As distribution systems age, they become increasingly vulnerable to water main breaks and system failures that can result in microbiological contamination. Also, deterioration can provide more sites for microbial growth and protection from disinfection. For water systems serving more than 50,000 people in the United States, the average age of the oldest section of the system is more than 50 years. For the largest systems in the country, the average age of the system's oldest section approaches 100 years. Even new water main installations can be susceptible to leakage and contamination.

In addition to the potential for contamination due to water main breaks, water main repair procedures, and external contamination of storage facilities, several other characteristics of distribution systems present scenarios where contamination is a risk. Contamination can be introduced through cross-connections that are not properly protected through cross-connection control and backflow prevention devices and assemblies.

Furthermore, intentional contamination has emerged as a concern, particularly since September 11, 2001. There are many points of entry in the distribution system (e.g., service connections and tanks) where a pathogen could potentially be introduced. In fact, water industry professionals have named distribution systems as one of the most likely areas where a contaminant could be intentionally introduced into the nation's drinking water.

The EPA's National Homeland Security Center(NHSRC) in Cincinnati, OH has been working with other federal agencies (e.g. the Centers for Disease Control and Prevention, FBI, and DOD) and water sector organizations (e.g. American Water Works Research Foundation, Water Environment Research Foundation) to improve information on technologies and conduct research for water sector security. NHSRC's Water Security Decontamination research includes:

- Decontamination methods such as flushing, surfactants, co-solvents, organic acids or chelating solutions; solutions designed to decontaminate chemical and biological weapons on surfaces; and enzymes among others.

- Detection and verification tests of chemical agents(e.g VX, Sarin, phosgene), biological agents and pathogens in drinking water. For example, a detection technology may be a rapid polymerase chain reaction (PCR) technology capable of detecting biological agents and pathogens in drinking water or a new online chemical and/or biological detection system which supplies real time data for analysis.

- Research and data gaps in emerging etection and removal of contaminants, interactions between contaminants and pipe walls, and other contaminants in water distribution systems.

This presentation will present an overview of EPA's Water Security Decontmination Research Program.