

The Threat Ensemble Vulnerability Assessment (TEVA) Research Program: Tucson Water Study

Software helps water utilities be better prepared for contamination threats

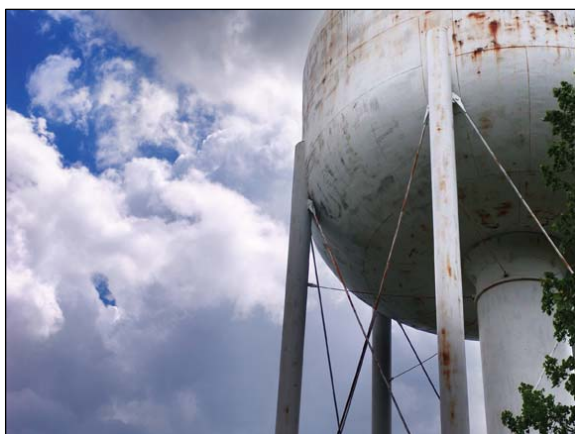
EPA's Threat Ensemble Vulnerability Assessment and Sensor Placement Optimization Toolkit software (TEVA-SPOT) can be used to assist water utilities by:

- Recommending key sensor locations (e.g., water quality monitoring locations) in water distribution systems
- Identifying critical water utility and public health response times to minimize impacts
- Identifying vulnerable areas in water distribution systems
- Helping improve water distribution system models

TEVA-SPOT software can be used to determine the number and location of sensors that are needed to support a contamination warning system. The location of online sensors can be optimized to help achieve such a system's primary goal: to detect contamination incidents in time to mitigate public health and economic consequences. TEVA-SPOT can also be used to meet additional design objectives — for example, minimization of costs, detection time, exposure to contaminants, and the spatial extent of contamination. In addition, the software can be used to demonstrate the importance of a fast response to a detected contamination incident.

In order to use TEVA-SPOT, it is necessary to have utility-specific input. Often, through the application of TEVA-SPOT, improvements to the distribution system models benefit the utility in other projects as well.

EPA's National Homeland Security Research Center (NHSRC) is researching ways to protect the nation's drinking water sources and distribution centers and to ensure the safety of wastewater collection, treatment, and disposal procedures. This research is part of EPA's larger effort to improve the security of drinking water and wastewater treatment systems. This task was assigned to EPA by the 2002 Presidential Budget and by Homeland Security Presidential Directive (HSPD) 7, which mandates protecting water resources from source water through use, treatment, and discharge.



Tucson Water Utility Study

Tucson Water is an innovative and advanced municipal drinking water system that serves nearly 700,000 customers. Through an EPA Environmental Monitoring for Public Access and Community Tracking (EMPACT) grant, online monitors have been providing near real-time water quality data to the public for several years. Tucson Water is currently considering the expansion of the online monitoring program to meet its security objectives.

EPA began TEVA work with the Tucson Water utility in early 2005. The goal of the Tucson Water TEVA study was to identify new and/or existing EMPACT locations

that could be used for monitoring for contamination incidents. Additionally through interaction with Tucson Water, as well as with other water utilities, EPA has been able to develop, test, and refine TEVA methodologies.

In order to use TEVA-SPOT, multiple pressure zone models had to be integrated into a single system-wide model. While separate pressure zone models are sufficient for many utility needs, water security

analyses require a systems-engineering approach, focusing on the entire distribution system as a whole. EPA is assisting Tucson Water in the development of the integrated model.

Tucson Water is evaluating how to effectively use the designs recommended by TEVA-SPOT to create and implement a sustainable and cost-effective contamination warning system. In addition to the number and placement of sensors, Tucson Water is also evaluating vulnerability information provided by EPA researchers to better understand the sensitivity of response time in mitigating public health impacts following a contamination event.

For more information, visit the NHSRC Web site at www.epa.gov/nhsrc and the TEVA Research Program page at <http://www.epa.gov/nhsrc/water/teva.html>.

Technical Contacts: Robert Janke (513) 569-7160, janke.robert@epa.gov

Regan Murray (513) 569-7031, murray.regan@epa.gov

Communications Contact: Kathy Nickel (513) 569-7955, nickel.kathy@epa.gov