EPA Science Forum 2003
Partnering to Protect Human Health and the Environment

Arsenic In Water Used For Drinking
An Environmental Technology Verification

Year of Water

Robert G. Fuerst,[1] Patricia J. White[2], Helen Latham[2] and Karen Riggs[2]
[1]Office of Research and Development, National Exposure Research Laboratory; [2]Battelle Memorial Institute, Columbus Ohio

How Can ETV Help?

In October 2001, the U.S. Environmental Protection Agency (EPA) announced a new federal standard for concentrations of arsenic found in drinking water. The new standard was to be 10 parts-per-million (ppm). This new standard will be required by the Safe Drinking Water Act in January 2006. The previous maximum acceptable arsenic standard for drinking water was 50 ppm. Nearly 97 percent of the water systems of the U.S. affected by this new rule are small systems. The World Health Organization (WHO) is seeking reliable, easy to operate, arsenic detection systems for use in countries such as Bangladesh and India. Many people, especially located in these countries are exposed to high levels of arsenic found in the underlying sediment of their drinking water systems. They draw their drinking water from small local and personal wells.

To meet this challenge and assist the WHO and others interested in arsenic as a possible contaminant in their drinking water obtained from above or below ground sources, the Environmental Technology Verification 's (ETV) Advanced Monitoring Systems (AMS) Center performance verified technologies that can be used to measure the concentrations of arsenic in water. The purpose of this verification testing was to evaluate the performance of these arsenic technologies to measure total arsenic in water under real-world conditions. The Verification Reports are published on the ETV Internet Website at <www.epa.gov/etv/centers/center1> for public scrutiny. Assisting the AMS Center are stakeholder committees whose members are drawn from diverse backgrounds, such as regulators, representatives of trade associations, industry, academia and investments companies. The stakeholders provide guidance in identifying technologies that meet public needs, prioritizing the list of technologies needed, helping to develop test plans and protocols, serving as observers at the test sites and lending their expertise in reviewing the test reports.

These type of ETV testings provide increased credibility in the performance of the technologies due to independent third-party testing, enhanced acceptance by purchasers of technologies, increased public awareness of available technologies, increased market and business opportunities for the vendors. ETV verifications also add business confidence for investors, stockholders and lenders. Performance parameters reported in the Verification Report of the arsenic testing include: accuracy, precision, linearity, method detection limit, matrix interferences, operator bias (skill level needed), and rate of false positives/false negatives. For comparison purposes, all samples, performance and real-world, were analyzed for using a laboratory reference method.

What Does ETV Do?

EPA's Environmental Technology Verification (ETV) Program develops testing protocols and verifies the performance of innovative technologies that have the potential to improve protection of human health and the environment. ETV was created to accelerate the entrance of new environmental technologies into the domestic and international marketplace.

Samples are collected in fresh water, well water, and public drinking water, then analyzed at the sites and in the lab.

OUTPUTS: Number of ETV protocols and verifications developed
Value placed on ETV by venders
Influence of ETV verification information on purchase decisions
Use of better technologies, reduced emissions because of ETV
Reduced exposure, reduced risk because of ETV

OUTCOMES: Improved health and environmental quality because of ETV

Why Arsenic?

The U.S. EPA defines arsenic as a chemical that occurs naturally in the earth's crust. When rocks, minerals, and soil erode, they release arsenic into water supplies. People are exposed to arsenic by drinking this water or eating plants and animals that have ingested it. Arsenic can also come from industrial sources. Studies have linked long-term exposure to arsenic in drinking water to a variety of cancers in humans. About 40 million people from five countries – India, Bangladlish, Nepal, Myanmar, and Thailand live in arsenic affected areas.

ETV's Advanced Monitoring Systems (AMS)Center Contributes to India Conference

ETV and Battelle staff members participated with representatives of five countries and the World Health Organization at Kolkata (Calcutta) Arsenic Conference in December 2002. A Battelle staff member attended the conference and presented the performance verification data collected and reported by the AMS Center. The ETV Program Director, Teresa Harten described the ETV program and responded to questions via video conferencing. The conference attendees were impressed with the ETV's verification testing and reporting principles, which require the support of their government, obtaining funds, and determining who should implement the program.

Partnering to Protect Human Health and the Environment