



# Cross Connection Plan

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**Prepared by the staff and management of**

Savannah Valley Utility District

**Technical Assistance Provided By TAUD**



**and**



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## I. INTRODUCTION

### A. Goal

The goal of Savannah Valley Utility District (**SVUD**) 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. Tennessee Code Annotated Section 68-221-703 defines a cross-connection as follows: “Cross-connection means the physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains or may contain, contaminated water, sewage, other waste or liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices through which, or because of which, backflow could occur are considered to be cross-connections”.

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 a large number 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. **SVUD** 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 to protect the public.

### B. Plan of Action

**SVUD** 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 this water system. 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 Cross-Connection Plan are being followed by customers.

## II. AUTHORITY FOR CROSS-CONNECTION CONTROL

This Plan prohibits cross-connections, auxiliary intake, by-pass or interconnections within the water system. It also authorizes the water system to make inspections of the customer's connection, requires that cross-connection hazards be corrected and provides for enforcement. This Plan expresses clear determination 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 Plan is also considered to be a sound basis for the control of cross connection hazards by the Board of Commissioners and management of **SVUD**. The provisions, contained within this Plan, are in keeping with the requirements set forth in **Section 68-221-711 (6)** of Tennessee Code Annotated and **Section 400-45-1-.17(6)** of Tennessee Department of Environment and Conservation (**TDEC**) Rules governing Public Water Systems.

Tennessee legislation prohibits all of the various hazardous connections or conditions that may allow the backflow of unsafe substances or liquids of unknown quality into potable water supply systems. **Section 68-221-702** states "Recognizing that the waters of the state are the property of the state and are held in public trust for the benefit of its citizens, it is declared that the people of the state are beneficiaries of this trust and have a right to both an adequate quantity and quality of drinking water".

The regulations for implementation of the Tennessee Safe Drinking Act requires that public water systems demonstrate that the water distributor meets certain health related standards of quality at the ultimate users free flowing outlet. This clearly implies that the water system has authority for on-site surveys and for requiring protective measures.

The above-mentioned state regulations mirror the requirements and language of the Federal Safe Drinking Water Act (and regulations) that applies to each public water supply in the USA. Therefore, these regulations can also be cited as authority for on-site visits of the customer's water distribution lines for the purpose of safeguarding against the degradation or contamination of water through cross-connections.

### III RESPONSIBILITIES

The water system shall be considered to be made up of two parts: The Utility's Water System and the Customer's System.

#### A. Utility's Water System

**SVUD** is responsible for preventing the contamination and pollution of the Water System's potable water supply. The Water System shall consist of the source facilities and the distribution system. It shall include all those facilities of the water system under the complete control of the utility, up to the point where the customer's system begins at the service-connection. The source shall include all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system. The distribution system shall include the network of conduits used for the delivery of water from the source to the customers' system.

#### B. Customer's System

The customer's system shall include those parts of the facilities beyond the service connection and includes all components used to transmit the potable water supply to its points of use. It is at this connection a **Backflow Prevention Assembly** is required by the customer to prevent possible contamination of the Water System's potable water supply. The consumer has the responsibility for protecting the potable water in their system from degradation due to conditions originating on the premises, and also for protecting the Water System's quality of water against any potential or actual health hazard(s) generated on or from their premises through uncontrolled cross-connections.

### IV. REQUIREMENTS

#### A. Policy

1. No water service connection to any premises shall be installed or maintained by **SVUD** unless the water supply is protected as required by **State Laws and Regulations** and this policy. Service of water to any premises shall be discontinued by **SVUD** if a backflow prevention assembly required by this policy is not installed, tested and adequately maintained, or if it is found that a backflow prevention assembly has been removed, by-

passed or if an unprotected cross-connection exists on the premises. Service will not be restored until such conditions or defects are corrected.

2. The customer's system should be open for inspection at all reasonable times to authorized representatives of the Utility to determine whether cross-connections or other structural or sanitary hazards, including violations of these regulations, exist. When such a condition becomes known, **SVUD** shall deny or immediately discontinue service to the premises by providing for a physical break in the service line until the customer has corrected the condition(s) in conformance with the **State Statues** relating to plumbing and water supplies and the regulations adopted pursuant thereto.
3. Section VIII (A) of this Plan contains a partial list of facilities identified by the Tennessee Department of Environment and Conservation (**TDEC**) as high risk high hazard cross-connections. The Utility has adopted this list, as a minimum, for types of facilities that will require backflow containment devices to protect the public water supply. See Appendix B for additional facilities.
4. An approved **Backflow Prevention Assembly** shall be installed by the customer on each service line to a customer's water system at or near the property line or immediately inside the building being served; but, in all cases, before the first branch line (point of use) leading off the service line. The effectiveness of the assembly is nullified if the relief port is subject to flooding. Therefore, **Backflow Prevention Assembly** should **NEVER** be installed below ground level or in other locations subject to flooding
5. The failure to correct conditions threatening the safety of the public water system as prohibited by this policy and the Tennessee Code Annotated, **Section 68-221-711**, within a reasonable time and within the time limits set by the Utility, shall be grounds for denial of water service. If proper protection has not been provided after a reasonable time, the Utility shall give the customer legal notification that water service is to be discontinued, and physically separate the public water system from the customer's on-site piping system in such a manner that the two systems cannot again be connected by an unauthorized person.

6. Where cross-connections, inter-connections, auxiliary intakes or bypasses are found that constitute an extreme hazard of immediate concern of contaminating the public water systems, the Utility shall require that immediate corrective action be taken to eliminate the threat to the public water system. Immediate steps shall be taken to disconnect the public water supply from the onsite piping system unless the hazard(s) is corrected immediately.
  
7. Where the nature of use of the water supplied premises by the water system is such that it is deemed:
  - a. Impractical to provide an effective air-gap separation;
  
  - b. That the owner and/or occupant of the premises cannot or is not willing to demonstrate to the official in charge of the system, or his designed representative, that the water use and protective features of the plumbing are such as to propose no threat to the safety or potability of the water system;
  
  - c. That the nature and mode of operation within premises are such that frequent alterations are made to the plumbing;
  
  - d. That there is likelihood that protective measures may be subverted, altered, or disconnected.

Then the Utility shall require disconnection of service to the premises by providing for a physical break in the service line until the customer has corrected the condition(s) in conformance with the **State Statues** relating to plumbing and water supplies and the regulations adopted pursuant thereto.

8. The failure to maintain backflow prevention devices in proper working order shall be grounds for discontinuing water service to the premises. Likewise, the removal, by-passing or altering a protective device, or the installation thereof, so as to render the device ineffective shall constitute grounds for discontinuance of water service. Water service to such premises shall not be restored until the customer has corrected or eliminated such conditions or defects to the satisfaction of the Utility.

**B. Utility**

1. On new installations, **SVUD** 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. Facilities listed in **Appendix B** hereto will as a minimum install a reduced pressure backflow preventer as a containment device to protect the public water system.
2. For premises existing **prior** to the start of this program, **SVUD** will perform evaluations and inspections of plans and/or premises and inform the customer, 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, sixty (60) 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. **SVUD** will not allow any cross-connection to remain unless it is protected by an approved backflow preventer which will be tested yearly by the customer to insure satisfactory operation.
4. **SVUD** shall inform the Customer by letter, of any failure to comply, by the time of the yearly inspection. In the event the Customer fails to comply with the necessary correction, the Utility will **disconnect water service after July 31 and charge a \$75 penalty fee**. Once the device has been tested and passed, service will be reestablished. In the event that the Customer informs **SVUD** of extenuating circumstances as to why the correction has not been made, a time extension may be granted by the Utility but in no case will exceed an additional thirty (30) days.
5. If **SVUD** determines at any time that a serious threat to the public health exists, the water service will be terminated immediately.

**C. Customer**

1. The Customer shall be responsible for the elimination or protection of all cross-connections on their premises including any premises that are supplied with water from the public water system, and who also has on the same premises a separate source of

water supply or stores water in an uncovered or unsanitary storage reservoir from which the water stored therein is circulated through a piping system.

2. The Customer shall inform **SVUD** of any existing proposed or modified cross-connections of which the Customer is aware but has not been found by the Utility.
3. The Customer shall not install a by-pass around any backflow preventer unless there is a backflow preventer of the same type on the bypass. Customers who cannot shut down operation for testing of the device(s) must supply additional devices necessary to allow testing to take place.
4. The Customer shall install backflow preventers in a manner approved by **SVUD** in accordance with Tennessee Department of Environment and Conservation Standards.
5. **Lawn Irrigation Systems**, both commercial and residential, are recognized by **TDEC** as an actual and potential cross-connection to a public water system. The contact between the sprinkler heads and the soil or standing water in contact with the sprinkler heads poses a significant risk of containing E. coli, Cryptosporidium, Giardia, other pathogens, and hazardous chemicals used for lawn care. Many lawn irrigation systems use toxic chemicals injected in the piping to fertilize and eliminate undesired plants. For public water systems to protect their distribution lines, lawn irrigation systems **MUST** be protected by a **Reduced Pressure Principle Assembly** or **Reduced Pressure Principle Detector Assembly**. See Appendix H.
6. Any Customer having a **Private Well** or other private water source, must install a **Reduced Pressure Principle Assembly** if the well or source is cross-connected to **SVUD's** system. Permission to cross-connect may be denied by the Utility. The Customer may be required to install a backflow preventer at the service entrance if a private water source is maintained even if it is not cross-connected to the Utilities system.
7. In the event the Customer installs plumbing to provide potable water for domestic purposes which is on the Utilities side of the backflow preventer, such plumbing must have its own backflow preventer installed.

8. Any backflow prevention assembly required herein shall be a model and size approved by **TDEC** and is on their most current list of approved backflow prevention devices.
9. It shall be the duty of the customer on any premises where backflow prevention assemblies are installed to have certified inspections and operational tests made upon installations at least once per year. In those instances where the Utility deems the hazard to be great enough it may require certified inspections at more frequent intervals. These inspections and tests shall be at the expense of the customer and shall be performed by a certified tester approved **TDEC**.
10. It shall be the customer's responsibility and expense if any assemblies are needing repaired, overhauled or replaced if found to be defective. Records of such tests, repairs and overhaul shall be sent to the Utility.
11. Any backflow preventer which fails during a periodic test must be repaired or replaced. When repairs are necessary, upon completion of the repair, the device will be re-tested at the Customer's 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 Customer is responsible for spare parts, repair tools, or a replacement device.

## **V. PROGRAM TO BE PURSUED**

**SVUD** 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 this water system.

### **A. Staffing**

**SVUD** has designated an individual to see that the program to control cross-connections is pursued in an aggressive and effective manner. It is proposed that ample time will be devoted to the program to ensure its effectiveness. Additional personnel will be added as is deemed necessary.

Linda Russell - Cross-Connection Control Coordinator

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

A survey is given to all customers, both residential and nonresidential, for possible cross-connections when service is started (See Appendix D). If it is determined from the surveys that possible cross-connections may exist, the customer will be required to have some form of a backflow assembly.

### **Non-Residential:**

All new installations for nonresidential and commercial establishments are required to have an approved backflow preventer installed. If establishment changes ownership, then a questionnaire will be given to determine if a possible cross-connection exists, the customer will be required to have some form of a backflow assembly.

### **Residential:**

For new residential customers, a written questionnaire will be given upon request for water service (See Appendix D). If the survey reveals that a potential cross-connection exists, the customer will be required to have some form of a backflow assembly. Each new residential customer will agree to not create cross-connections and it will be the responsibility of the customer not to create 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.

All residential lawn irrigation systems will require a **Reduced Pressure Principle Assembly**. 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 bibb). However, if the pool or vessels is connected directly or indirectly by a hard line, a reduced pressure principle assembly is required at minimum.

#### **Well Systems:**

Wells drilled on properties that are supplied by a public water system, particularly those designed for chemigation and fertigation, will need to be inspected to ensure separation or the premises will require an approved assembly. Any well system that is connected directly or indirectly to the water system is required to disconnect or install a **Reduced Pressure Principle Assembly**. (See Appendix H)

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

**SVUD** 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. The water system 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.

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

Cross-connections, created and maintained by the customer for their 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, **SVUD** will require the problem 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 (30 days maximum for high and low hazard, 15 days maximum for high-risk high hazards) to the customer, water service will be discontinued until conditions are in line with the Cross-Connection Plan 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 (30 days maximum for high and low hazard, 15 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 **SVUD**. 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.

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

## VI. PROCEDURE FOR INSPECTIONS

**SVUD** 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. Where the customer is asked to install a **Backflow Prevention Assembly**, the customer will be supplied with a list of acceptable and approved assemblies. It will be pointed out that a unit cannot be accepted until 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 have a make, model, and orientation currently listed as acceptable by the both the water system and **TDEC**.

## **VII. TYPES OF BACKFLOW PREVENTION DEVICES**

### **A. Air-Gap Separation**

An air-gap separation is the vertical separation between the water supply line outlet and the overflow rim of the non-pressurized receiving fixture or tank. An “approved air-gap separation” must have a vertical unobstructed distance of at least twice the internal diameter of the outlet pipe but never less than one inch.

In theory, a properly designed and maintained air-gap is the best means available to protect against backflow. An air-gap is not always practical and is vulnerable to being altered to nullify its effectiveness. In certain high risk health hazard installations, an air-gap separation is highly recommended. Particular attention should be given to monitoring air-gap separation installations to see that they are not altered.

Approved air-gap separations are frequently used at sinks, showers, bathtubs, drinking fountains, etc., however, the practicality of their use elsewhere is very limited. The two main limitations to using an approved air-gap separation are briefly outlined below.

1. The protection for the water system is frequently destroyed due to modifications or being bypassed.
2. The distribution system pressure, needed by the customer for many intended water uses, is dissipated through an air-gap separation. The cost and maintenance of equipment for re-pumping or an elevated storage tank would be a financial burden on the customer.

### **B. Reduced Pressure Zone Assembly (RPZ)**

The reduced pressure zone type backflow prevention assembly contains two spring loaded resilient seat check valves with a relief valve mechanism that will automatically discharge to the atmosphere any leakage past either check valve, which might otherwise allow contamination to flow back into the water supply lines.

The check valves and relief valve function mechanically independent. The relief valve ensures that the pressure in the zone between the two check valves is always at least 2 psi lower than the pressure on the inlet side of the unit. This reduced pressure in the zone is always

maintained regardless of fluctuations in the supply pressure and flow through the assembly. Any leakage past either check valve could allow the pressure in the zone (between the check valves) to rise. The relief valve, however, will automatically discharge to the atmosphere insuring that the pressure in the zone is always at least 2 psi lower than the pressure at the inlet to the first check valve. Any leakage through either or both check valves will not result in a reversal of flow.

The reduced pressure backflow preventer assembly is normally used in locations where an air-gap separation is impractical or where there is a tendency to modify an air-gap separation. This assembly effectively protects against backflow caused by either backpressure or back siphonage condition and is used for protection against backflow of substances that may be hazardous to health. If the backflow preventer is to be installed on a hot water line, care must be taken to see that the unit is designed and approved for hot water use.

#### **C. Double Check Valve Assembly**

An approved double check valve assembly has two internally loaded, independently acting, resilient seat valves in series. The unit includes tightly closing shutoff valves located on each end of the assembly and suitable connections for testing the water-tightness of each check valve. A double check valve assembly **does not** provide the same degree of protection as the **Reduced Pressure Backflow Preventer**.

The unit will function under pressure for extended periods and, when functioning properly, will protect against backpressure and back siphonage conditions. Unlike the reduced pressure backflow preventer, protection against backflow is not provided when both check valves leak.

#### **D. Double Check-Detector Check Valve Assembly**

A double check-detector check valve assembly contains a main line double check valve assembly with a smaller factory installed double check valve assembly and meter in a bypass configuration to detect leakage or unauthorized usage. The check valves in the main line double check valve assembly are heavier loaded than the small bypass unit to ensure that if there is flow in the line, at least part of the flow registers on the bypass meter. The bypass does not interfere with flow through the main line assembly, but if the meter is read routinely, leakage, unauthorized use, or theft can be detected. It is important from a fire protection standpoint that the private fire lines

be kept free of leaks and it is very important to the water system that there be no unauthorized usage of water from unmetered fire lines. The degree of protection against backflow is identical in the double check valve assembly and in the double check-detector check valve assemblies.

**E. Atmospheric Vent Backflow Preventer**

Similar to a residential dual check, this unit has the additional feature of a vent opening to the atmosphere that allows either air to enter the unit or leakage to be vented to the atmosphere. This unit must be used in heated areas above floor level with the vent terminating a minimum of six (6) inches above drain or maximum flood level.

**F. Vending Machine Backflow Preventer**

This is a dual check with a vent to the atmosphere, designed for use in preventing carbon dioxide gas and/or carbonated water from vending machines from entering the water supply system. Carbon dioxide in water lowers the pH to the point that an appreciable amount of copper may be dissolved in water that is standing in copper pipe. Copper concentrations sufficient to cause copper poisoning may result.

**G. Hose Bibb Vacuum Breakers**

These units, which are quite common, are used in hose bibb outlets and laboratory fittings where a hose can be attached. They are designed to prevent against back siphonage situations only where the hose may be immersed in non-potable solutions.

Caution: Vacuum breakers on frost free hose bibbs must be of a design that can be drained in cold weather to prevent freezing. The use of self-draining hose bibb with a built-in vacuum breaker is highly recommended. This effectively eliminates the problem of the regular wall frost free hydrant equipped with a hose bibb vacuum breaker being destroyed in a hard freeze because someone failed to properly drain the unit.

## **VIII. PREMISES REQUIRING RPZ 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 and require a reduced pressure principle assembly:

#### **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. Petroleum processes and storage plants
18. Restricted establishments
19. Schools and Educational Facilities
20. Animal feedlots, chicken houses, and CAFOs
21. Taxidermy facilities
22. 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.

**IX. PREMISES ALLOWING DOUBLE CHECK VALVE ASSEMBLIES**

**A. Low Risk Hazards**

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 (AWWA Classifications for Fire Systems).

**X. INSPECTION AND TESTING OF BACKFLOW PREVENTION ASSEMBLIES**

**A. Approval of New Installations**

The Water System will not consider the installation of assemblies to be complete until:

1. The installation has been inspected, and approved by the water system based on 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 must be tested within a 12-month (365 days from last test) period by backflow prevention assembly testers possessing a valid Certificate of Competency from the State with a Certificate of Competency. If assembly is not tested within the 12-month period, enforcement action will be started. In conjunction with testing the assembly, an 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 the water system 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 the water systems. 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 water service to be on for testing of 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 the water system, has an obligation to work out a mutually agreeable time for testing assemblies within time allotted by the water system.

#### **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 water system 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 of 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.

### **XI. PARALLEL UNITS**

The water system 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.

## **XII. 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 Document that assemblies have been properly installed, maintained, and tested routinely.

Records to be maintained by the Water System will include, but not necessarily be limited to;

- 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. Test reports for each assembly
- E. Copies of Certificates of Competency for each tester
- F. Copies of test kit certifications
- G. Site Inspection Reports
- H. Residential written surveys
- I. Backflow incident reports

- J. Records on initial surveys, recommendations, follow-up, corrective action, routine re-inspections, etc.
- K. A file system designed to call to the attention of the cross-connection control personnel when testing and re-inspections of premises are needed.
- L. Public education pamphlets and information.

### **XIII. BACKFLOW CONTAMINATION PROCEDURES**

If contamination is caused by backflow, **SVUD** 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 local environmental 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 affected customers once water is safe;
- H. Document the details of the incident including cause, isolation, and correction, and send report to the local environmental field office;
- I. Continue to survey and inspect system for similar situations that may allow backflow.

### **XIV. MODIFICATIONS TO PLAN**

This plan may be modified from time to time to meet the needs of the utility and to meet the states requirements. The plan and procedures will be reviewed by the water system 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 manager shall be authorized to modify, as needed, this plan without the approval of the water system's governing body. The manager shall report any modifications to this plan to the board for their information, in a timely manner. The manager shall also advise the local environmental field office of any changes to this plan for their review and comments.

**XV. APPROVAL SIGNATURE**

Floyd D Ferrell

Date: 8-9-21

President, Board of Commissioners

## **APPENDIX A - TERMINOLOGY FOR BACKFLOW-PREVENTION PROGRAM**

**AIR-GAP** - The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing, fixture, or other device and the flood level rim of said vessel. An approved air-gap shall be at least double the diameter of the supply pipe, measured vertically, above the overflow rim of the vessel; and in no case less than one inch.

**ATMOSPHERIC VACCUM BREAKER** – A backpressure and backsiphonage type backflow-prevention device designed to operate under continuous pressure, including backpressure, where low-degree contaminants are involved. This device **CAN NOT** be used for isolating residential lawn sprinkler systems, etc., where pollutants may be involved

**AUXILIARY INTAKE**– Any piping connection or other device whereby water may be secured from a source other than that normally used.

**BACKFLOW**– The reversal of the intended direction of flow of water or mixtures of water and other liquids, gases, or other substances into the distribution pipes of a potable water system from any source.

**BACKFLOW PREVENTER** – A device designed to prevent reverse flow in a water system. The term should normally be used where backpressure-type backflow is implied.

**BACKFLOW PREVENTION** – A program, an ordinance, a code, a policy; designed to discover, to eliminate, to prevent all unauthorized and uncontrolled backflow and cross-connections.

**BACKFLOW-PREVENTION BY CROSS-CONNECTION CONTROL** – The installation of a backflow-prevention device at each cross-connection on a premise to protect both the premises and the Public Water Supply main ("The First Line of Defense").

**BACKFLOW-PREVENTION BY CONTAINMENT** – The installation of a backflow preventer at the service-connection to the premises to protect the Public Water Supply Main only ("The Second Line of Defense").

**BACKPRESSURE** – An increase in pressure in a Consumer's water system, or a branch of the systems, above that at the service-connection. It is generally caused by pumps, thermal expansion, or reasons other than a reduction or loss of the incoming pressure. Backpressure is generally more evident in a closed water system.

**BACKSIPHONAGE** – A reverse flow in a water system caused by a negative pressure in the incoming pipe, when the point of use is at atmospheric pressure. Backsiphonage is generally more evident in an open water system.

**BACKSIPHONAGE PREVENTER** – A device designed to prevent reverse flow in a water system. The term should be used only where a negative supply pressure is implied.

**BYPASS** – Any system of piping or other arrangement whereby the water may be diverted around any part or portion of the water purification plant.

**CERTIFIED TESTER** – A person qualified to test and repair backflow-prevention and cross-connection control devices and approved by **TDEC**

**CLOSED WATER SYSTEM** – One with a checking device installed in the service pipe. A check valve, backflow preventer, or pressure reducing valve would create a closed system.

**CONSUMER'S WATER SYSTEM** – All potable water piping, valves, fittings, and appurtenances on the premise side of the service-connection.

**CONTAINMENT** - A method of backflow prevention which requires backflow prevention preventer at the water service entrance.

**CONTAMINANT** – Any substance that, if introduced into the potable water system, could create a health hazard.

**CONTAMINATION** - An impairment of the quality of the potable water by sewage, industrial fluids or waste liquids, compounds or other materials to a degree which creates an actual or potential hazard to the public health through poisoning or through the spread of disease.

**CROSS-CONNECTION** – A physical connection or arrangement between two otherwise separate piping systems; one of which contains potable water, the other a non-potable fluid, or water of unknown quality, where there could be backflow into the potable system unless it is protected by an appropriate backflow-prevention device.

**CROSS-CONNECTION, NONPRESSURE TYPE** – A low-inlet installation where a potable water pipe is connected or extended below the overflow rim of a receptacle, or an environment, that contain a non-potable fluid, and is at atmospheric pressure.

**CROSS-CONNECTION, PRESSURE TYPE** – An installation where a potable water pipe is connected to a closed vessel, or a piping system, that contains non-potable fluid, and is above atmospheric pressure.

**DEGREE OF HAZRD** – A danger or potential danger to health, due to contaminants entering the potable water system via uncontrolled cross-connections, which can range in severity from mildly toxic to lethal.

**DOUBLE CHECK DETECTOR** – A backpressure-type backflow-prevention device designed to serve also as a detector check on fire protection systems where non-health hazard pollutants are involved. It includes a line-size approved double check valve backflow preventer with a metered bypass, into which has also been incorporated an approved double check valve backflow preventer. This device **CAN NOT** be used for isolating residential lawn sprinkler systems, etc., where pollutants may be involved.

**DOUBLE CHECK VALVE** – A backpressure-type backflow-prevention device designed for continuous or intermittent pressure, including backpressure. This device **CAN NOT** be used for isolating residential lawn sprinkler systems, etc., where pollutants may be involved.

**FAILED** - The status of a backflow prevention assembly determined by a performance evaluation based on the failure to meet all minimums set forth by the approved testing procedure.

**GENERAL MANAGER** - The (Person) appointed by the Savannah Valley Utility District Board of Commissioners to be in charge of operations of the Savannah Valley Utility District of Hamilton County, Tennessee or the authorized representative of that person vested with the authority and responsibility for the implementation of an effective cross-connection control program and for the enforcement of the provision of this policy.

**HEALTH HAZARD** - A cross-connection or potential cross-connection involving any substance that could, if introduced in the public water supply, caused death, illness, and spread disease also known as a High Hazard.

**INSPECTOR** –An individual qualified and authorized to make inspections, interpret codes, regulations, and procedures.

**INTERCONNECTION** - Any system of piping or other arrangement whereby the public water system is connected directly with a sewer, drain, conduit, pool, storage reservoir, or other device which does or may contain sewage or other waste, or liquid which would be capable of imparting contamination to the public water system.

**OPEN WATER SYSTEM** – One with no checking device installed in the service pipe. Water from the Consumer's system is free to backflow into the main, for whatever reason.

**PASSED** - The status of a backflow prevention assembly determined by a performance evaluation in which the assembly meets all minimums set forth by the approved testing procedure.

**POLLUTANT** – Any substance that, if introduced into potable water system, could be objectionable but could not create a health hazard.

**POTABLE WATER** – Any water that, according to recognized standards, is safe for human consumption.

**PRESSURE VACUUM BREAKER ASSEMBLY** - An assembly consisting of one or two independently operating spring loaded check valve(s) and an independently operating spring loaded air inlet valve located on the discharge side of the check valve(s), with tightly closing shutoff valve(s) on each side of the check valves and properly located test cocks for testing valves. This assembly is approved for internal use only and is not approved for premise isolation by the State of Tennessee.

**PUBLIC WATER SUPPLY/SYSTEM** – A water system (including but not limited to supply, treatment, transmission, and distribution facilities, and appurtenances) operated as a Public Utility that supplies potable water to the service-connection of the Consumer's water system. (Herein defined Cleveland Utilities).

**REDUCED PRESSURE PRINCIPLE ASSEMBLY** - An assembly consisting of two independently acting approved check valves together with hydraulically operating, mechanically independent, pressure differential relief valve located between the check valves and below the first check valve. These units shall be located between two tightly closing resilient seated shutoff valves as an assembly and equipped with properly located resilient seated test cocks.

**REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY** - A specially designed assembly composed of a line-size approved reduced pressure principle backflow prevention assembly with a bypass containing a water meter and approved reduced pressure principle backflow prevention assembly specifically designed for such application. The meter shall register accurately for very low flow rates of flows up to 3 gallons per minute and shall show registration for all flow rates. This assembly shall be used to protect against non-health and health hazards and used for internal protection.

**SERVICE-CONNECTION** – The point of delivery of water to a premise: the normal location of the meter. It is the end of the water purveyor's jurisdiction and the beginning of the plumbing official's and the consumers.

**VACUUM BREAKER (VB)** – A backsiphonage-prevention device that introduces air into the potable water system when the system pressure approaches zero. It is designed for use where the receptacle or environment being served is subject to atmospheric pressure only.

**VACUUM BREAKER, ATMOSPHERIC TYPE** – A backsiphonage-prevention device designed for use under flow conditions only, not to exceed 12 consecutive hours, and where it will be subject to no static pressure, and no backpressure.

**VACUUM BREAKER, PRESSURE TYPE** – A backsiphonage-prevention device designed to operate under continuous pressure; static or flowing, but no backpressure.

**VACUUM RELIEF VALVE** – A device designed to limit the degree of vacuum in a vessel or pipe, but not for cross-connection control.

## APPENDIX B - TYPICAL CROSS CONNECTION HAZARDS

The following includes premises or facilities types that usually require a reduced pressure backflow preventer in the main water service line before any branch connections and maybe found in our Water District

1. Agricultural Processing Facilities - 1 or more of the operations that transform, package, sort, or grade livestock or livestock products, agricultural commodities, or plant or plant products into goods that are used for the intermediate or final consumption including goods for nonfood use.
2. Apartments/Condos/Building Structures – single and multi-structures (4 stores or more)
3. Auxiliary Water Systems - Any premises or facility with an alternate water supply on or available to the premises. Water stored in reservoirs that are not properly protected or circulated is considered an auxiliary supply.
4. Car Wash - A building or structure with machine or hand operated facilities for the cleaning, washing, polishing or waxing of motor vehicles.
5. Cooling Systems Single Pass - Compressors, heat exchangers, air-conditioning equipment, and other water-cooled equipment that may be sewer connected.
6. Dairies and Creameries - Any place, premises or establishment where any milk or any dairy product is received or handled for processing or manufacturing or prepared for distribution.
7. Farming Operation - Poultry houses, chicken houses with automatic proportioning pumps or feeder barrels for supplying water with live virus or other medication, livestock watering troughs with below the rim filling outlet, diluting and mixing of pesticides and insecticides, mixing and spray equipment, greenhouses, dilution of liquid fertilizers, dairies, unprotected hose bibbs.
8. Fire Systems - Piping systems and storage reservoirs that may be treated for prevention of scale formation, corrosion, algae, or slime from water sitting for lengths of time. Fire systems with an auxiliary source of supply or which are located within 1700 ft. of streams, lakes, ponds, reservoirs, or other non-potable waters that could be utilized in emergencies.

9. Food Processing - Pressure cookers, autoclaves, retorts, and other steam connected facilities.
10. Greenhouse/Nursery - Structure with the sides primarily made of a transparent material such as glass or plastic for the purpose of growing of plants or hastening growth of plants under controlled environment using agriculture chemicals.
11. Hospital/Lab/Health Facility – Structures that may have unprotected connections to bedpan washers, hydrotherapy tubs, toilets, urinals, autopsy and mortuary equipment, aspirators, x-ray and photo processing equipment, vacuum pump seals. May have unprotected connections from laboratory equipment which may be chemically or bacteriologically contaminated, such as, steam sterilizes, autoclaves, specimen tanks, and pipette washers.
12. Irrigation Systems, public or private – Underground water system equipped with pumps, injectors, pressurized tanks, or other facilities for injecting agricultural chemicals, such as, fungicides, pesticides, herbicides, and other toxic or objectionable substances.
13. Laundromats - means an establishment containing one or more washers, and could include drying, ironing, finishing and incidental equipment, provided that only water, soaps and detergents are used and provided
14. Power Plants - A facility for the generation of electricity that is permitted as a single plant by the energy facility site evaluation council or a local jurisdiction. A power plant may be comprised of one or more individual electrical generating units, each unit of which can be operated or owned separately from the other units.
15. Private Wells - Any manmade opening into the ground developed for the purpose of meeting a person's current potable drinking water needs provided said well does not supply a public water system.
16. Restaurants – An establishment that is licensed to provide food services to the public.
17. Restricted Establishments – Facilities or areas that are used for special use purposes and are not available for inspection.
18. Sand and Gravel Plants – Locations used to produce sand and gravel

19. Schools and Colleges – Includes public and private schools starting with Elementary Level
20. Sewage Treatment Plants – Any arrangement of devices and structures used for treating sewage.
21. Sewage Pumping Stations – Any arrangement of devices within a structure used for lifting and forcing out sewage.
22. Shopping Center (Occupancy unknown) – Building or buildings containing two or more stores that are used primarily for retail sales but may include commercial trade or professional uses.
23. Swimming Pools, Ponds and Fountains – Any natural or artificial basin used for swimming, wadding or recreational use that is connected to a mechanical suction device for removing or recirculating the water.
24. Travel trailer park or trailers – An area, usually with piped water, electricity, etc., designed to provide rental space for trailers, esp. mobile homes, to be parked for a long or short time.
25. Vegetable and Food Processing Facilities - A type of food service establishment that is a commercial operation that processes food for human consumption, and provides processed food for sale and distribution to other business entities such as other food establishments.
26. Water Treatment Plants – Facility used to treat water for private or public consumption.
27. Wastewater Treatment Plants – Facility used to treat waste or sewage material for private or public use.

**APPENDIX C - PUBLIC NOTICE AND AWARENESS**

**Newspaper Notice  
(Fall Version)**

**NOTICE**

Over the next few weeks, the cooler temperatures will bring people outdoors to work in their yards, finish gardening and begin getting swimming pools ready for winter. Savannah Valley Utility District would like to ensure that our customers are aware of the dangers associated with these activities. A garden hose submerged in any liquid or attached to certain devices used to spray pesticides or herbicides forms a cross connection. A cross connection is a situation where a possible source of contamination is directly linked to our public water system. If the end of your hose is connected to a chemical container, swimming pool or other contaminant during a water main break or fire, the substance can be siphoned back into the water system. This condition, known as back siphonage, could cause a public health hazard. Devices are available to prevent this problem; however, the best solution is to always be careful how you use your hose.

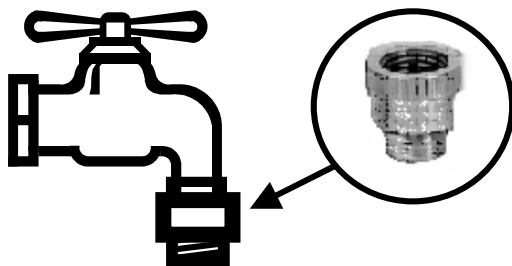
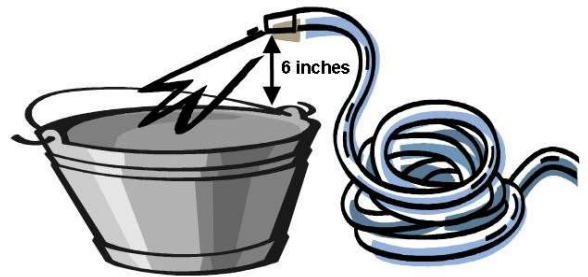
Please help us provide a safe supply of water to all of our customers. Remember; never stick your hose in anything you would not want to drink. For more information on cross connections and how to protect against them, call our main office at 423-344-8440.

## Customer Handout

Savannah Valley Utility District makes every effort to ensure that our customers enjoy a continuous supply of safe drinking water. We appreciate the help of our customers to maintain the quality of our water supply.

Cross Connections can cause the water system to become contaminated. A cross connection is a link with the public water supply and a possible source of contamination. An example of a cross connection would be a garden hose submerged in a source of contamination such as a swimming pool, car radiator or other liquid. If a water main break should occur or if a fire pumper used a fire hydrant while the hose was submerged in a source of contamination, the contaminant could be pulled back into the public water supply. This occurrence, known as backflow, can be prevented.

One simple way to stop backflow is by using an air gap. An air gap can be created by arranging your hose so that the end is at least six inches above the top rim of the container it is being used to fill. This air gap will prevent the contaminant from being siphoned into the water supply.



Another method of preventing backflow with a garden hose is using a device known as a vacuum breaker. Vacuum breakers are inexpensive devices that can be screwed onto your outside faucet. These devices will prevent contaminants from being siphoned back into your plumbing and the public water system.

More hazardous cross connections or cross connections created with permanently installed plumbing may require more sophisticated devices known as reduced pressure backflow preventers. These devices are much more complicated and must be tested annually by certified testers.

For more information on preventing cross connections and protecting our water supply, contact the main office at 423-344-8440.

**REMEMBER: Never submerge your garden hose in anything you would not want to drink!**

**APPENDIX D - CROSS CONNECTION SURVEY**

SAVANNAH VALLEY UTILITY DISTRICT CUSTOMER  
CROSS CONNECTION SURVEY

TENNESSEE STATE WATER REGULATIONS REQUIRE SUPPLIERS OF PUBLIC WATER TO MAINTAIN RECORDS OF POSSIBLE CROSS CONNECTIONS TO THEIR SYSTEM. IF ANY OF THE ITEMS BELOW APPLY TO YOUR ACCOUNT, IT IS IMPORTANT THAT YOU COMPLETE THIS FORM AND RETURN IT TO OUR OFFICE.

DATE: \_\_\_\_\_

CUSTOMER NAME: \_\_\_\_\_

SERVICE ADDRESS: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

ARE ANY OF THE FOLLOWING LOCATED AT THIS SERVICE ADDRESS? (CHECK ALL THAT APPLY)

- WATER WELL
- LAWN SPRINKLER / IRRIGATION SYSTEM
- SWIMMING POOL / SPA
- FIRE SPRINKLER SYSTEM
- CATTLE /LIVESTOCK WATERER
- WATER STORAGE TANK
- CHEMICAL STORAGE

## **APPENDIX E - STATE GUIDANCE FOR BACKFLOW PREVENTION ASSEMBLIES**

All assemblies, used to protect the public water supply, must be approved by the Division of Water Supply. New installation and replacement assemblies required by a public water system must be included on the latest listing of the Approved List maintained by the Division of Water Supply. A backflow prevention device will qualify as an assembly, if it is consistent with the following definitions:

### **Double Check-Detector Check Valve Assembly**

A specially designed unit composed of a line size approved double check valve assembly with a specific bypass line equipped with a small water meter and a ¾ inch approved double check valve assembly. The meter shall register accurately for only very low rates of flow and shall show a registration for all rates of flow. The meter will detect small leakage or theft of water for un-metered fire lines. This assembly is designed for fire service lines and is recommended for un-metered fire lines. This assembly is designed to protect against a low hazard or pollutant.

### **Double Check Valve Assembly**

An assembly composed of two independently acting, approved check valves, including tightly closing shutoff valves located at each end of the assembly and fitted with properly located test cocks. This assembly is designed to protect against a low hazard or pollutant.

### **Reduced Pressure Principle Backflow Prevention Assembly**

An assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit shall include properly located test cocks and tightly closing shutoff valves at each end of the assembly. This assembly is designed to protect against a health hazard (i.e. contaminant).

### **Reduced Pressure Principle-Detector Backflow Prevention Assembly**

A specially designed assembly composed of a line-size approved pressure principle backflow prevention assembly with a bypass containing a specific water meter and an approved reduced pressure principle backflow prevention assembly. The meter shall register accurately for only very low rates of flow up to 3 GPM and shall show a registration for all rates of flow. This assembly shall be used to protect against a non-health hazard or a health hazard. The RPDA is

primarily used on fire sprinkler systems. This assembly is designed to protect against a health hazard (i.e. contaminant).

The following assemblies will meet recommendations and requirement for protection of the water system:

1. Reduced Pressure Principle Assembly
2. Reduced Pressure Principle Detector Assembly
3. Double Check Valve Assembly\*
4. Double Check Valve Detector Assembly\*

\* Double Check Valve Assemblies and Double Check Valve Detector Assemblies are permissible on non-chemical fire lines Class 1-3 only. Use of these assemblies is at discretion of the water purveyor.

Atmospheric Vacuum Breakers, Pressure Vacuum Breakers, and Spill-Resistant Pressure Vacuum Breakers are not approved by the Division of Water Supply for premise isolation.

#### **For Existing Assemblies not on Approved List**

Assemblies not listed on the Approved List may be accepted by the Division of Water Supply as an approved assembly under very strict guidelines. The water purveyor may elect, at their discretion, to accept only assemblies listed on the Approved List in order to establish the utmost confidence in backflow protection and prevention.

The Division of Water Supply highly recommends the use of assemblies listed only on the Approved List. Approval of assemblies not listed on the Approved List will be considered on a case-by case basis by the water system with fulfillment of these requirements:

1. Approved plan and policy/ordinance of water purveyor at the time of installation did not address or require assemblies from Approved List. Plan or policy/ordinance must be amended and approved, if needed, to allow unapproved existing assemblies that meet the following requirements.
2. Assembly must meet all installation criteria required by the water provider

3. Must meet the definition of assembly and is annually tested. The assembly must be deemed **Passed** to remain as an acceptable and approved backflow prevention assembly for the protection of the water system.
4. Installation, operation, and maintenance of the assembly will provide adequate protection against backflow.
5. Assembly must be repaired using manufacturer-specified parts in accordance to procedures outlined by manufacturer.
6. A written plan must be reported by the water provider concerning the assembly not shown on the latest Approved List. The plan will specify all conditions and information concerning the assembly including manufacturer, model, serial number, installation, repair information (if available), time line of replacement (depending on type of hazard and risk of contamination) if assembly cannot be repaired in accordance with manufacturer procedures. All plans and worksheets must be completed and kept on file by the water system.
7. If assembly cannot be repaired according to the manufacturer-specified procedures, it must be replaced with an assembly listed on the latest Approved List. The replacement assembly will be installed, operated, and maintained in accordance to the approved plan/policy/ordinance of the water purveyor.

## APPENDIX F - STATE GUIDANCE FOR BACKFLOW PREVENTION ASSEMBLY PERFORMANCE EVALUATIONS

Performance evaluations are needed to demonstrate that all parts of the assemblies are performing as designed and as approved.

1. Performance evaluations must be performed on every assembly at least annually.
2. Each backflow prevention assembly must be deemed **Passed** to remain approved and acceptable protection for the public water system.

**Passed:** The status of a backflow prevention assembly determined by a performance evaluation in which the assembly meets all minimum standards set forth by the approved testing procedure.

### **Reduced Pressure Principle Assembly:**

- a. Relief Valve must have an opening point of 2.0 psid or greater
- b. Backpressure on Check Valve #2 must hold tight.
- c. Static Pressure Drop across Check Valve #1 must be 3.0 psid or greater than relief valve opening point.
- d. Shutoff Valve #2 must hold tight.
- e. Static Pressure Drop across Check Valve #2 must be 1.0 psid or greater.

### **Double Check Valve Assembly:**

- a. Static Pressure Drop across Check Valve #1 must be 1.0 psid or greater.
  - b. Backpressure on Check Valve #2 must hold tight.
  - c. Shutoff Valve #2 must hold tight.
  - d. Static Pressure Drop across Check Valve #2 must be 1.0 psid or greater.
3. The Backflow Prevention Assembly Tester must have, at minimum, a valid Certificate of Competency in Testing and Evaluation Backflow Prevention Assemblies and a valid test kit certification by a manufacturer-approved entity.

4. Backflow Prevention Assembly Testers must test and evaluate according to the latest Division of Water Supply's approved procedures.
5. Test kits must be certified annually and the water provider and tester must show proof of certification from manufacturer-approved entities.
6. Proof of annual test kit certification and Certificate of Competency must be current and kept on file for each tester by water provider for five years.
7. Test reports must be completely and accurately documented and the appropriate evaluation determined from testing procedure.
8. All correspondence and documentation pertaining to each backflow prevention assembly will be kept on file by the water provider for at least five years. This includes, but not limited to, test reports, repair reports and installation records.
9. Each location requiring an assembly will have a documented backflow prevention assembly, if the assembly at the address cannot be identified or is not the correct assembly, the water provider will be notified.
10. Every assembly must pass each part of the Performance Evaluation. If any test does not meet the minimum requirements set forth in the testing procedure, the assembly is deemed **Failed**. If conditions around the assembly do not allow the assembly to be tested, the assembly fails the assembly performance evaluation. (Examples would include assembly is submerged, test cocks missing or plugged, relief valve continually discharging)

**Failed:** The status of a backflow prevention assembly determined by a performance evaluation based on the failure to meet all minimum standards set forth by the approved testing procedure.

11. Assemblies must be tested when installed and after every repair. Backflow prevention assemblies on lawn irrigation systems must be tested when assemblies are placed in service. If lawn irrigation backflow assemblies are taken out of service to winterize the system, upon startup of the system, the assemblies must be retested.
  
12. Water systems may elect to place additional requirements on assembly testers as long as there is no conflict with State statute or regulation.

**APPENDIX G - STATE GUIDANCE FOR CERTIFICATE OF COMPETENCY FOR TESTING AND  
EVALUATING BACKFLOW PREVENTION ASSEMBLIES**

The information listed below is guidance concerning Certificate of Competencies:

1. Anyone testing backflow prevention assemblies for the purposes outlined in the water system's Cross-Connection Control Ordinance or Policy/ordinance must have a **valid** Certificate of Competency in Testing and Evaluation of Backflow Prevention Assemblies issued by the Division of Water Supply.
2. A valid certificate is defined as a Certificate (Basic or Renewal) issued by the state of Tennessee that has not surpassed the three-year time limit from issuance. After certificates have been granted by the State of Tennessee, a Certificate No. is assigned to the applicant. Certificates are valid for three (3) years after certificates are granted. All Certificates are no longer valid, if the Renewal Certificate is not attained within three (3) years from the date the certificate was issued. A 1 year grace period is allowed to attend the renewal class however, the person must not be allowed to test after the 3 year expiration.
3. The applicant must complete and satisfy all requirements set forth by the Division of Water Supply to attain and renew the Certificate of Competency.
4. Applicant must successfully complete a State-approved Basic Cross-Connection Control training session, written exam, and practical exam to attain an initial Certificate of Competency. The student must successfully complete a State-approved Renewal Cross-Connection Control training session and practical exam to renew the Certificate of Competency.
5. Certificate of Competency must be valid in order to perform assembly evaluations.
6. In order to renew the Certificate of Competency, a Renewal Course and Exam must be taken within three years after the issuance date to remain valid.

7. If the Certificate of Competency is not renewed three years after issuance, the certificate is no longer valid, but does not expire.
8. A one-year grace period to renew the Certificate of Competency is allowed once the three year time limit has passed.
9. Water providers will not accept a test report from a tester whose certificate is in the grace period or has expired.
10. If the tester does not renew during the one-year grace period, the certificate expires and the tester must take the Basic Course and Basic Exam in order to attain the Certificate of Competency.
11. The Certificate of Competency is not transferable and no one may work “under” the certificate.
12. A Plumber Certificate in Testing and Evaluating Backflow Prevention Devices issued by Division of Water Supply cannot be substituted and will not be accepted in place of the Certificate of Competency.
13. Certificates of Competency in Testing and Evaluation of Backflow Prevention Assemblies from other states or entities will only be accepted if approved by the Division of Water Supply. No entities or states presently have an approved Certificate of Competency.
14. Water providers may elect to impose additional restrictions on testers within their systems, as long as the State’s statutes, regulations, and policies are met.

**For Minimum Requirements in Plan and Ordinance/Policy:**

Anyone testing backflow prevention assemblies for the purposes outlined in the water system’s Cross-Connection Control Ordinance or Policy/ordinance must possess a **valid** Certificate of Competency in Testing and Evaluation of Backflow Prevention Assemblies issued only by the Division of Water Supply.

## APPENDIX H - STATE GUIDANCE CONCERNING LAWN IRRIGATION SYSTEMS AND WELL SYSTEMS

Lawn irrigation systems, both commercial and residential, are recognized by the State of Tennessee, Division of Water Supply as an actual and potential cross-connection to a public water system. The contact between the sprinkler heads and the soil or submergence of sprinkler heads allows a connection between the potable water system and water of unknown or unsafe quality.

Soil and standing water in contact with the sprinkler heads poses a significant risk of containing E. coli, Cryptosporidium, Giardia, other pathogens, and hazardous chemicals used for lawn care. Many lawn irrigation systems use toxic chemicals injected in the piping to fertilize and eliminate undesired plants.

### **Required Protection for Lawn Irrigation Systems by Public Water Systems:**

- For public water systems to protect their distribution lines, lawn irrigation systems are protected by a **Reduced Pressure Principle Assembly** or **Reduced Pressure Principle Detector Assembly**.
- Double Check Valves cannot be used for premise isolation on lawn irrigation systems. Double Check Valves may be used for non-health hazards only. Water which contains or may contain pathogens or harmful chemicals is considered a health hazard and must be protected by a **Reduced Pressure Principle Assembly** or **Reduced Pressure Principle Detector Assembly** only.
- Pressure vacuum breakers, Spill-resistant vacuum breaker, and atmospheric vacuum breakers may not be used to protect the public water system's main-line piping or distribution system. These devices are point-of-use devices and may not be used for premise isolation.
- Assemblies must be tested annually.
- Assemblies on lawn irrigation systems must be tested during the start-up period (typical maximum time limit is within 90 days). Annual testing just prior to winterization or seasonal shutdown is not acceptable. Testing may also be initially staggered in order to reduce problems with scheduling tests.

### **Required Protection for Lawn Irrigation Systems on Well Systems:**

- Lawn irrigation systems on well systems with chemical additional systems are protected by a **Reduced Pressure Principle Assembly** or **Reduced Pressure Principle Detector Assembly**.
- Double Check Valves cannot be used on lawn irrigation systems. Double Check Valves may be used for non-health hazards only. Water which contains or may contain pathogens or harmful chemicals is considered a health hazard and must be protected by a **Reduced Pressure Principle Assembly** or **Reduced Pressure Principle Detector Assembly** only.
- Pressure vacuum breakers, Spill-resistant vacuum breaker, and atmospheric vacuum breakers may not be used to protect the well system. These devices are point-of-use devices and may not be used for premise isolation.

- Assemblies should be tested periodically.
- The assembly is placed immediately after the pressure tank.
- The number 1 test cock may be used as a sampling port.

## APPENDIX I - STATE GUIDANCE FOR RESIDENTIAL AND COMMERCIAL FIRE SPRINKLER SYSTEMS

Public water systems must protect their distribution system from cross-connections with residential and commercial fire sprinkler systems. Level of protection is determined by the degree of hazard.

### **Degree of Hazard:**

**Non-health Hazard:** Pollutants that will not cause illness or death.

- Commercial fire sprinkler systems: Classes 1-3 (Systems with no hazardous chemical additives)
- Residential fire sprinkler systems: Closed Fire Protection Systems (Systems that do not circulate fresh water through system, lines that dead end without connecting to domestic supply)

### **Minimum Protection for Non-Health Hazards Required by Public Water System:**

Double Check Valve or Double Check Valve Detector Assembly

The following Residential Fire Protection Systems do not require backflow prevention assemblies due to circulation of fresh, potable water throughout the system:

- **Flow-Through Protection Systems-** Domestic and Fire System split after meter and reconnect at the end to a clothes washer, dishwasher, toilet or other fixture to prevent water from becoming stagnant.
- **Protection Systems-** Domestic and Fire System are all on one line. Use of Domestic water prevents system from becoming stagnant.

**Health Hazard:** Contaminants that cause illness or death.

- Commercial fire sprinkler systems: Classes 4-6 (Systems with chemical additives-ethylene glycol, MIC (Microbiologically Influenced Corrosion) inhibitors, anti-foaming agents)
- Residential fire sprinkler systems: Any residential fire sprinkler system with harmful chemical additives or connections to hazardous chemicals.

**Minimum Protection for Health Hazards Required by Public Water System:**

Reduced Pressure Principle or Reduced Pressure Principle Detector Assembly

**Note of Importance:**

Testing fire sprinkler system backflow prevention assemblies may be restricted and regulated by other State departments or divisions. All backflow prevention assemblies required by the public water supply to protect the distribution system must be tested annually. If backflow prevention assemblies on fire sprinkler systems cannot be tested by the public water system, amendments to the policy or ordinance may be needed to allow the testers with appropriate licenses or certifications required by other entities to perform assembly evaluations.

## APPENDIX J - FROST PROOF HYDRANT – INSTALLATION CRITERIA

Frost proof hydrants prevent damage to hydrants during cold weather. Properly installed hydrants pose virtually no hazard to the distribution system. However, frost proof hydrants, if not properly installed, may constitute a hazard not only to the water system, but also to those who may consume water from the hydrant. The freeze proof hydrants and drinking fountains utilize drains to subsurface pits. When the hydrant is closed, a drain at the bottom of the hydrant is opened. This could allow contaminated water to run back into the barrel of the hydrant if the surrounding ground becomes saturated because of heavy rainfall, heavy hydrant usage, and poor soil percolation. If frost proof hydrants cannot be installed without the high risk of contamination, the following recommendations may need to be considered.

### Acceptable Means of Protection:

- A. Where conditions permit, a conventional frost free hydrant can be fitted with a watertight pipe sloped to drain to the atmosphere. Such a drain must extend above ground level and not be subject to flooding.
- B. The use of hydrants of a design which do not use subsurface drains, such as:
  - 1. Murdock “Ejecto-San” style Post water hydrant/jug filler, Models ESH-65, ESH-65LB, and ESHSC-65
  - 2. Murdock trimline, push button, fountain/hydrant, Model TLFH-60, Note: This unit is not a freeze proof design
  - 3. Murdock “Ejecto-San style drinking fountain/jug filler combination Model ESHD-3565
  - 4. Murdock “Expelo” hydrant – The Murdock Mfg. & Supply Co.
    - a. 2488 River Rd. Cincinnati, Ohio 45204
  - 5. American No. 126 – American Foundry & Mfg. Co. 920 Palm Street St. Louis, MO 63160
  - 6. KenRay Brass Model 841 – KenRay Brass Products, Inc. Vermont, IL
  - 7. Josam No. 1445 – Josam Mfg. Co. Michigan City, Indiana
  - 8. White Water Model 256 – White Water Mfg. Co. Whitewater, WI 53190

**APPENDIX K - WELL USER AGREEMENT OF NON-USE OR CONNECTION TO THE PUBLIC WATER SUPPLY**

In accordance with Water System’s Cross Connection Control program and state law, a private well or auxiliary water source may not be connected in any manner to the public water supply unless proper protection against cross connection is provided. Only a Reduced Pressure Backflow Preventer or an approved air gap (complete separation from public water supply) may be used for protection. These devices must have prior approval by Water System. Customers using the public water supply and not in compliance with this rule will have their water service discontinued.

**Check appropriate box:**

- This serves as notification that a well is located on the property at the following address:*
- This serves as notification that a well is not located on the property at the following address:*

\_\_\_\_\_

Please type or print

\_\_\_\_\_

\_\_\_\_\_

I (we) understand and agree that this system is, and shall remain totally segregated from the public water supply, and no unapproved or unauthorized cross connections, auxiliary intakes, bypasses, or interconnections with any type of irrigation systems or otherwise will be permitted without the proper cross connection control device and approval of the Water System.

I (we) further understand and agree that should an auxiliary water supply be connected to the public water system at the above address, maximum cross connection control equipment in the form of an approved air gap or reduced pressure backflow prevention device shall be installed to protect the public water supply.

Date: \_\_\_\_\_

Name: \_\_\_\_\_ Notary: \_\_\_\_\_

Signature: \_\_\_\_\_ Commission Expires: \_\_\_\_\_