

# **Fayetteville Public Utilities Water Department Cross-Connection Control Plan**

## **I. Introduction**

### **A. Goal**

The goal of the Fayetteville Public Utilities Water Department is to supply safe water to each and every customer under all foreseeable circumstances. Each instance where water is used improperly so as to create the possibility of backflow due to cross connections threatens the health and safety of customers and chances of realizing this goal. The possibility of backflow due to improper use of water within the customer's premises is especially significant because such cross connections may easily result in the contamination of our water supply mains. Such situations may result in the public water system becoming a transmitter of diseased organisms, toxic materials, or other hazardous substances that may adversely affect large numbers of people. The only protection against such occurrences is the elimination of such cross connections or the isolation of such hazards from the water supply lines by properly installed approved backflow prevention assemblies. The Utility must continue maintenance of a continuing program of cross connection control to systematically and effectively prevent the contamination or pollution of all potable water systems.

### **B. Plan of Action**

Fayetteville Public Utilities is determined to take every reasonable precaution to ensure that cross connections are not allowed to contaminate the water being distributed to its customers. This cross connection plan outlines a course of action designed to control cross connection within the area served by the utility. This plan is intended to be a practical guide for safeguarding the quality of water distributed from becoming contaminated or polluted through backflow. By following the plan of action, the water provider will ensure that all aspects of the ordinance on Cross Connection Control are being followed by customer.

## **II. Authority for Cross Connection Control**

A copy of the ordinance, adopted by the Board of Mayor and Alderman is attached to this plan as Appendix 1. This ordinance prohibits cross connections within water systems, authorizes the water system to make inspections of the customer's premises, requires that cross-connection hazards be corrected and provides for enforcement. This ordinance expresses clear determination on the part of the Board that the water system is to be operated free of cross-connections that endanger the health and safety of those depending upon the public water supply. This ordinance is considered to be a sound basis for the control of cross-connection hazards by the operating staff and management of the Fayetteville Public Utilities. The provisions, contained within this ordinance, are in keeping with the requirements set forth in Section 68-221-711 (6) of Tennessee Code Annotated and Section 1200-5-1-.17(6) of

Tennessee Department of Environment and Conservation Rules governing Public Water Systems.

### **III. Program To Be Pursued**

Fayetteville Public Utilities will establish an active on-going cross-connection control program. This program is to be a continuing effort to locate and correct all existing cross-connection hazards and to discourage the creation of new problems. Safeguarding the quality of water being distributed to our customers is a high priority concern of the management of the Fayetteville Public Utilities.

#### **A. Staffing**

Fayetteville Public Utilities has designated staffing to ensure that the program to control cross-connections is pursued in an aggressive and effective manner. It is proposed that a minimum of one man at four days per month be allotted to the cross-connection control program initially. Depending on customer preference in scheduling, work related to the testing of devices may occur after hours or on weekends. The Water Operations & Construction Superintendent is in charge of implementation of an effective cross-connection control program. The Inspections Department will ensure that all aspects of the plan and ordinance are followed.

Joe Self – Water Operations & Construction Superintendent

#### **B. Cross-Connection Control Surveys/Inspections**

A representative of the Fayetteville Public Utilities will survey the distribution for all customers, both residential and nonresidential, for possible cross-connections. If it is determined from the surveys that possible cross-connection may exist, the premise will be inspected. The need for backflow protection will be determined based on the results from the inspection. Notification of the type of backflow prevention assembly required and a date of compliance will be sent to the customer.

##### **Non-Residential:**

All nonresidential and commercial establishments are required to have an approved backflow preventer installed that is in agreement to the hazard present or be inspected every 5 years. The inspections will be performed on all new establishments before water service is established or within 90 days of connection. If there are existing establishments that have not been inspected, a list (based on risk and public safety) and time line for inspection by the Fayetteville Public Utilities will be generated. All non-residential establishments not requiring an assembly will be inspected (every 5 years maximum). If establishment changes ownership (name listed on water bill), if plumbing permits are issued, irrigation systems installed, or a well is drilled within the Fayetteville Public Utilities' system, then an inspection will need to be performed (no later than 90 days). The need for backflow protection will be determined based on the results from the inspection.

Notification of the type of backflow prevention assembly required and a date of compliance will be sent to the customer. (Attach a list of criteria for requiring assemblies)

**Residential:**

For new residential customers, a written questionnaire will be given upon request for water service. If the survey reveals that a potential cross-connection may be present, an inspection is to be performed. The need for backflow protection will be determined based on the results from the inspection. Notification of the type of backflow prevention assembly required and a date of compliance will be sent to the customer. Each new residential customer will agree to not create cross-connections and a brochure is given to each new customer describing cross-connections and the responsibility of the customer in not creating one.

If the written questionnaire reveals that the new customer may have any of the following, an inspection will be required:

1. Lawn irrigation systems
2. Residential fire protection systems (closed loop systems will require a double check valve minimum)
3. Pools, Saunas, Hot Tubs, Fountains
4. Auxiliary Intakes and Supplies-wells, cistern, ponds, streams, etc.
5. Home water treatment systems
6. Hobbies that require extensive amounts of toxic chemicals (taxidermy, metal plating, biodiesel, ethanol production, etc.)
7. Any other situations or conditions listed in the manual or conditions deemed a threat by the water system.

Written questionnaires will be sent to existing residential customers to determine if potential cross-connections exist. The distribution system will be divided into five segments and will be entirely surveyed within five years. The distribution system will continue to be surveyed in this manner. Questionnaires that reveal potential cross-connections based on the criteria above will be inspected and a determination if backflow prevention assemblies are needed.

The system will be surveyed for residential lawn irrigation systems through questionnaires received and by secondary meters. All residential lawn irrigation systems will require a reduced pressure principle assembly or testable double check assembly, depending on the degree of hazard. Residential customers with pools, saunas, hot tubs not filled by a hard pipe directly or indirectly connected may be allowed to use an air gap (and may be requested to use an atmospheric vacuum breaker at the hose bib). However, if the pool or vessel is connected directly or indirectly by a hard line, an RP is required at minimum.

Residential customers required to have backflow prevention assemblies will be informed of possible thermal expansion problems within the establishment and correction of the condition.

### **Well System Inspections:**

Wells drilled on properties that are supplied by Fayetteville Public Utilities, particularly those designed for chemigation and fertigation, will need to be inspected to ensure separation or the premises will require an approved assembly.

Wells that are drilled within the area of the distribution system within the last calendar year are inspected and a well user agreement is signed between Fayetteville Public Utilities and the customer. A list of existing wells that do not have a well user's agreement within the distribution area will be generated and ten (10) wells per year will be inspected until the entire list has been completed. Any well system that is connected directly or indirectly to the water system is required to disconnect or install a reduced pressure principle assembly. The customer will be required to sign a well user agreement if no assembly is required. It is recommended that inspections be performed on new listings within the year, and then perform inspections on existing, uninspected wells. The list is updated at the Local environmental field office and is available to the water system.

New lines that are constructed in areas where residential areas have been mainly supplied by well systems are surveyed and inspected.

### **C. Public Education and Awareness Efforts**

Fayetteville Public Utilities recognizes that it is important to inform its customers of the health hazards associated with cross-connections and to acquaint them with the program being pursued to safeguard the quality of water being distributed. Fayetteville Public Utilities will seek to use every practical means available to acquaint the customers with the health hazards associated with cross-connections in an effort to get cooperation. Use of customer notification letters, annual consumer confidence report and local video and print media will be incorporated into the notification plan. Efforts will be made to have an employee, or employees, of the water system to appear before the civic clubs, PTAs, school groups, and other appropriate forums to discuss the problem of cross-connections and the program that is being pursued for their control.

Information will be provided to **all** customers about cross-connection control and backflow prevention by individual pamphlets or through an article in the Consumer Confidence Report (CCR) at least once per year. A brochure will be given to all new customers requesting water service describing cross-connections and prevention of backflow.

The following measures may also be used to inform customers about the need to control cross-connections:

1. Reminders with water bills.
2. Posters at the counter where the water bills are paid displayed one month out of the year

3. Annual consumer confidence report
4.
  - a. Personal visits to commercial, industrial, institutional, and agricultural customers to explain the need for controlling cross-connections.
  - b. Whenever possible, any such potential customer will be informed of needed cross-connection measures in the design or construction stage.

#### **D. Customer's Responsibility**

Cross-connections, created and maintained by the customer for his convenience endanger the health and safety of all who depend upon the public water supply. Therefore, the customer who creates a cross-connection problem shall bear the expense of providing necessary backflow protection and for keeping the protective measures in good working order. This includes repair, testing, installation, etc.

#### **E. Enforcement**

Where cross-connections are found to exist, Fayetteville Public Utilities will require the problem to be eliminated or isolated by a properly installed, approved backflow prevention assembly to prevent the possibility of backflow into the distribution system. Such protective measures will include a backflow prevention assembly on the customer's water service line ahead of any water outlets. Every effort will be made to secure the voluntary cooperation of the customer in correcting cross-connection hazards. If voluntary action cannot be obtained with time set forth by written notice (90 days maximum for high and low hazard, 14 days maximum for high risk high hazards) to the customer, water service will be discontinued until conditions are in line with the water provider's ordinance for the protection of the health and safety of the water distribution system.

After surveys or inspections have been completed, the establishments will be contacted by written correspondence outlining any correction (adding or repairing backflow prevention devices) needed and the time schedule allowed for correction of conditions. If the conditions have not been corrected by the time allotment (90 days maximum for high and low hazard, 14 days maximum for high risk high hazards), the water service will be discontinued to the establishment, along with any fines or other penalties deemed necessary by Fayetteville Public Utilities.

Fayetteville Public Utilities may give additional warnings of discontinuance and/or bring about penalties before the water service is discontinued. The time period for correction will be determined by Fayetteville Public Utilities, based on the seriousness of the hazard and risk of contamination, ranging from immediate correction or time period of up to 90 days. The maximum allowable time for correction will no more than 90 days. Those sites deemed high risk high hazard are corrected within a maximum limit of 14 business days, preferably immediate correction. If the conditions do not satisfy the ordinance or plan within 90 days, water service will be discontinued. In the case of backflow prevention devices on fire systems, it is recommended that the fire marshal be contacted before water service is discontinued, to prevent harm to anyone in case a fire occurred in a public building. The fire marshal can condemn the building, thus not allowing anyone to enter.

Water service will not be allowed to the establishment until all corrections have been made and all conditions of the ordinance have been satisfied.

#### **IV. Procedures for Inspections:**

Fayetteville Public Utilities hopes that its efforts to acquaint its customers with the hazards of cross-connections will be successful to the point that the customer will try to maintain their internal water delivery system free of cross-connections. It is recognized that many customers may not recognize that they have a situation that would permit backflow into the water supply lines. Therefore, a thorough investigation will be made of all premises considered likely to have cross-connections. Such inspections will involve the customer's entire water using equipment, and other system components in an effort to locate all actual and potential cross-connections. The findings will be reported to the owner or occupant in writing along with a request for needed corrective action necessary to properly protect the public water system.

##### **A. Field Visit Procedures:**

During the inspection, a field sheet will be completed showing details of significant findings. The hazards which cross-connections pose will be explained fully to the persons assisting the inspection. The customer will be informed that the information gathered during the survey will be reviewed by Fayetteville Public Utilities' management and that a written report containing any recommendations and requirements will be mailed to them as soon as possible.

##### **B. Reports to Customers:**

The findings of the investigation will be summarized and a written report will be sent to the person assisting in the investigation, or the ranking management official of the establishment. Cross-connections found will be described briefly along with recommended method of correction. An effort will be made to keep the description of the findings and recommendations clear, concise and as brief as possible. The correspondence will indicate a willingness to assist the questions. The customer will be given a time limit for making the needed corrections depending (maximum of 90 days) upon the seriousness of the cross-connections involved and upon the complexity and difficulty of correcting the problems.

##### **C. Follow-up Visits and Re-inspections**

Follow-up visits will be made as needed to assist the customer and to assure that satisfactory progress has been made such visits will continue until all corrective action has been completed to the satisfaction of Fayetteville Public Utilities.

##### **D. Installation of Backflow Prevention Devices:**

Where the customer is asked to install a backflow prevention assembly, the customer will be supplied with a list of acceptable and approved assemblies. In addition, minimum acceptable installation criteria will be supplied. It will be pointed out that a unit cannot be accepted until the water system has verified that the installation fully meets the installation criteria and has been tested to verify that the assembly has a status of Passed. Such

backflow prevention assemblies must of a make, model, and orientation currently listed as acceptable by the both the water system and Tennessee Department of Environment and Conservation.

**E. Technical Assistance:**

The customer will be urged to notify Fayetteville Public Utilities when they are ready to begin installing either a reduced pressure or double check valve type backflow preventer assembly. Fayetteville Public Utilities' cross-connection representative will visit the site to detail how the units must be installed to achieve the desired protection and to minimize maintenance and testing problems.

**V. Premises Requiring Reduced Pressure Principle Assemblies or Air Gap Separation**

**A. High Risk High Hazards**

Establishments which pose significant risk of contamination or may create conditions which pose an extreme hazard of immediate concern (High Risk High Hazards), the cross-connection control inspector shall require immediate or a short amount of time (14 days maximum), depending on conditions, for corrective action to be taken. In such cases, if corrections have not been made within the time limits set forth, water service will be discontinued.

High Risk High Hazards require a reduced pressure principle (or detector) assembly. The following list is establishments deemed high risk high hazard:

**High Risk High Hazards:**

1. Mortuaries, morgues, autopsy facilities
2. Hospitals, medical buildings, animal hospitals and control centers, doctor and dental offices
3. Sewage treatment facilities, water treatment, sewage and water treatment pump stations
4. Premises with auxiliary water supplies or industrial piping systems
5. Chemical plants (manufacturing, processing, compounding, or treatment)
6. Laboratories (industrial, commercial, medical research, school)
7. Packing and rendering houses
8. Manufacturing plants
9. Food and beverage processing plants
10. Automated car wash facilities
11. Extermination companies
12. Airports, railroads, bus terminals, piers, boat docks
13. Bulk distributors and users of pesticides, herbicides, liquid fertilizer, etc.
14. Metal plating, pickling, and anodizing operations
15. Greenhouses and nurseries
16. Commercial laundries and dry cleaners
17. Film Laboratories
18. Petroleum processes and storage plants
19. Restricted establishments

20. Schools and Educational Facilities
21. Animal feedlots, chicken houses, and CAFOs
22. Taxidermy facilities
23. Establishments which handle, process, or have extremely toxic or large amounts of toxic chemicals or use water of unknown or unsafe quality extensively.

## **B. High Hazard**

In cases where there is less risk of contamination, or less likelihood of cross-connections contaminating the system, a time period of (90 days maximum) will be allowed for corrections. High Hazard is a cross-connection or potential cross-connection involving any substance that could, if introduced in the public water supply, cause death, illness, and spread disease. (Provide criteria list, suggested to use Appendix A of manual)

## **VI. Premises Allowing Double Check Valve Assemblies**

### **Low Hazard**

Low hazard is a cross-connection or potential cross-connection involving any substance that would not be a health hazard but would constitute a nuisance or be aesthetically objectionable if introduced into the public water supply. Low Hazards are protected by double check valve assemblies at minimum. Double check valve (and detector) assemblies used for main line protection are allowed only on Classes 1-3 fire protection systems.

## **VII. Inspection and Testing of Backflow Prevention Assemblies**

### **A. Approval of New Installations**

Fayetteville Public Utilities will not consider the installation of assemblies to be complete until:

1. The installation has been inspected, and approved by the Fayetteville Public Utilities' based installation criteria; and
2. Assembly is tested initially and has a status of Passed.

### **B. Routine Inspection and Testing of Assemblies**

To assure that all assemblies are functioning properly, assemblies will be tested within a 12 month period (no more than 365 days from last test) by backflow prevention assembly testers with a valid Certificate of Competency. If assembly is not tested within the 12 month period, enforcement action will be started. In conjunction with testing the assembly, the water system representative or approved tester will investigate to determine:

1. That cross-connections, actual or potential, have not been added ahead of the protective assemblies,
2. The assembly meets all installation criteria; and

3. The assembly has not been bypassed or altered in some other way to compromise the backflow protection.

All reduced pressure and double check valve backflow prevention assemblies, including detector assemblies, utilized for the protection of the water system will be tested by a person possessing a valid Certificate of Competency from the State and approved by Fayetteville Public Utilities in keeping with the following criteria:

1. Immediately following installation;
2. At least every 12 months;
3. Any time assemblies have been partially disassembled for cleaning and/or repair and;
4. Where there is indication that the unit may not be functioning properly (i.e. excessive or continuous discharges from relief valve, chatter, or vibration of internal parts).

### **C. Accepted Test Procedure**

Tests of assemblies will be made using a 3 or 5 valve test kit that has valid annual certification in accordance to the latest approved testing procedure from the Division of Water Supply.

### **D. Official Tests**

Only tests performed by persons possessing a valid Certificate of Competency will be considered official tests by Fayetteville Public Utilities. All test reports submitted must be of the type approved by the Division of Water Supply. All parts of testing procedure are recorded accurately on the test report with a determination of status (Passed or Failed). Certificates of Competency are not transferrable.

### **E. Prior Arrangements for Testing**

Prior arrangements will be made for a mutually agreeable time for testing the assemblies prior to performing the test. In all cases, the time which water services are interrupted will be held to a minimum in order to minimize the inconvenience to the customer. The customer, upon notification by Fayetteville Public Utilities, has an obligation to work out a mutually agreeable time for testing assemblies within time allotted by the Fayetteville Public Utilities.

### **F. Repairs**

Should a protective assembly not be tested within the 12 month time frame be found defective or have a status of Failed, the Fayetteville Public Utilities will require the assembly to be repaired promptly with manufacturer's specified parts, in accordance to manufacturer's suggested procedure, and placed in proper operating condition within a (specified) time limit (maximum 90 days, 14 days for high risk high hazards). Following repairs, the assembly is to be tested again to verify that it is meeting performance standards and have a status of Passed. The owner will be held responsible for maintaining protective measures in a good state of repairs. The owner of an assembly needing repairs or maintenance will be permitted to do the work, if such owner is properly qualified or the

owner may elect to secure the services of someone else experienced in the repair of the assemblies.

### **VIII. Parallel Units**

Fayetteville Public Utilities may require the installation of parallel assemblies if the customer cannot readily accommodate interruptions of water service for periodic testing and repairs of the assemblies or is unwilling to cooperate in scheduling a shutdown promptly for testing during normal hours worked by water system personnel.

### **IX. Records**

Good records are invaluable in the water system's efforts to safeguard the quality of water being distributed against degradation from backflow through cross-connections. Adequate records will be maintained as a part of the Water System's permanent files to:

- A.** Document the overall effort of the water system to properly discharge its responsibility to see that each customer receives a safe water under all foreseeable circumstances;
- B.** Give a complete picture as to the current status and history of the individual premises regarding the potential for backflow, corrections made, etc.;
- C.** To support enforcement action, whenever necessary, to obtain backflow protection; and
- D.** Document that assemblies have been properly installed, maintained, and tested routinely.

Records to be maintained by Fayetteville Public Utilities will include, but not necessarily be limited to the following;

- A.** Master List of all Establishments with assemblies used for premise isolation, including location, assembly used, make, model, size, serial number etc.;
- B.** Correspondence between water system and its customers
- C.** Copy of Approved Plan
- D.** Copy of Approved Ordinance
- E.** Test reports for each assembly
- F.** Copies of Certificates of Competency for each tester
- G.** Copies of test kit certifications
- H.** Site Inspection Reports
- I.** Residential written surveys
- J.** Backflow incident reports
- K.** Records on initial surveys, recommendations, follow-up, corrective action, routine re-inspections, etc.
- L.** A file system designed to call to the attention of the cross-connection control personnel when testing and re-inspections of premises are needed.
- M.** Public education pamphlets and information.

### **X. Backflow Contamination Procedures:**

If contamination is caused by backflow, Fayetteville Public Utilities will take the following actions to protect the health of the customer:

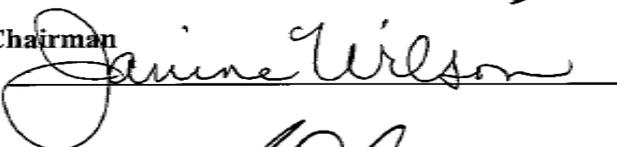
- A. Isolate the lines containing any contaminant from the distribution system;
- B. Inform customers with contaminated lines not to consume or use the water;
- C. Report contamination to the Columbia Field Office;
- D. Determine and separate the cross-connection allowing the backflow and contamination;
- E. Remove contamination from lines;
- F. Test and ensure that lines meet Division of Water Supply regulations for safe water;
- G. Return service to customers affected customers once water is safe;
- H. Document the details of the incident including cause, isolation, and correction, and send report to Columbia Field Office;
- I. Continue to survey and inspect system for similar situations that may allow backflow.

**XI. Modifications to Plan**

This plan may be modified from time to time to meet the needs of the Fayetteville Public Utilities and to meet the states requirements. The plan and ordinance will be reviewed by Fayetteville Public Utilities every five (5) years to determine if the existing plan meets requirements set forth by the Division of Water Supply and that it promotes an ongoing program. The CEO/General Manager shall be authorized to modify, as needed this plan without the approval of the Fayetteville Public Utilities' governing body. The CEO/General Manager shall report any modifications to this plan to the board for their information, in a timely manner. The CEO/General Manager shall also advise the Columbia Field Office of any changes to this plan for their review and comments.

**XII. Approval Signatures**

State Approval:  Date: 11/25/09

Board Chairman  
Signed:  Date: 11/20/09

CEO/General Manager  
Signed:  Date: 11/20/09