

STATE OF MISSOURI  
**DEPARTMENT OF NATURAL RESOURCES**

Mel Carnahan, Governor • David A. Shorr, Director

DIVISION OF ENVIRONMENTAL QUALITY  
P.O. Box 176 Jefferson City, MO 65102-0176

September 15, 1997

Mr. Hugh A. Curry, P.E.  
State Conservation Engineer  
Natural Resources Conservation Service  
Parkade Center, Suite 250  
601 Business Loop 70 West  
Columbia, Missouri 65203

Dear Mr. Curry:

First, let me apologize for not responding sooner to your letter of June 2, 1997. In regard to livestock watering systems, specifically those served by public water systems, our department does have certain concerns for the safety of the public water supply. In situations involving a direct connection between the public water system and a livestock watering system, there exists the potential to introduce contaminants when water pressures fluctuate due to high usage or water main breaks. These conditions provide the means for backflow to occur. Backflow is defined as the unwanted reversal of flow in a water distribution system.

Enclosed is a copy of our state regulation, 10 CSR 60-11.010, Prevention of Backflow. This regulation establishes the requirements for protection of public water supplies from the introduction of contaminants due to backflow. Although livestock watering systems are not specifically listed as an actual or potential hazard, Section (3)(E) provides a means for their identification and designation as a potential hazard.

For the majority of livestock watering systems, an air gap separation between the water supply piping and the receiving vessel would constitute adequate protection for essentially no cost. However, there may be extenuating circumstances where a mechanical backflow prevention assembly would be necessary. In either case, an inspection by a qualified person to verify proper installation would be required. If you have details of or recommendations for specific installations, I would appreciate receiving that information.

If you have any additional questions after reviewing the referenced regulation, please feel free to contact me at (573) 751-4594.

Sincerely,

PUBLIC DRINKING WATER PROGRAM



Michael Logston, P.E.  
Environmental Engineer

ML:cb

Enclosure



Mr. Jerry L. Lane  
Missouri Department of Natural Resources  
Division of Environmental Quality  
Public Drinking Water Program  
P.O. Box 176  
Jefferson City, MO 65102-0176

June 2, 1997

Dear Mr. Lane:

The Natural Resources Conservation Service, formerly Soil Conservation Service, is a U. S. Department of Agricultural agency which provides assistance to landowners in addressing natural resource concerns. This involves assisting livestock producers with livestock watering systems. Many times the source of water is from existing or planned ponds or impoundment structures. But sometimes the use of public water supplies is a more economical alternative.

As our employees work with landowners to plan and install livestock watering systems, what health and safety rules and regulations should be followed? We recognize that the requirements may vary from one water district to another.

Would you please provide a copy of any State safety and health regulations that pertain to rural public water supplies?

If you or a member of your staff has any questions for us, feel free to contact Richard Koenig or Neil Pellmann in Columbia. Our telephone number is (573) 876-0910 and FAX (573) 876-0913.

Thank you in advance for your assistance.

HUGH A. CURRY P.E.  
State Conservation Engineer

cc: Richard Koenig, Head, Design Section  
Neil Pellmann, Agricultural Engineer

**Title 10—DEPARTMENT OF  
NATURAL RESOURCES**  
**Division 60—Public Drinking Water  
Program**  
**Chapter 11—Backflow Prevention**

**10 CSR 60-11.010 Prevention of Backflow**

*PURPOSE: This rule establishes requirements for protection of public water systems from introduction of contaminants by backflow.*

**(1) Applicability, Exemptions and Compliance Dates.**

(A) Applicability. This rule applies to all community water systems.

**(B) Exemptions.**

1. This rule does not apply to customer facilities used solely for residential purposes unless a cross-connection is specifically identified or the rule indicates otherwise.

2. The department may issue an exemption from the requirements of paragraphs (3)(A)1. and (3)(B)1. of this rule if the customer can demonstrate to the department, the local governmental authority (if one exists) and the supplier of water that the activities taking place at the customer's facility and the materials used in connection with these activities or stored on the premises cannot endanger the health of customers or degrade the water quality of the public water system should backflow occur, or that any potential risk posed by these materials or activities is isolated from the public water system. Those customers granted an exemption in accordance with this paragraph shall report to the supplier of water any proposed change in process, plumbing or materials used or stored at the exempted facility at least fourteen (14) days prior to making the change.

3. Any exemption granted under paragraph (1)(B)2. of this rule shall be void if the supplier of water, local governmental authority (if one exists) or the department determines that the customer facility has become an actual or potential backflow hazard, or if the customer fails to provide notice at least fourteen (14) days prior to making any change in process, plumbing or materials used or stored at the facility.

(2) Cross-Connections. No customer shall cause or allow the construction or maintenance of an unprotected cross-connection.

**(3) Backflow Control by Containment.**

**(A) Class I Backflow Hazards.**

1. A Class I backflow hazard presents an actual or potential health hazard to customers of the public water system should backflow occur. The customer or the customer's autho-

rized representative shall construct a department-approved air-gap separation or install a reduced pressure principle backflow prevention assembly on the customer service line, in accordance with section (4) of this rule, when—

A. The supplier of water or local governmental agency (if one exists) requires protection from an actual or potential Class I backflow hazard at any facility;

B. Modification is made to the customer water system at an existing facility which is designated an actual or potential backflow hazard in paragraph (3)(A)2. of this rule. If an addition or modification requiring a separate customer service line is made to an existing facility, the new service line as well as the existing customer service line shall be equipped with department-approved backflow prevention assemblies;

C. A new customer service line connection is made to a facility listed in paragraph (3)(A)2. of this rule; or

D. A backflow incident occurs which introduces a contaminant into the public or customer water system which may create a health hazard.

2. Following is a list, not all inclusive, of actual or potential Class I backflow hazards:

A. Aircraft and missile manufacturing plants;

B. Automotive plants including, but not limited to, those plants which manufacture motorcycles, automobiles, trucks, recreational vehicles and construction and agricultural equipment;

C. Potable water dispensing stations which are served by a public water system;

D. Beverage bottling plants including, but not limited to, dairies, soft drink bottlers, and breweries;

E. Canneries, packing houses and reduction plants;

F. Car washes;

G. Chemical, biological and radiological laboratories including, but not limited to, those in high schools, trade schools, colleges, universities and research institutions;

H. Hospitals, clinics, medical buildings, autopsy facilities, morgues, mortuaries, veterinary facilities, dental clinics, and other medical facilities;

I. Metal or plastic manufacturing, fabrication, cleaning, plating or processing facilities;

J. Plants manufacturing paper and paper products;

K. Plants manufacturing, refining, compounding or processing fertilizer, film, herbicides, natural or synthetic rubber, pesticides, petroleum or petroleum products,

pharmaceuticals, radiological materials or any chemical which would be a contaminant to the public water system;

L. Commercial facilities that use herbicides, pesticides, fertilizers or any chemical which would be a contaminant to the public water system;

M. Plants processing, blending or refining animal, vegetable or mineral oils;

N. Commercial laundries and dye works;

O. Sewage, storm water and industrial waste treatment plants and pumping stations;

P. Waterfront facilities including piers, docks, marinas and shipyards;

Q. Industrial facilities which recycle water;

R. Restricted or classified facilities or other facilities closed to the supplier of water or the department;

S. Fire sprinkler systems using any chemical additives;

T. Auxiliary water systems, including but not limited to alternative water sources;

U. Irrigation systems with facilities for injection of pesticides, herbicides or other chemicals or with provisions for creating back pressure. The backflow assembly may be installed between the customer service line and the irrigation system;

V. Portable tanks for transporting water taken from a public water system;

W. Facilities which have pumped or repressurized cooling or heating systems that are served by a public water system; and

X. Facilities which contain any boiler system and are served by a public water system. The backflow assembly may be installed on the water service line to the boiler.

**(B) Class II Backflow Hazards.**

1. A Class II backflow hazard threatens to degrade the water quality of the public water system should backflow occur. The customer or the customer's authorized representative shall install, as minimum protection for Class II backflow hazards, a department-approved double check valve assembly on the customer service line in accordance with section (5) of this rule when—

A. The supplier of water or local governmental agency (if one exists) requires protection from an actual or potential Class II backflow hazard at any facility;

B. Modification is made to the customer water system at an existing facility which is designated an actual or potential backflow hazard in paragraph (3)(B)2. If an addition or modification requiring a separate customer service line is made to an existing facility, the new service line, as well as the existing customer service line, shall be

equipped with department-approved backflow prevention assemblies;

C. A new customer service line connection is made to a new facility listed in paragraph (3)(B)2.; or

D. A backflow incident occurs in any situation described in paragraph (3)(B)2. or subsection (3)(C).

2. Following is a list, not all inclusive, of actual or potential Class II backflow hazards:

A. Tanks to store water from the public water system for fire fighting only, unless the tanks meet the requirements of the department for construction to maintain bacteriological quality of the water;

B. Fire sprinkler systems not using chemical additives. This only applies to new fire sprinkler systems or fire sprinkler systems scheduled for modifications;

C. Irrigation systems without facilities for injection of pesticides, herbicides or other chemicals. The backflow assembly may be installed between the customer service line and the irrigation system; and

D. Cross-connections that could permit introduction of contaminants into the public or customer water system and create a nuisance, be aesthetically objectionable or cause minor damage to the public water system or its appurtenances.

(C) Customer facilities not designated a backflow hazard by subsection (3)(A) or (B) may be designated a Class I or Class II backflow hazard by written notification from the supplier of water or the department to the customer. The notice shall specify the nature of the customer activity which necessitates designation of the facility as a backflow hazard, the type of backflow protection required and the date by which the customer shall install or construct this assembly on the customer service line to the facility.

(D) Following is a list of facilities, not all inclusive, considered to be actual or potential Class II backflow hazards:

1. Tanks to store water from the public water system for fire fighting only, unless the tanks meet the requirements of the department for construction to maintain bacteriological quality of the water;

2. Fire sprinkler systems not using chemical additives;

3. Irrigation systems without facilities for injection of pesticides, herbicides or other chemicals and without provisions for creating back pressure. The backflow assembly may be installed between the customer service line and the irrigation system; or

4. Cross-connections that could permit introduction of contaminants into the public or customer water system and create a nuisance,

be aesthetically objectionable or cause minor damage to the public water system or its appurtenances.

(E) Customer facilities not designated a backflow hazard by subsection (3)(B) or (C) may be designated a backflow hazard by written notification from the supplier of water or the department to the customer. The notice shall specify the nature of the customer activity which necessitates designation of the facility as a backflow hazard, the type of backflow protection required and the date by which the customer shall install or construct this assembly on the customer service line to the facility.

(4) Department-Approved Backflow Prevention Assemblies.

(A) The department shall maintain a current list of approved backflow prevention assemblies and shall make this list available to the public upon request.

(B) The discharge pipe of an approved air-gap shall terminate a minimum of two (2) pipe diameters of the discharge pipe above the flood level rim of the receiving vessel; in no case shall the distance be less than one inch (1").

(C) Only those models of double check valve assemblies and reduced pressure principle backflow prevention assemblies which are approved by the Foundation for Cross Connection Control and Hydraulic Research of the University of Southern California and are on the approved list maintained by the department are acceptable.

(5) Standards of Construction and Installation.

(A) Reduced pressure principle backflow prevention assemblies shall be installed with no plug or additional piping affixed to the pressure differential relief valve port (except for specifically-designed funnel apparatus available from the manufacturer) and with the pressure differential relief valve port a minimum of twelve inches (12") above floor level. Additionally, the assembly shall be installed at a location where any leakage from the pressure differential relief valve port will be noticed, that allows easy access to the assembly for maintenance and testing, and that will not subject the assembly to flooding, excessive heat or freezing.

(B) All double check valve assemblies shall be installed at a location that allows easy access to the assembly for maintenance and testing and that will not subject the assembly to excessive heat or freezing.

(C) Backflow prevention assemblies shall be installed on the customer water system as close as possible to the point of service con-

nection and prior to any other connection or branch line. If it is not possible to install the backflow prevention assembly as described, then installation shall be at the approval of the department.

(D) No bypass piping shall be allowed around a backflow prevention assembly unless the bypass is equipped with the same degree of backflow prevention protection.

(6) Backflow Prevention Assembly Testing and Inspection.

(A) All backflow prevention assemblies shall be inspected and tested by testers certified in accordance with the requirements and procedures in 10 CSR 60-11.030.

(B) Air-gaps shall be inspected each year by a date which is no later than thirty (30) days past the anniversary date established by the supplier of water to ensure that they continue to meet the requirements of subsection (4)(A).

(C) Reduced pressure principle backflow prevention assemblies shall be tested by a certified backflow prevention assembly tester each year by a date which is no later than thirty (30) days past the anniversary date established by the supplier of water to ensure that—

1. The pressure differential relief valve operates to maintain the zone between the two (2) check valves at least two pounds per square inch (2.0 psi) less than the supply pressure;

2. The #2 check valve is leak tight against reverse flow under all pressure differentials; and

3. The static pressure drop across the #1 check valve is at least three pounds per square inch (3.0 psi) greater than the pressure differential between the supply pressure and the pressure in the zone required to open the pressure differential relief valve.

(D) Double check valve assemblies shall be tested each year by a certified backflow prevention assembly tester by a date which is no later than thirty (30) days past the anniversary date established by the supplier of water to ensure that both the #1 and #2 check valves maintain at least one pound per square inch (1.0 psi) differential in the direction of flow and are leak tight against reverse flow under all pressure differentials.

(E) All certified backflow prevention assembly testers shall report to the appropriate governmental authority (if one exists), the supplier of water, the customer, and, if requested, the department the results of inspections or tests conducted in compliance with this section (6). Reports of tests shall contain the signature of the certified backflow prevention assembly tester attesting to the



compliance (or noncompliance) of the assembly with established operational requirements. Routine reports shall be submitted within thirty (30) days after making the inspection or test. Falsification of testing or inspection information shall be grounds for removing the tester from the list of testers authorized to operate in Missouri.

(7) Customer Responsibilities.

(A) The customer shall furnish, install and maintain in working order at all times any backflow prevention assembly required by this rule.

(B) To ensure that each backflow prevention assembly required by this rule is in working order, the customer shall have each assembly inspected and tested by a certified backflow prevention assembly tester at the time of construction or installation and at the frequency specified in section (6).

(C) The customer shall permit access to the premises by the certified backflow prevention assembly tester, supplier of water and department representatives, at reasonable times and upon presentation of identification, for inspection of the customer water system or testing of backflow prevention assemblies installed in accordance with this rule.

(8) Responsibilities of the Supplier of Water.

(A) Because backflow may cause a health hazard through transmission of contaminants via the public water system, the supplier of water shall remove the water meter or otherwise sever the public water system from the customer service line serving a facility when the supplier of water—

1. Has knowledge that the customer is causing or maintaining an unprotected cross-connection;

2. Has knowledge that the customer is failing or refusing to proceed without delay to correct any violation of the provisions of this rule after having been notified to do so;

3. Is so ordered by the appropriate local governmental authority (if one exists); or

4. Is so ordered by the department because of violation of any provision of this rule by the customer.

(B) The supplier of water shall retain records of the reports of inspections, tests and repairs on backflow prevention assemblies for a period of five (5) years.

(C) The supplier of water may develop, for use within his/her service area, written procedures to implement the provisions of this rule. In developing the procedures, the supplier of water will be permitted to take into account existing backflow prevention programs and incorporate ordinances, regulations or requirements of appropriate local

governmental authorities. However, the written procedures shall be no less stringent than the provisions of this rule. The department will prepare and make available on request the appropriate forms needed to assist the supplier of water in implementing the provisions of this rule. The supplier of water may submit the procedures to the department for approval.

(D) The supplier of water shall record the date of the initial inspection or test of backflow prevention assemblies required under subsections (3)(A) and (3)(B) and shall require that an annual inspection or test report be submitted by a certified backflow prevention assembly tester. The supplier of water shall establish an annual anniversary date for these inspection or test reports. If these reports are not received by the supplier of water on or before sixty (60) days following this anniversary date, the supplier of water promptly shall notify the customer, the local governmental agency (if one exists) and the department.

(E) The supplier of water shall notify the department within forty-eight (48) hours whenever a cross-connection problem has occurred which resulted in contamination of the public water system.

*AUTHORITY: section 640.100, RSMo (Cum. Supp. 1996). \* Original rule filed May 4, 1979, effective Sept. 14, 1979. Rescinded and readopted: Filed July 11, 1986, effective Jan. 1, 1987. Amended: Filed Dec. 4, 1990, effective July 8, 1991. Amended: Filed Jan. 2, 1997, effective Sept. 30, 1997.*

*\*Original authority 1939, amended 1978, 1981, 1982, 1988, 1989, 1992, 1993, 1995, 1996.*

**10 CSR 60-11.030 Backflow Prevention Assembly Tester Certification**

*PURPOSE: This rule establishes certification and recertification requirements for backflow prevention assembly tester training programs.*

(1) Applicability. This rule applies to all persons seeking certification or recertification as backflow prevention assembly testers. A certified backflow prevention assembly tester shall inspect, test and report on backflow prevention assemblies in accordance with applicable requirements in 10 CSR 60-11.010.

(2) Certification Requirements.

(A) Any person seeking to be a certified backflow prevention assembly tester shall—

1. Satisfactorily complete written and performance (hands on) examinations (including questions specific to Missouri

backflow prevention rules) provided by the American Backflow Prevention Association (ABPA) Tester Certification Program or the American Society of Sanitary Engineering (ASSE); and

2. Ensure that ABPA or ASSE notifies the department that the tester has passed the examinations. The department shall not be held liable for any failure of ABPA or ASSE to notify the department that a person has passed the written and performance examinations.

(B) Certification shall be valid for three (3) years. Certification may be renewed in accordance with section (4) of this rule.

(C) Submittal of false information shall be grounds for denying or revoking certification.

(3) Examination Schedule. The department shall, in consultation with training providers, prepare an annual schedule of dates and locations of backflow prevention assembly tester examinations. The department shall make this schedule available to backflow prevention assembly tester training providers and to any interested person upon request. (Training providers may offer additional examinations, at their discretion.)

(4) Recertification Requirements.

(A) Any certified tester seeking to be recertified shall—

1. Satisfactorily complete ABPA's or ASSE's recertification requirements, including examination questions on Missouri backflow prevention rules; and

2. Ensure that ABPA or ASSE notifies the department that the tester has satisfactorily completed the requirements. The department shall not be held liable for any failure of ABPA or ASSE to notify the department that a tester has satisfactorily completed the recertification requirements.

(B) Recertification shall be valid for three (3) years.

(C) Submittal of false information shall be grounds for denying or revoking recertification.

(D) Any certified tester who fails the ABPA or ASSE examination within three (3) years of the effective date of this rule shall, upon request and submission of proof having taken and failed the examination, be granted a one (1)-time one hundred twenty (120)-day extension of his/her certification. The tester shall submit, or ensure that the instructor or testing organization submits, to the department a copy of the course roster and test results or other documentation which in the opinion of the department are equivalent.



(5) Reciprocity. Any backflow prevention assembly tester listed with ABPA or ASSE may be certified by the department upon notification from ABPA or ASSE that the tester has satisfactorily completed an examination on Missouri backflow prevention rules.

*AUTHORITY: section 640.100, RSMo (Cum. Supp. 1996). \* Original rule filed Jan. 2, 1997, effective Sept. 30, 1997.*

*\*Original authority 1939, amended 1978, 1981, 1982, 1988, 1989, 1992, 1993, 1945, 1996.*