

Scrubbing Drinking Water to Meet New Federal Requirements for Arsenic

BILL LOFTUS / Programs & People Summer03

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Testing in several locations, including Fruitland, show the Vandal- ION™ process can reduce arsenic levels below the new federal limit.

UI researchers tested a new, simple method that relies on readily available commercial materials. The research is a cooperative effort with the UI, the Idaho Department of Environmental Quality, and U.S. Environmental Protection Agency.

Like many communities nationwide, Fruitland's water supply now meets the federal regulation but won't when new restrictions are applied. An estimated 3,300 small water systems across the U.S. face changes to reduce arsenic levels. For systems that supply 100 or fewer homes, EPA estimates the cost may be as high as \$1,000 per household each year. The experimental UI system would reduce costs per household year to \$40 for large systems and \$160 for small systems.

Fruitland Mayor Tom Limbaugh's cooperation was essential to the testing, said Greg Möller, a UI environmental scientist, who leads the project. UI's Remy Newcombe, who just earned her doctorate in civil engineering, oversaw the testing. Other UI students helping test were Brian Hart and Gary Keller.

The testing relies on a tank-like "reactor" that holds chemically active granule arsenic scrubbers. The pilot project can treat 15,000 gallons a day, which equals a flow of 10 to 15 gallons per minute. The Fruitland tests reduced arsenic concentrations from the natural background of 30 to 40 parts per billion, purer than the 50 ppb set as a threshold by current federal regulations.

The Vandal-ION process successfully removed enough arsenic to drop levels well below the future federal standard of 10 ppb. In some tests, concentrations even dropped below 1 ppb.

What we have works

"We know what we have works," Möller said. "Now we are working to fine tune the process."

The process removes arsenic almost immediately, requiring only a 10 to pure 15 minute “contact time” when the water must be in contact with the treatment process.

That is an economic advantage because the treatment system can be smaller since water passes through it quickly. Some water treatment systems require water to be held for hours, requiring much larger holding tanks.

Another advantage of the Vandal- ION process is the arsenic residue can be disposed of inexpensively and is not considered hazardous waste.

The Idaho Research Foundation has protected the process and has licensed its use to Blue Water Technologies, Inc., of Coeur d’Alene, a start-up company with five employees. Newcombe is its chief technology officer.

Now for the larger systems

Möller said the process is undergoing additional engineering and economic analysis so that it can be scaled up to treat larger water volumes required by cities like Fruitland, which has a population of 3,805 according to the 2000 Census. Fruitland might require a treatment system 100 times larger than the pilot system.

The process was tested previously at a small water system near Sandpoint, Idaho, and on a water system near Moscow.

The new federal rules are intended to make drinking water safer and are based on health studies that suggest the current threshold needs tightening.

A \$200,000 EPA grant to the UI Environmental Research Institute through the Experimental Program to Stimulate Competitive Research supported the pilot project.

source: <http://info.ag.uidaho.edu/magazine/summer2003/pure.html> 9aug03

University of Idaho Researchers Develop Cheap Water Purifier

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MOSCOW, Idaho—University of Idaho researchers have come up with a process they say

can strip harmful contaminants from drinking and waste water at a fraction of the cost of existing technology.

The process, created by Associate Professor Greg Möller, uses rust to pull phosphorus and arsenic out of water.

"We have successfully engineered for that iron to stick to sand particles, and we move them around to allow them to scrub out the arsenic," Möller said. "It's simple and the simplicity leads to good economics."

Möller said his process is 25 percent to 40 percent cheaper than the EPA's most cost-efficient methods of cleaning water. In some communities, purifying the water so it can meet new federal guidelines could cost as much as \$1,600 a year per household.

"With this process it's closer to \$30," he said.

A Coeur d'Alene startup, Blue Water Technologies Inc., has signed a licensing agreement with the Idaho Research Foundation to market what is being called the "Vandal-Ion process."

Arsenic occurs in nature and as an industrial byproduct. It is found in high concentrations in Western mining states. Even at low levels it can cause cancer.

Some smaller cities and water agencies have complained that meeting federal clean water standards for arsenic levels would be difficult because of the cost.

The EPA has estimated that one in 20 water systems, or about 4,100 nationwide, will have to additionally treat their water to meet the new standard. About 97 percent of these are small systems serving communities of fewer than 10,000 people.

In wastewater, phosphorus stimulates algae growth, damaging water quality in streams and lakes.

"There was obviously a need from a public health and environmental perspective," said Gene Merrell, the university's chief of technology transfer.

source: http://seattlepi.nwsourc.com/health/134377_water09.html 9aug03

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