the tank. The water pressure in the tank can cause *backpressure* in the water system. The towers and tanks may be contaminated with range of items from toxic water-treatment compounds, bacterial slime or algae, to bird droppings or vermin.

Cold Storage Buildings and plants have the potential of hazardous cross connections between the consumer's water system and: reservoirs, cooling towers, circulating systems, and steam generating facilities and lines; water-cooled equipment which may be sewer connected; and

bottle washing machines and lines. The major *contaminants* of concern are the chemicals from water treatment and cleaning compounds.

Water from a **well** or **pond** are required to have an air gap between water supplied by the Macon Water Authority.

Risk Group II

1. Warehouses
2. Restaurants
3. Irrigation Systems (residential, commercial, and industrial) without pumps injecting chemicals
4. Swimming Pools
5. Convenience Stores
6. Day Care Facilities
7. Department Stores (where food services are **not provided** on premises)

Irrigation Systems present a potential for cross connections, especially if equipped with pumps, injectors, pressurized tanks or vessels, or other facilities for injecting into the irrigation system agricultural chemicals, such as fungicides, pesticides, and fertilizers. Irrigation systems are also subject to contamination from submerged inlets, auxiliary water supplies, ponds, and reservoirs.

Restaurants have several areas of operation susceptible to cross connections. Steam tables and dishwashing basins with submerged inlets may contaminate potable water lines with food products. Carbonation machines may carbonate outside potable water lines during a low-pressure event. Other miscellaneous restaurant equipment may also contribute to cross connection problems.

Swimming pools present hazards because water connections are often made below the water surface level. Cross connections may also occur in the chemical addition process.

Risk Group III

Administrative buildings (1 story) offices i.e., lawyer, engineer, architect, insurance, travel agent, accountant & clerical.
Electronic retail shops
Gift shops

SECTION V

CONTAINMENT PLAN

NEW CUSTOMERS

All new commercial customers and customers changing a type of business at existing location shall submit a set of plans for review to the engineering department of the Macon Water Authority. The department will recommend the appropriate backflow prevention device for that business risk. Upon installation the backflow prevention device shall be tested and then tested annually thereafter. New customers shall abide by the rules and regulations stated in the Macon Water Authority's "Manual of Backflow Prevention and Cross-Connection Control and Emergency Response Program".

EXISTING CUSTOMERS

Existing commercial and industrial customers will receive a letter requesting the installation and or testing of a backflow prevention device for business address. Existing customers shall abide by the rules and regulations stated in the Macon Water Authority's "Manual of Backflow Prevention and Cross-Connection Control and Emergency Response Program".

Risk Group I

The use of an *air gap* or *reduced pressure zone (RP) assembly* on the service lines to the customer is mandatory. The customer will be responsible for installation and testing of these backflow prevention devices in accordance with standards set forth by the AWWA Manual-14 and this department. All backflow prevention devices shall be installed in accordance to the rules and regulations of the Macon Water Authority.

Risk Group II

A double check valve assembly or equal on the service line to the customer is mandatory. The requirements for selection, installation and testing are the same as in Risk Group I.

Risk Group III

The use of a double check valve assembly or equal on the service line to the customer is mandatory. The requirements for selection, installation and testing are the same as Risk Group I.

THERMAL EXPANSION

Thermal expansion is the expansion of water due to being heated, as in a common water heater. This expansion causes water pressure to increase. In an unprotected or open water system, one without a backflow prevention device, the additional pressures will *backflow* into the public potable water system. Closing the system with the addition of a backflow preventer will not allow this backflow to occur. Most water heaters are equipped with Pressure Relief Valves (PRV)'s to help stabilize the pressure caused by thermal expansion. In this situation **PRV's shall *not* be vented in such a way as to cause a cross connection**. It may be necessary for the customer to install an additional thermal expansion unit; one designed to relieve the added water pressure. Customers will be warned that the use of a backflow prevention device will result in a closed system and may cause some *thermal expansion* problems.

SECTION VI

IMPLEMENTATION OF PLAN

The Macon Water Authority's objective is to have backflow prevention devices tested at time of installation and annually thereafter. The water customer must have the backflow prevention assembly tested by a Certified Backflow Prevention Assembly Tester. The test results must be sent to the Backflow Prevention Coordinator of the Macon Water Authority. All test documentation will be recorded in the Backflow Prevention Program database.

Key personnel involved with the program are:

Executive Director & President - ***Mr. Jess R. Shell (Interim)***

Executive Vice President, Director of Field & Plant Operations, Assistant Executive Director– *Mr. Jess R. Shell* - Director of the BFP Program

Director, Field Operations - ***Mr. Michel Wanna*** **-** Manager of the BFP Program

Backflow Prevention Coordinator – ***Ms. Adrienne Onibe*** – Manages the daily operations of the Backflow Prevention Program

Backflow and Cross Connection Inspector, Linear Planner - ***Mr. Daniel Smith*** – Support Services

Water Distribution/Sewer Conveyance Manager - ***Mr. Darryl Macy*** -Isolation and Containment of Polluted and or Contaminated Water

Director of Water Operations - ***Mr. Gary McCoy.*** – Director of Water Treatment Plant

Assistant Manager of Water Treatment- ***Mr. Chuck Mixon.*** – Manager of Water Treatment Plant

Laboratory Analyst II – *Ms. Sylvia McCrary* - Schedules Sample Analysis and Testing

Water Customers **-** Responsible for having the installation of backflow prevention device(s) and annual tests performed on backflow device(s). Copies of annual test reports must be sent to the Backflow Prevention Coordinator's Office at the Macon Water Authority.

SECTION VII

EMERGENCY PLAN

In the event of an emergency situation where contaminated or polluted water enters into the public water system, the Macon Water Authority mandates that the following actions be taken:

A. Report of a Cross Connection to the MWA: **Business Hours (8am ~ 5pm) (478) 464-5620**
Or Engineering Office (8am ~ 5pm) (478) 464-5635
After Hours (After 5pm) (478) 464-5656 or 464-5650

B. The following information will be obtained by the individual receiving the call or notification of the cross connection or chemical spill.

1) Location of the emergency situation.
2) Date and Time that the emergency situation occurred.
3) Name of the person or company reporting the emergency situation.
4) Type of potential contaminate(s).
5) Physical form of contaminate(s). (Liquid, Solid, Gas, etc...)

C. The following persons will be notified immediately upon notification of a cross connection or chemical spill: Executive Director & President, Executive VP Field & Plant Operations, Field Operations Director, Distribution/Conveyance Manager, Distribution/Conveyance Assistant Manager, Water Plant Operations Director, Engineering Superintendent, Engineering Supervisor, Backflow Prevention Coordinator, Backflow Prevention Inspector, Lab Analyst II.

D. An immediate evaluation of the cross connection or spill will be conducted and the following authorities will be notified of the situation. (EPD, Emergency Management Center, Police, Fire, Health Department, etc...) The contact person and phone number of each of these departments will be readily available to all key personnel involved within the program.

E. The location of the emergency situation will be identified on a water system map to include all the appropriate valves that will be used to isolate and contain the problem area.

F. A distribution service crew, a laboratory chemist/technician, the backflow team and/or Engineering Superintendent will be immediately dispatched to the emergency area upon notification.

G. The Laboratory Chemist/Technician, Distribution/Conveyance Manager, and/or Engineering Superintendent shall determine the limits of contamination upon evaluation of the emergency situation.

H. The Distribution Crew will isolate the contaminated area by closing all valves surrounding the problem area. They shall then flush and sanitize the contaminated lines back to the source of entry if possible. Sample collection and analysis will be then be performed again by the laboratory.

I. Notification and education to the General Public shall be issued through the following means:

1) Radio and television broadcasts as directed by the Macon Water Authority
2) Newspaper notices, as instructed by the Macon Water Authority
3) Door to door notification

The MWA Executive Director or his representative shall notify the Environmental Protection Division using the 24-hour emergency phone number.

Emergency Contact Agencies

Environmental Protection Division ~	*1-800-241-4113*
Bibb County Fire Department ~	*478-751-7370*
Bibb County Police Department ~	*478-751-7500*
Emergency Management Center ~	*478-751-7214*
Bibb County Health Department ~	*478-749-0121*

LABORATORIES USED FOR TESTING

GA EPD Laboratory Operations Programs

Atlanta, GA

Phone: 404 206-5269

David Jones, Laboratory Director

Analytical Services Inc

Norcross, GA

770 734-4200

Lynn Collins, Project Manager

Environmental Health Laboratories

South Bend, IN

(800) 332-4345

Laura Snell, Senior Project Manager

Macon Water Authority

Mr. Gary McCoy, Director of Water Plant Operations

Office # (478) 464-5653
Cell # (478) 256-9407

www.maconwater.org

SECTION VIII

PUBLIC AWARENESS

The Macon Water Authority will encourage public awareness to the hazards of potential cross connections and to protect the public water system in the following way:

1. Inspections and counseling with Risk Groups I, II and III
2. Educational mailers with the customers' bills

SECTION IX

INVENTORY OF BACKFLOW PREVENTION DEVICES

The Macon Water Authority has an established program of filing test reports of new and existing backflow preventers. This program is administrated by the Macon Water Authority Backflow Prevention Coordinator.

SECTION X

ENFORCEMENT

The following enforcement actions may be taken on those users not complying with the Backflow Prevention and Cross Connection Control and Emergency Response Program.

A. Inspections: Duly authorized employees of the Macon Water Authority bearing proper credentials and identification shall be permitted either alone or in the company of plumbing and health department officials to enter all properties for the purposes of inspection, observation, measurement and testing in accordance with the provisions of this policy.

B. Warning: Any person found to be violating the provisions of this policy shall be served written notice stating the nature of the violation and shall be provided a reasonable time limit for the satisfactory correction thereof, except in cases of emergency where such notice would be improvident.

C. Legal Action: Water service can be terminated, and a reconnection fee will be charged and collected before the reconnection is made and/or a $100 per day compliance charge will be imposed until corrective actions are taken on the part of the customer.
See page 5, Section II, Water Customers Responsibility for timetable and charges associated with adherence to this policy.

APPENDIX A

DOUBLE CHECK VALVE ASSEMBLY TESTING PROCEDURE (SINGLE HOUSE & TUBE METHOD)

PREPARATION

- NOTIFY CUSTOMER
- IDENTIFY, INSPECT AND OBSERVE
- FLUSH TESTCOCKS
- INSTALL PROPER ADAPTERS AND FITTINGS
- INSPECT TEST KIT & CLOSE NEEDLE VALVES
- HAVE TUBES AVAILABLE, IF NEEDED

DEVICE SETUP

- **INSTALL TEST GAGE AND HOSES AT SAME HEIGHT AS DEVICE**
  IF TEST COCK (TC) 3 IS NOT AT THE HIGHEST POINT OF THE CHECK VALVE BODY, INSTALL TUBE TO BRING WATER TO THE TOP OF THE BODY
- ATTACH HIGH SIDE HOSE & BLEED VALVE ARRANGEMETN TO TC2
- OPEN TC2 SLOWLY, THEN OPEN HIGH SIDE BLEED VALVE
- CLOSE HIGH SIDE BLEED VALVE
- IF TUBE IS ATTACHED, OPEN TC3 TO FILL TUBE, THEN CLOSE
- **RECORD LINE PRESSURE**
- CLOSE SHUTOFF VALVE #1
- OPEN TC3 (TC2 MUST BE OPEN, AND DISCHARGE OF TC3 MUST BE HIGHER THAN TC2 AND/OR CHECK VLAVE HOUSING)

EVALUATE CV (CHECK VALVE) 1 IN DIRECTION OF FLOW

- **OBSERVE AND RECORD CV1 (PSI DIFFERENTIAL)**

EVALUATE CV 2 IN DIRECTION OF FLOW

- CLOSE TC2 AND TC3
- OPEN SHUTOFF VALVE #1
- MOVE HIGH HOSE & BLEED VALVE ARRANGEMENT FROM TC2 TO TC3
- IF TC4 IS NOT AT THE HIGHEST POINT OF THE CHECK VALVE BODY, INSTALL TUBE TO BRING WATER TO THE TOP OF THE BODY
- OPEN TC3 SLOWLY
- OPEN HIGH SIDE BLEED VALVE, THEN CLOSE
- CLOSE SHUTOFF VALVE #1
- OPEN TC4 (TC3 MUST BE OPEN, AND DISCHARGE OF TC4 MUST BE HIGHER THAN TC3 AND/OR CHECK VALVE HOUSING)
- **OBSERVE AND RECORD CV2 (PSI DIFFERNTIAL)**
- **OBSERVE AND RECORD SHUTOFF #2 (LEAKS OR HOLDS TIGHT)**

COMPLETION

- CLOSE ALL TESTCOCKS, DISCONNECT ALL HOSE, REMOVE FITTINGS AND DRAIN TEST KIT
- **OPEN SHUTOFF #1**
- **OPEN SHUTOFF #2 SLOWLY**

REDUCE PRESSURE ASSEMBLY
BACKFLOW PREVENTER TESTING PROCEDURE

PREPARATION

- NOTIFY CUSTOMER
- IDENTIFY, INSPECT, AND OBSERVE
- FLUSH TESTCOKS: 4,3,2,1,4
- INSTALL PROPER ADAPTERS AND FITTINGS
- INSPECT TEST KIT & CLOSE ALL NEEDLE VALVES

DEVICE SETUP

- ATTACH HIGH SIDE HOSE TO TC2
- ATTACH LOW SIDE HOSE TO TC3
- OPEN TC3, THEN OPEN LOW SIDE BLEED VALVE
- OPEN TC2 **SLOWLY**, THEN OPEN HIGH SIDE BLEED VALVE
- CLOSE HIGH SIDE BLEED VALVE
- AFTER GAGE REACHES UPPER END, CLOSE LOW SIDE BLEED VALVE
- **RECORD LINE PRESSURE**

OBSERVE CV1

- CLOSE SHUTOFF VALVE #2
- **OBSERVE CV1 (CLOSED OR LEAKING)**: DO NOT RECORD APPARENT PRESSURE

RELIEF VALVE OPENING POINT

- OPEN HIGH SIDE CONTROL VALVE ONE FULL TURN
- OPEN LOW SIDE CONTROL VALVE SLOWLY ABOUT ¼ TURN
- **OBSERVE AND RECORD RV OPENING POINT(PSI DIFFERENTIAL)**
- CLOSE LOW SIDE CONTROL

CV2 LEAKAGE WITH BACKPRESSURE

- OPEN BYPASS VALVE TO PURGE AIR
- ATACH BYPASS CONTROL VALVE
- OPEN TC4
- REESTABLISH SETUP PRESSURE IN THE ZONE BE OPENING LOW SIDE BLEED VALVE, THEN CLOSE
- OPEN THE BYPASSS CONTROL NEEDLE VALVE
- **OBSERVE AND RECORD CV2 (CLOSE TIGHT OR LEAKING WITH BACKPRESSURE)**

EVALUATE CV1 IN DIRECTION OF FLOW

- REESTABLISH SETUP PRESSURE IN THE ZONE BY OPENING LOW SIDE BLEED VALVE, THEN CLOSE
- **OBSERVE AND RECORD CV2 (PSI DIFFERENTIAL)**

COMPLETION

- CLOSE ALL TESTCOCKS, DISCONNECT ALL HOSES, REMOVE FITTINGS, AND DRAIN TEST KIT
- **OPEN SHUTOFF #2**

REVISIONS

Changes in Personnel & Titles

4/30/08
1/14/09
11/21/13
2/2/15
8/26/16
7/20/21

DELETIONS

5/11/05 - Section 5, Containment Plan, Residential Customers
(Reference GA EPD letter dated May 11, 2005; attached)

8/1/11 - Page 7, Typical Cross Connection, Paragraph one, deleted “residential” and “homeowner”.

ADDITIONS

12/07/16 – Page 17, Risk Group I, Item 13 – Added clarification/definition of apartment complexes (Reference *EPD Letter dated 20 March 2013, attached).*

07/20/21 – Page 5, Section II, Water Customers Responsibility, Paragraph three, revised in entirety to read as follows…’All backflow prevention devices shall be tested annually within 30 days of the renewal date, and a copy of the test result shall be mailed to 537 Hemlock St., Macon, GA 31202 or emailed to backflow@maconwater.org to the attention of the MWA Backflow Prevention Coordinator.’

REFERENCES

Georgia Department of Natural Resources
2 MLK, Jr. Drive, S.E., East Floyd Tower, Atlanta, Georgia 30334
Noel Holcomb, Commissioner
Carol A. Couch, Ph.D., Director
Environmental Protection Division

Reply To:
Drinking Water Permitting & Engineering Program
Suite 1362, East Floyd Tower
2 MLK, Jr. Drive, S.E.
Atlanta, Georgia 303

May 11, 2005

Mr. Michel Wanna
Engineering Superintendent
Macon Water Authority
P.O. Box 108
Macon, Georgia 31202-0108

RE: Residential Backflow Requirements

Dear Mr. Wanna:

In follow-up to your recent inquiry concerning residential backflow requirements for public water systems, enclosed is a copy of Section 391-3-5-.13 of the Rules for Safe Drinking Water regarding Cross Connection Control. Georgia's regulations do not include specific backflow protection requirements for industrial, commercial or residential service connections. Instead the rules refer to acceptable guidance manuals that a water system may use in the development of their cross connection control plans to provide "containment" at the service connection. The manuals cited by the Rules are the USC Cross Connection Manual and AWWA Manual M19. The Rules also include a reference to the Georgia Plumbing Code in regard to hazard identification. In general, the referenced guidance manuals do not address residential backflow protection except as may be related to irrigation systems (with or without chemical injection), auxillary sources, multi-story buildings and/or potential backpressure conditions. Therefore, backflow protection for most residential connections where these conditions do not exist would be considered optional and left to the utility to determine what if any protection to provide.

A number of systems have addressed residential backflow at all connections in their cross connection control plans which EPD approved and which may be advisable in order to provide the greatest level of protection for the public; however, this is not a requirement EPD mandated. We sincerely apologize for any confusion resulting from statements by Mr. North in regard to this important issue.

If you have any questions or if we can assist, please do not hesitate to contact me in regard to the Cross Connection Rules.

Sincerely,

William N. Morris

William N. Morris
West Unit Program Manager
Drinking Water Permitting & Engineering Program
Bill_Morris@DNR.state.ga.us
(404) 651-5158

391-3-5-.13(4)

A supplier shall, when requested by the Division, develop a control program for the elimination and prevention of all cross-connections. A written plan for the program shall be submitted to the Division for review and approval within two (2) years or less in accordance with a written request by the Division. When the plan is approved by the Division, the supplier shall implement the program immediately.

391-3-5-.13(5)

The supplier shall ensure that good engineering and public health protection practices are used in the development and implementation of cross-connection control programs. References such as the latest revision of the American Water Works Association, Manual 14, the U.S. Environmental Protection Agency Cross-Connection Manual, or the University of Southern California Manual of Cross-Connection Control may be used as guidance for program development and implementation.

391-3-5-.13(7)

(7) The supplier shall require that all backflow prevention assemblies installed pursuant to this section be field tested following installation, repair, or relocation and at least annually thereafter.

391-3-5-.13(8)

(8) After October 1, 2004, all required field testing shall be performed by persons who are certified in the testing of backflow prevention assemblies by the Georgia Statewide Backflow Prevention Assembly Certification Program, as approved by the Division, the American Backflow Prevention Association (ABPA), the American Society of Sanitary Engineers (ASSE) or the University of Florida TREEO Center.

391-3-5-.13(9)

(9) Gauges used in the testing of backflow prevention assemblies shall be tested for accuracy annually in accordance with the University of Southern California Manual of Cross-Connection Control or American Water Works Association Manual 14. Public water systems shall require testers to include test gauge serial numbers on "Test and Maintenance" report forms and ensure testers have gauges tested for accuracy.

391-3-5-.13(10)

(10) Each water supplier shall maintain records of the following for a minimum of three years:

(a) Most current hazard assessment, conducted pursuant to Section 608 of the Georgia State Minimum Standard Plumbing Code (International Plumbing Code);

(b) Locations and types of backflow protection and associated hazards;

(c) Results of all backflow prevention assembly field testing and air gap inspections; and

(d) Repairs made to, or replacement or relocation of, backflow protection.

391-3-5-.13(11)

(11) Summaries of the information in section (9)(a) - (d) shall be available to the Division on request for a minimum of three years.

391-3-5-.13(12)

(12) The supplier shall ensure that backflow prevention assemblies that fail the field test are repaired or replaced within 30 days.

391-3-5-.13(13)

(13) The supplier shall ensure that bypass piping installed around any approved backflow preventer is equipped with a backflow preventer providing an equivalent level of protection.

391-3-5-.13(14)

(14) Reduced pressure principal backflow prevention assemblies shall not be installed in any location subject to possible flooding. This includes pits and/ or vaults which are not provided with a gravity drain to the ground's surface that is capable of exceeding the discharge rate of the relief valve.

391-3-5-.13(15)

(15) Each supplier shall notify the Division of any known incident of backflow into the public water system as soon as possible but no later than the end of the next business day upon discovery of the incident. If requested to do so by the Division, the supplier shall submit a written report of the incident describing the nature and severity of the backflow, the actions taken by the water supplier in response to the incident, and the action plan intended to prevent such incidents in the future.

391-3-5-.13(16)

(16) The supplier of water shall deny or discontinue water service to a commercial consumer if a required backflow prevention device is not installed or properly maintained. Water service shall not be restored to such premises until the deficiencies have been corrected or eliminated to the satisfaction of the supplier and the Division. Residential connections shall be maintained in accordance with the Georgia State Minimum Standard Plumbing Code (International Plumbing Code)

Georgia Department of Natural Resources
Environmental Protection Division
Watershed Protection Branch Drinking Water Program
2 Martin Luther King Jr. Dr., S.E., Suite 1362 East, Atlanta, Georgia 30334
Linda MacGregor, P.E., Branch Chief
(404) 656-5660

20 March 2013

PWSID: GA0210001

Mathue Joiner, Grease Management and Backflow Coordinator
Macon Water Authority
790 Second Street
PO Box 108
Macon, GA 31202-0108

Re: Letter from Mr. Martin Bell to Macon Water Authority on Backflow Prevention

Dear Mr. Joiner:

Macon Water Authority (MWA) has requested the Georgia Environmental Protection Division to provide guidance on the Georgia Backflow Prevention and Cross-Connection Control Program, as set out in the Rules for Safe Drinking Water, Chapter 391-3-5-.13. The basis for this program stems from federal law at 42 USC 300f, and from the Georgia Construction Codes, codified in state law in O.C.G.A. 8-2-20(9)(B). The minimum state construction codes reference the International Plumbing Code as being the mandatory standards for plumbing for Georgia. Section 608 of the International Plumbing Code (Protection of Potable Water Supply) states: "A potable water supply system shall be designed, installed and maintained in such a manner so as to prevent contamination from nonpotable liquids, solids or gases being introduced into the potable water supply through cross-connections or any other piping connection to the system."

The City of Macon's Code of Ordinances, in Section 4-1, defines that building codes means all building, plumbing, and electrical codes and any other technical codes of the city. Macon's ordinances go on to state in Section 6-1 that building codes are enforced by the city and in Section 6-1(a)(8) that the latest edition of the state minimum codes shall be enforced by the city department of inspection and fees. Furthermore, the Code of Ordinances, in Section 3.5, has the power to enforce rules and regulations for management and operation of the water and sewerage systems.

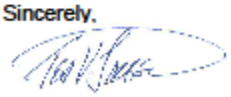
Macon Water Authority's Backflow Prevention and Cross-Connection Control Program is the basis for making decisions on cases of when and where backflow prevention and cross-connection controls shall be implemented within the public drinking water distribution system. The Division supports Macon Water Authority's requirement of using a containment strategy, that is, use of the appropriate backflow preventer at service connections in the distribution system. This is protective of public health and safety for individuals served elsewhere in the distribution system from potential contamination.

MWA requested guidance as to how your approved Backflow Program might address apartments, home conversions and home rentals. In reviewing MWA's Backflow Manual, apartment complexes (designed and built for multi-unit housing) are listed as Risk Group I (highest risk). Formerly single-family home conversions to duplex or more living spaces in the same structure are not listed. Also not listed is a single-family home with an adjoining structure on the same property that is served by a single service connection. The Division would consider these types of entities to remain as residential. As the Division indicated in our correspondence to MWA in 2005, the Division did not mandate residential backflow prevention devices. Macon

Water Authority may wish to revise the Backflow Prevention and Cross-Connection Control Program document to provide more clarity on these matters.

I trust that this meets your request for guidance. Should you have any further questions, please contact Brett Blackwelder at (404) 463-6426.

Sincerely,



Ted V. Jackson, Manager
Drinking Water Program