



The TTEP Quarterly

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The quarterly update of U.S. EPA's Homeland Security Technology Testing & Evaluation Program (TTEP)



TTEP Water Security Technology Evaluations Underway

Two TTEP water security technology evaluations have begun since the last issue of the *TTEP Quarterly*.

Multi-Parameter Water Monitors for Distribution Systems. Five different water monitors including Analytical Technology Incorporated's Q45WQ, ECSI International's Sentinal 500 Series, YSI Incorporated's 6920, Rosemount Analytical's Model WQS, and Censar's Six-Cense are undergoing evaluation.

The water monitors include sensors for free and total chlorine, monochloramine, pH, conductivity, dissolved oxygen, oxidation-reduction potential (ORP), turbidity, and chloride. Total organic carbon (TOC) is also monitored in order to observe its response to various contaminants. The experimental plan includes two major components. First, the accuracy of the measurements made by the water monitors is being evaluated during periods of stable water quality conditions by comparing each sensor measurement to a grab sample result generated using a standard laboratory reference

method, and then calculating the percent difference. The second component involves evaluating the response time and magnitude of response of the water monitors to changes in water quality parameters caused by injecting 20 different contaminants into EPA's newly constructed, recirculating,

portable pipe loop containing finished drinking water. The pipe loop is made of stainless steel and consists of approximately 100 feet of 3-inch diameter pipe capable of

flow rates from 10-160 gallons per minute at a wide range of pressures. Contaminants include potassium cyanide, cesium chloride, aldicarb, *Bacillus anthracis*, *Yersinia pestis*, *Francisella tularensis*, sarin, soman, and VX. At least three concentration levels (ranging from 0.01 mg/L to 10 mg/L) of contaminants will be injected into the portable pipe loop. The concentration level at which each contaminant impacted each water quality parameter is being determined during this evaluation.



Drs. Jeff Adams and Jeff Yang (left photo), both of EPA, monitor water quality parameters after a contaminant was injected into the pipe loop. Dr. Ryan James (right photo), Battelle, describes EPA's pipe loop to Mr. Eric Koglin, EPA TTEP Program Manager.



See **Water Security Evaluations** next page

Welcome to TTEP

The U.S. Environmental Protection Agency (EPA) is actively participating in the national homeland security effort by ensuring the protection of the nation's drinking water systems and the safety of the public in buildings and other structures. The National Homeland Security Research Center under EPA's Office of Research and Development has established the Technology Testing and Evaluation Program (TTEP) to assist this effort. TTEP is conducting third-party performance evaluations of commercially available homeland security technologies, incorporating stakeholder guidance and a high degree of quality assurance oversight. Questions about TTEP should be directed to Mr. Eric Koglin (koglin.eric@epa.gov or 702-798-2332).

Water Security Evaluations (cont.)

Expeditionary Unit Water Purifier (EUWP), a mobile water treatment technology, is being evaluated by challenging a laboratory-scale experimental setup of two 4-inch by 40 inch reverse osmosis membranes with various chemical contaminants. The full-size EUWP is a transportable, skid-mounted ultrafiltration (UF)/reverse-osmosis (RO)-based system that is intended to meet expeditionary purified water needs in areas with challenging water sources of very high total dissolved solids (TDS), turbidity, or hazardous contamination during emergency situations when other water treatment facilities are incapacitated. Due to the high flow rate required for operating a full-scale EUWP, (i.e., up to 300,000 gal/day, depending on the source water quality), testing at full scale is not practical because of the large quantity of toxic industrial chemicals (TICs) needed, space requirements of a full-scale system, and handling logistics and costs associated with waste disposal. As such, evaluation of the EUWP under multiple challenge conditions is being conducted on a smaller-scale RO component representation (see picture below). This component is being challenged with several



Pictured above is the laboratory-scale experimental setup, including the RO system and corresponding plumbing (at right) tanks, being used for the EUWP evaluation.

TICs, including cesium chloride, chloroform, dichlorvos, mercuric chloride, methomyl, methylmercury, and sodium fluoroacetate, injected into finished drinking water. The evaluation is assessing the efficiency of rejection of the various TICs, specific flux, and water recovery. For more information pertaining to either of these TTEP water security evaluations, please contact Dr. Jeff Adams (adams.jeff@epa.gov or 513-569-7835) or Dr. Ryan James (jamesr@battelle.org or 614-424-7954).

Radiological Decontamination Technology Evaluation to Begin this Fall

A TTEP evaluation of radiological decontamination technologies is being planned for the last quarter of 2007. This TTEP evaluation will focus on commercially available radiological decontamination technologies and/or processes as applied to urban building materials contaminated following would-be terrorist use of a radiological dispersion device. The evaluation, to be conducted at Idaho National Laboratory, will include contamination of concrete test coupons with radioactive cesium-137, measurement of activity applied to the concrete, application of decontamination technologies in both horizontal and vertical orientations both 7 and 28 days following contaminant application, and follow-up measurement of the residual activity on the concrete. Decontamination factors for each technology and from each set of test conditions will be determined. Two technologies will participate in this evaluation. One uses physical processes and one uses chemical interactions to remove the radionuclide. Watch upcoming issues of the *TTEP Quarterly* for updates on the progress of this work. For more information, contact Mr. John Drake (drake.john@epa.gov or 513-569-7164) or Dr. Ryan James (jamesr@battelle.org or 614-424-7954).

TTEP Building Decontamination Stakeholder Meeting

On August 7, 2007, EPA's TTEP Building Decontamination Stakeholder Committee met in Washington, D.C. Eric Koglin, the EPA TTEP Program Manager, spoke to the stakeholders about the role of EPA and TTEP in building decontamination. Then the stakeholders were updated on TTEP evaluation activities by EPA staff including biological decontamination technologies (Dr. Shawn Ryan and Mr. Joe Wood), chemical agent decontamination technologies (Dr. Emily Snyder), and radiological decontamination technologies (Mr. John Drake). The committee participated in and added technical insight to the discussion of these technology evaluations and other issues pertaining to the area of decontamination technologies. Discussions also prioritized technology category areas for future evaluation. The Committee determined that cold-plasma decontamination technologies seemed to hold the most promise for future application.