

# 'Revolutionary' water treatment units on their way to Afghanistan

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The United States Army has taken delivery of the first two units of a "revolutionary" waste-water treatment system that will clean putrid water within 24 hours and leave no toxic by-products, according to scientists at Sam Houston State University.

"The system is based on a proprietary consortium of bacteria-- you can find them in a common handful of dirt," said lead scientist Sabin Holland.

"In the right combination and in the right medium, they have the capability to clean [polluted water](#) with a very high efficiency very quickly. It truly is a revolutionary solution."

Holland said the physical systems themselves-- called "bio-reactors"-- use little energy, are transportable, scalable, simple to set-up, simple to operate, come on-line in record time and can be monitored remotely.

The first two units, about the size of standard shipping containers, will be deployed by the Army to Afghanistan.

"The science and engineering technology behind this process have both military and civilian applications," said Holland.

"The technology was developed for remote applications where little infrastructure exists, such as remote military operations, [disaster relief](#) and nation-building situations."

"These systems would be immensely useful right now in Haiti," Holland said. "One of the most pressing threats to public health in the aftermath of the recent earthquake is contaminated water and the lack of infrastructure to clean it up."

Holland has managed the research and development of the systems and directs the Texas Research Institute for Environmental Studies at Sam Houston State.

"We have gone from basic research into the bacteria to actual construction and deployment of the systems in seven years. The typical time from discovery to commercialization is 14 years," Holland said.

"The bacteria, the 'bugs,' we are working with are naturally occurring. We have isolated a small subset of them-- each bacterium has a specific function-- and we have engineered a [biofilm](#) that is self-regulating and highly efficient at cleaning wastewater."

Holland and his colleagues have tested and demonstrated the systems' capabilities and effectiveness at several municipal and military sites-- to the satisfaction of the Army-- by cleaning influent wastewater within 24 hours after set-up to discharge levels that exceed the standards established by the Environmental Protection Agency for municipal wastewater, "leaving less than ten percent of sludge, in most cases less than one percent."

"The typical septic system or traditional waste treatment process can take as long as 30 days and leave 40 to 50 percent sludge," he said.

Part of the recent engineering and component testing were done in partnership with Lamar University and Sul Ross University, Sam Houston State's sister institutions within the Texas State University System.

"The technology is scalable," Sabin said. "We can make the units as large as required for large scale treatment applications, or as small as a single home unit."

The research has been funded over the last three years by U.S. Department of Defense. The first deployable systems have been purchased by the United States Army for use in Afghanistan. The Army's systems will be deployed in rugged terrain and transported by the Army's standard heavy trucks using a standard pallet loading system.

After an extended search for a business partner, Sam Houston State selected a private firm, PCD Inc, of Palestine Texas, to form a limited liability corporation company named Active Water Sciences (AWS), to market, manufacture, sell and further develop the systems.

The University owns a majority interest in the corporation and has licensed the technology to AWS for three years.

"This technology is an elegant, simple system," said Dan Davis, SHSU's associate vice president for research administration and technology commercialization. "We are at a very exciting point in its commercialization."

Sam Houston State University received three patents to protect the technology and engineering associated with a system and has three more patent applications pending.

Provided by Sam Houston State University

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