Advancing Ways to
Clean Up Drinking Water Systems

EPA researchers and partners have built the nation’s first field-scale “Water Security Test Bed”
EPA is the federal agency responsible for working with water utilities to improve protection of systems from contamination and to clean up systems that become contaminated. Purposeful or inadvertent contamination of distribution systems can result in large amounts of infrastructure and water that must be cleaned. Contamination incidents can be caused by, for example, natural disasters such as Superstorm Sandy or by individuals hoping to cause harm.

Advancing the science and engineering of decontaminating pipe systems and safely disposing of high-volumes of contaminated water are high priorities for the EPA. To help address these science gaps, Agency homeland security researchers have developed the first-of-its-scale Water Security Test Bed (WSTB).

The first phase of the test bed, constructed at the Department of Energy’s (DOE) Idaho National Laboratory, replicates a section of a typical municipal drinking water piping system with roughly 445 feet of pipe and two fire hydrants laid out in an “L” shape using 40-year-old, eight-inch cement mortar lined, ductile iron pipes, excavated after twenty years of use for water conveyance. Researchers built the WSTB above ground for easy access during experiments, and to facilitate fast leak detection.

Over the next several years, EPA and partner researchers will conduct experiments using simulants of various biological, chemical, and radioactive materials that simulate high toxic versions of these agents. At this “full” sized system, researchers will demonstrate approaches to contamination detection, sensor and model testing, infrastructure decontamination, water treatment and cyber testing developed at lab and pilot scale.

Treatments tested may include chlorination and flushing protocols, use of advanced oxidative processes, or perhaps emptying and fumigating the pipes. The research team plans to connect the test bed to a building with a room set up like a typical residential bathroom to investigate how users of the facility might be exposed to contaminants in water through typical uses of showering and flushing. The team will also study the potential exposure of humans to this contaminated water.

EPA is opening up the test bed research capability to additional potential collaborators such as agencies within the DOE, Department of Defense, the Department of Homeland Security, universities, water utilities, and foundations interested in water security research. EPA is also considering partners’ needs as they build out the test bed to include service connections and other types of pipe commonly found throughout water distribution systems.

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