



Environmental Technology Verification Drinking Water Systems Center May 2003

Introduction and Goals

The Drinking Water Systems (DWS) Center is one of several US EPA Environmental Technology Verification (ETV) centers dedicated to producing credible environmental performance data. The EPA Office of Research and Development (ORD) leads the ETV Program.

On October 1, 2000, NSF International (NSF) entered into an agreement with the EPA to form an ETV center dedicated to providing independent performance evaluations of drinking water technologies for small systems with the goal of raising awareness for new treatment technologies. The DWS Center represents the next phase of the ETV Program's Drinking Water Treatment Systems Pilot, which began in 1995 as a partnership between NSF and the EPA's National Risk Management Research Laboratory (NRMRL) and laid the groundwork for the new Center. In 2002, NSF received funds for water security efforts. This water security effort will consist of testing home water treatment system capabilities for providing a protective barrier to possible water agents.

Concern about drinking water safety has accelerated in recent years due to highly publicized outbreaks of waterborne diseases, information linking ingestion of high levels of contaminants to cancer incidence, and water security issues. The 1996 Safe Drinking Water Act requires the US EPA to set numerical contaminant standards and treatment and monitoring requirements to ensure the safety of public water supplies. Since many small communities lack updated equipment to comply with new stricter regulations, emerging treatment technologies may offer a solution. Recent focus and concern to provide an additional level of water security protection on individual homes has also lead the DWS Center to prioritize the testing of residential point-of-use (POU) water treatments systems.

DWS Center Key Features

- ETV DWS Center testing verifies performance of commercially ready drinking water treatment technologies for use in small communities and residential treatment units.
- A steering committee (SC) and technical panels advise NSF and the EPA on the DWS Center's activities and direction.
- Protocols and Technology-Specific Test Plans (TSTPs) assure uniform testing.
- DWS Center oversight assures that quality data is produced during verification.

Benefits to Stakeholders

Equipment Manufacturers and Vendors:

- Reduction in general pilot testing requirements for state acceptance of small systems
- Consistent and technically appropriate evaluation methods
- Reliable and independent test results

Small Communities/General Public:

- Improved drinking water quality
- Compliance with the Safe Drinking Water Act for small systems
- Faster state approvals of technologies at less cost for small systems
- Additional level of water protection for individual residents by providing test data on home water treatment systems

State Regulatory Agencies of Small Communities:

- Credible and independent test reports to help with approval considerations
- Reduced dependence on staff to develop and implement testing protocols by reducing the amount of pilot testing for state acceptance of small systems

Results and Current Activities

The Center's activities include development of verification protocols and test plans, independent testing and validation of equipment, conveying and supporting government/industry partnerships to obtain credible cost and performance data, and preparation of product-specific verification reports for broad dissemination. Emphasis is on the performance and cost factors of specific vendor systems that address the treatment of common small community problems, i.e., arsenic, microbiological contaminants, particulates, and disinfection by-products. In the case of water security, emphasis is on performance of specific residential treatment systems making homeland security claims.

The Center currently has nine contaminant-specific verification protocols and 24 TSTPs that outline testing procedures for small system technologies. The contaminant-specific protocols include testing procedures for technologies that inactivate or remove microbiological contaminants, arsenic, nitrate, precursors to disinfection by-products, inorganic and organic chemicals, and radionuclides. As of April 2003, 27 verification tests and reports have been completed, evaluating drinking water treatment technologies for small systems. The following technology types have been evaluated: ultraviolet (UV) radiation systems, microfiltration and ultrafiltration membrane systems, a nanofiltration system, on-site sodium hypochlorite generation systems, bag and cartridge filters, precoat (diatomaceous earth) filters, backwashable depth filtration with and without coagulation, reverse osmosis membranes, and ozone disinfection. Updated lists of protocols/test plans and verification reports can be found on the EPA and NSF Web sites <http://www.epa.gov/etv> and <http://www.nsf.org/etv/dws>.

Current and Future Activities

The DWS Center's priorities for future work, based on EPA and stakeholder input, are as follows:

- Highest priority will be a focus on small system arsenic reduction technologies (e.g. adsorptive media).
- Harmonization of the ETV UV and Filtration Protocols with the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). Testing will focus on ultraviolet technologies as well as bag/cartridge and membrane technologies.
- Focus towards on-site generation of disinfectants to reduce or eliminate stockpiles of chemicals at utility sites.
- More cost sharing with stakeholders.
- The completion of two additional TSTPs in 2003: Test Plan for Removal of Synthetic Organic Chemicals (SOCs) by Adsorptive Media and Test Plan for Removal of Volatile Organic Chemicals (VOCs) by Adsorptive Media.
- Revision of the Center's Existing Data Policies to enable a vendor to include more data in an ETV report from previous testing of the system.
- Identification of priority agents for treatment, selection of potential technologies, development of test protocols, and evaluation of equipment for homeland security verifications. Protocol development plans include the following:
 - Reverse osmosis for the reduction of microbial and chemical agents,
 - Mechanical filtration for the reduction of microbial agents,
 - Carbon filtration for the reduction of chemical agents,
 - UV light for the inactivation of microbial agents,
 - Distillation for the inactivation of microbial and chemical agents, and
 - Other technologies as funds allow.

Vendors will be solicited for product evaluation pending the completion of the above protocols. The first verification reports are targeted for late 2003.

Contact the DWS Center

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