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Cross-Connections and Backpressure

Dear Reader:

The following document was created from the Municipal Technical Advisory Services website (mtas.tennessee.edu). This website shares information relative to Tennessee municipal government. We hope this information will be useful to you and that it will assist you with questions that arise in your tenure in municipal government. However, the *Tennessee Code Annotated* and other relevant laws or regulations should always be consulted before any action is taken based upon the contents of this document.

The Municipal Technical Advisory Service (MTAS) was created in 1949 to provide technical assistance to elected and appointed municipal officials in Tennessee. We are a resource for Tennessee municipal officials in areas of municipal government, human resources, finance, fire, legal, police, public works, water, and wastewater. We provide personal and professional knowledge growth opportunities on current issues within municipal government.

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Table of Contents

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A cross-connection is an actual or *potential* connection between a potable (safe to drink) water supply and a non-potable (unsafe to drink) source, where it is possible for a contaminant to enter the drinking water supply.

In the residential setting, a cross connection is a direct link between a household water line and a contaminated source such as a garden hose, toilet tank, laundry tub, swimming pool, lawn sprinkler system, etc. The most common contaminants, such as pesticides, sewage, and detergents, can enter the public drinking water system through cross connections in home water lines. Most household cross connections are created by the use of garden hoses. Under certain conditions, the flow in household water lines can reverse and siphon contaminants into the water supply. For example, using a garden hose to spray pesticides is normally harmless, but if the city's water supply is interrupted during the spraying, the potential for contamination exists. If water main pressure is reduced due to a water main break or nearby firefighting operations, a backsiphonage effect is created. This can draw pesticide from the sprayer through the garden hose into the household water lines and possibly the water main. The contamination may be localized (the home), or spread through the water mains to other areas.

The public water system can also be contaminated by an effect called backpressure. Backpressure results when the water supply is connected to a system under high pressure such as a hot water boiler for home heating or a portable pressure washer. Since the pressure in these devices is higher than the normal home water supply, water can sometimes be forced backwards. Contaminants in these systems, such as cleaners or soaps in a pressure washer, can enter and contaminate the public drinking water supply.

In the fire department setting, cross-connections occur when a garden hose or fire hose is submerged into the water tank when filling a fire truck, when pulling the residual pressure too low on a fire hydrant, and even when a fire engine is being filled directly from a fire hydrant. An on-board foam system, such as a CAFS system, can introduce firefighting chemicals into the water system. These are only a few examples, and many more exist. As in the residential setting, a fire department created cross-connection or backpressure problem can contaminate the public water system.

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