

The Arsenic Water Technology Partnership

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The decrease of the drinking water standard (MCL) for arsenic from 50 parts per billion (ppb) to 10 ppb in January 2006 will lead to significant increases in the cost of water for many rural systems throughout the United States. The Arsenic Water Technology Partnership, a collaborative effort of Sandia National Laboratories, the Awwa Research Foundation (AwwaRF) and WERC (a Consortium for Environmental Education and Technology Development) was formed to address this problem by developing and testing novel treatment technologies that could potentially reduce these treatment costs. AwwaRF manages a bench-scale research programs through a series of competitive grants; Sandia conducts a field-scale pilot demonstration program using the best commercially-available technology and innovative technologies from the AwwaRF program and other sources including national laboratories, and WERC evaluates the economic feasibility of the technologies investigated and conducts technology transfer and outreach activities. The Partnership has received \$10M dollars since FY2003 from Congressional appropriations with the support of the New Mexico Congressional delegation.

The AwwaRF research program has sought to develop improvements in treatment processes including 1) fixed bed adsorbent media with high selectivity and capacity and 2) batch systems with superior coagulation/flocculation efficiencies. In addition, AwwaRF grants have funded evaluation of secondary unintended impacts of arsenic treatment. WERC hosts an annual contest in which university students compete to provide the best solution to a design challenge involving arsenic treatment. The technologies that show the most promise from both programs are then tested at the field scale by Sandia National Laboratories at several sites in New Mexico and in other states.

In the Sandia Pilot Demonstration Program, approximately 8 pilot tests will be conducted at a suite of sites that will span ranges of important hydrochemical, regulatory and socioeconomic factors. Phase I pilot tests involve side-by side evaluation of the best commercially-available technologies selected during Vendors Forums that Sandia runs each fall. Pilots are currently underway in Socorro, NM, Anthony, NM, and Rio Rancho, NM. After baseline performance data on technologies are obtained, Phase II testing begins. These tests evaluate the efficacy of potential improvements to the existing treatment methods, evaluate inadvertent delirious effects of treatment processes or compare the performance of experimental technologies developed through the AwwaRF program or other sources to the commercial products. Laboratory studies using rapid small scale test procedures are also being carried out to predict media performance and will minimize the number of field tests required. In FY06, pilots will begin at the Jemez Pueblo and at sites in Nebraska and Oklahoma.

The results of these studies will be combined with performance data produced by private companies, the US EPA and other agencies to produce a comprehensive interactive, web-based cost model that can be used by communities to choose the treatment system that is most appropriate for their needs. Information from the program will be disseminated to New Mexico utilities by training sessions conducted by WERC and to other states by the Interstate Technology Regulatory Council (ITRC).

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Speaker biography

Malcolm Siegel is a Principal Member of the Technical Staff at Sandia National Laboratories. He received a BA in Chemistry from Columbia University; a Ph.D. in Geological Sciences/Geochemistry from Harvard University, and a Masters in Public Health/Epidemiology from the University of New Mexico. Dr. Siegel has served as Principal Investigator for experimental and modeling studies of radionuclide retardation and hydrogeochemical studies at the Waste Isolation Pilot Plant Site and Yucca Mountain, as the Technical Coordinator of the U.S. DOE Innovative Treatment and Remediation Demonstration program and as the Project Manager for the Sandia Arsenic Treatment Technology Pilot Demonstration Program. He is the author of over 55 scientific articles, book chapters and peer-reviewed reports.

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