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Contact: Linda Fresques, Media Specialist  
(800) 523-5996

### **WERC-Developed Computer Model to Help Water Utilities Meet New Arsenic Regulations**

A New Mexico State University environmental consortium is creating an engineering economics model that will be used nationwide to help communities select the most cost efficient and effective technologies to remove arsenic from their public water systems. The Arsenic Partnership Program was established by Congress in 2003 as a response to new Safe Drinking Water Act requirements that lower the acceptable levels of arsenic in drinking water.

WERC: A Consortium for Environmental Education and Technology Development, headquartered at New Mexico State University, is part of the U.S. Department of Energy partnership that also includes Sandia National Laboratories and the Awwa Research Foundation (AwwaRF). The partnership is charged with providing domestic and municipal water utilities, particularly those serving small and rural communities, with cost-effective solutions for complying with the new standards. The new regulations lowered the limits for arsenic, a known carcinogen, from 50 parts-per-billion (ppb) to 10 ppb. It is estimated that more than 2,000 public water systems across the nation will have to implement new processes in order to comply with the new regulation by 2006.

“There are many communities that simply don’t have the resources to evaluate and acquire the appropriate technology that is needed,” said WERC Executive Director Abbas Ghassemi. “Our goal is to provide them with a tool that will help them make the most informed decision.”

WERC’s effort toward that end is being led by Civil Engineering Professor Fernando Cadena who is developing an economic analysis tool that will be accessible via the Internet. Administrators from public water utilities will be able to enter specific information about their community, such as population and the number of gallons of water supplied, and their water chemistry properties, such as pH level and arsenic content, into the model. The model will provide them with a comparison of commercially available technologies and the relative cost of each in their particular community.

AwwaRF is conducting bench-scale testing of new arsenic removal technologies. Those that show promise will be pilot tested by Sandia National Laboratories. Sandia is currently in the process of identifying communities in New Mexico where they will deploy pilot units for field tests. The data derived from these tests will be added to the computerized economic analysis model. As new technologies emerge and are tested, information will be incorporated into the model.

Graduate students Chandana Dabbiru (electrical engineering) and Muhammad Waseem (computer science) are programming the model. A prototype of the model is expected to be completed by the end of this summer.

“We are building the foundation now—it will be constantly evolving,” explained Cadena. “We are combining algorithms from other economic models and modifying them into what will be a single, more powerful, user-friendly model.”

Once the model has been fully developed, it will be tested in Michigan, Wisconsin, Arizona and California. It will then be made available worldwide at no cost to users.

Cadena likens the model to a consumer report, allowing people to compare items and look at the economics. “It will allow these communities to make more savvy decisions about how to best meet their needs,” he said. “In the end, the public will benefit from this selection process.”

The WERC consortium is comprised of New Mexico State University, the University of New Mexico, the New Mexico Institute of Mining and Technology, Diné College and Los Alamos and Sandia National Laboratories. WERC’s mission is to develop human resources and technologies that assist various levels of



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government and private sector companies in addressing environmental issues. For more information about WERC, visit [www.werc.net](http://www.werc.net) or call 505-646-2038.

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