



Department of the Air Force  
HQ AEDC (AFMC)  
Arnold AFB, TN 37389

## Safety, Health, and Environmental Standard

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**Title:** CROSS CONNECTION AND BACKFLOW PREVENTION

**Standard No.:** D14

**Effective Date:** 09/23/2010

The provisions and requirements of this standard are mandatory for use by all AEDC personnel engaged in work tasks necessary to fulfill the AEDC mission. Please contact your safety, industrial health and/or environmental representative for clarification or questions regarding this standard.

Approved:

Contractor /ATA Director  
Safety and Health Group

Air Force Functional Chief





## Safety, Health, and Environmental Standard

### CROSS-CONNECTION AND BACKFLOW PREVENTION

#### 1.0 INTRODUCTION/SCOPE/APPLICABILITY

- 1.1 **Introduction** – This standard establishes requirements and responsibilities for protection of the AEDC drinking water system from contamination by cross connection or backflow.
- 1.2 **Scope** – The AEDC Cross-Connection and Backflow Prevention Program adopts the *Uniform Plumbing Code* (latest edition) for technical requirements related to cross connection control.
- 1.3 **Applicability** – This standard applies to all AEDC personnel, including Department of Defense and Contractors (including Subcontractors), who are involved in the installation or maintenance of cross-connection and/or backflow prevention devices at the Tennessee location. The AEDC Operating Contractor Facilities Operations and Maintenance Department Director or his designee is the AEDC Cross Connection Program Manager.

#### 2.0 BASIC HAZARDS/HUMAN FACTORS

Potential contaminants include untreated water, chemicals, and sewage. The AEDC potable water supply system must be designed, installed, and maintained to prevent contamination from non-potable liquids, solids, or gases through cross-connections or any other piping connections to the system.

#### 3.0 DEFINITIONS

**Back Siphonage** – Backflow resulting from a vacuum in the distributing pipes of a potable water supply.

**Backflow** – The flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source or sources other than its intended source (back siphonage is one type of backflow).

**Backflow Preventer** – A device or means to prevent backflow into the potable water system.

**Cross-Connection Program Manager** – An individual designated by the Operating Contractor Facilities Operations and Maintenance Department Director to maintain an aggressive program to identify, isolate, record, and correct cross connections and other potential sources of contamination to the AEDC potable water distribution system. This person shall have overall responsibility for developing and documenting the cross connection program.

**Cross-Connection** – Any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water, and the other, water of unknown or questionable safety, or steam, gases, or chemicals, whereby there may be a flow from one system to the other. Furthermore, it is any potable water supply outlet that is submerged or can be submerged in waste water and/or any other source of contamination. See definitions for *backflow* and *back siphonage*.

**Non-potable Water** – Water that is not safe for human consumption or that is of questionable safety.

**Operating Contractor** – A long-term contractor directly accountable to the Air Force for the AEDC mission.

**Pollution** – The presence of any foreign substance (organic, inorganic, radiological, or biological) in water that tends to degrade its quality resulting in a hazard or impairing the usefulness of the water.

**Potable Water** – Water free from impurities in amounts sufficient to cause disease or harmful physiological effects. Its bacteriological and chemical quality conforms to the requirements of the Federal Drinking Water Standards or to the regulations of the public health authority having jurisdiction.

#### 4.0 REQUIREMENTS/RESPONSIBILITIES

- 4.1 **Persons Authorized to Work on Potable Water System** – Operating Contractor Facilities Operations and Maintenance [Base Civil Engineering (BCE)] Pipe Shop shall be the only organizational unit authorized to install or modify the piping system associated with the AEDC potable water system or the fire-fighting water lines. No other shop or organization shall make any extension, connection, modification, change, or alteration to any potable or fire-fighting water line. All personnel who work on backflow prevention devices shall maintain current State of Tennessee cross-connection certification.

**4.2 Work Request and Project Coordination** – All work requests to modify or add to the AEDC potable water system shall be approved by the Potable Water Systems Engineer or the Configuration Control Board (CCB). AEDC/TSD-SG (Air Force Bioenvironmental Engineering) must be notified anytime a potable water system is tapped at AEDC.

**4.3 Cross Connection Control Plan** – The Operating Contractor Facilities Operations and Maintenance Department, with assistance from the Operating Contractor Environmental Branch and Safety and Health Group, shall develop a Cross Connection Control Plan in accordance with requirements of the Tennessee Department of Environment and Conservation Rules for Public Water Supplies, section 1200-5-1.17(6). Plans shall be approved by the Cross Connection Program Manager and submitted to the Tennessee Department of Environment and Conservation through AEDC/TSCA and TSD-SG. Plan contents shall include the following:

- Purpose
- Methods to inform the AEDC population about cross connections
- Methods to identify cross connections including surveys
- Actions to be taken when a cross connection is identified
- Methods to ensure proper installation and maintenance of cross connection control devices

**NOTE:** New backflow prevention devices shall be installed and repaired in accordance with manufacturers' instructions approximately 30 inches above floor in locations easily accessible for testing and maintenance. A reduced pressure backflow preventer shall never be installed where it could be submerged. Existing backflow preventers currently in unsafe locations shall be relocated when feasible. A double check valve backflow preventer shall be installed on new dry/wet fire suppression systems using water only as a fire suppressant. A reduced pressure type backflow device shall be used where antifreeze or other hazardous chemicals are added.

- Process and methods to test installed devices
- Personnel to carry out the plan
- Records to be maintained

**4.4 Operating Contractor Facility Cross Connection Surveys**–Base facilities and water-using equipment shall be surveyed by BCE representatives at least every five years. The survey team shall attempt to physically locate any unauthorized, undocumented cross connections to the potable water system and locate all backflow prevention devices, assess their adequacy, and determine the need for additional devices. The results of the survey shall be documented and used for hazard evaluation and programming purposes. One fifth of the buildings are inspected each year. Technical support shall be provided by the Environmental Branch as needed.

**4.5 Operating Contractor Inspection and Testing of Backflow Prevention Devices**–Inspections and testing of backflow devices shall be conducted and documented by certified personnel. The degree of hazard as determined from facility surveys shall be used to develop the schedule. Results of the inspection and testing program shall be documented and made available to the Cross Connection Program Manager, the Environmental Branch, and the Safety and Health Group for review. The records are stored and maintained at the Water Treatment Plant for five years. Asset location and maintenance history shall be maintained electronically in the base wide computerized maintenance system.

## 5.0 TRAINING

Persons testing backflow prevention assemblies must maintain a current Certificate of Competency via a State of Tennessee-approved Cross-Connection Control training program. Initial certification requires completion of 32 hours of training and satisfactory completion of a written exam and practical exam. The State requires that the certificate be renewed every three years via refresher training and exam.

## 6.0 REFERENCES

- 6.1 *Cross-Connection Control Manual and Design Criteria for Cross-Connection Control Plans, Ordinances, and Policies*, Tennessee Department of Environment and Conservation Division of Water Supply
- 6.2 *Illustrated Training Manual*, International Association of Plumbing and Mechanical Officials
- 6.3 *Uniform Plumbing Code*, International Association of Plumbing and Mechanical Officials
- 6.4 *Unified Facilities Criteria (UFC) 3-420-01 Plumbing Systems*, U.S. Department of Defense