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A Miracle? It's Water Out Of Air

FEMA, military among first customers for new hygroscopic technology

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When Scott Morris took over as Florida's head of the Federal Emergency Management Agency in 2004, the state was reeling from the effects of a nasty hurricane season.

Morris recalls costly efforts to deliver clean drinking water to mobile medical teams and others in hard-hit areas. Back then, he wished his crew had access to what he now calls "the water machines."

Two months ago, the FEMA staff in Florida bought two 40-foot trailers that can extract thousands of gallons of pure water from the atmosphere each day.

"This is a revolutionary way for FEMA to do business in Florida," Morris said. "We're fascinated with this technology and very excited by its potential."

The technology uses a patented, natural salt-based solution that's hygroscopic. That means it's highly attractive to moisture. It literally strips water molecules from the atmosphere, rather than condensing the droplets on cold coils like a standard household dehumidifier.

Each mobile water system lets FEMA wring 2,500 gallons of water from the air each day. The cost is about 15-30 cents per gallon, com-

pared with \$15 or more per gallon to truck water to disaster sites.

The new water system comes in trailers with generators and containers to package the water. The system includes a reverse-osmosis device, itself not a new technology, that can squeeze 12,000 more fresh gallons per day from nearby sources of brackish water.

Well Water A Concern

FEMA hopes to anticipate future storms and get the trailers out to sites before disasters strike. This should also allow FEMA to send fresh water to remote areas. For instance, even when bridges wash out in the Florida Keys, a trailer could be delivered via barge or helicopter.

"This is a big concern for rural communities in Florida that use well water," Morris said. "In the case of storm-water events, those wells can quickly become contaminated."

Aqua Sciences, a privately held firm based in Miami, developed the water-harvesting process. The system is so efficient that it even works in low-humidity desert settings such as Africa or the Middle East, says Abe Sher, the founder and chief executive of Aqua Sciences.

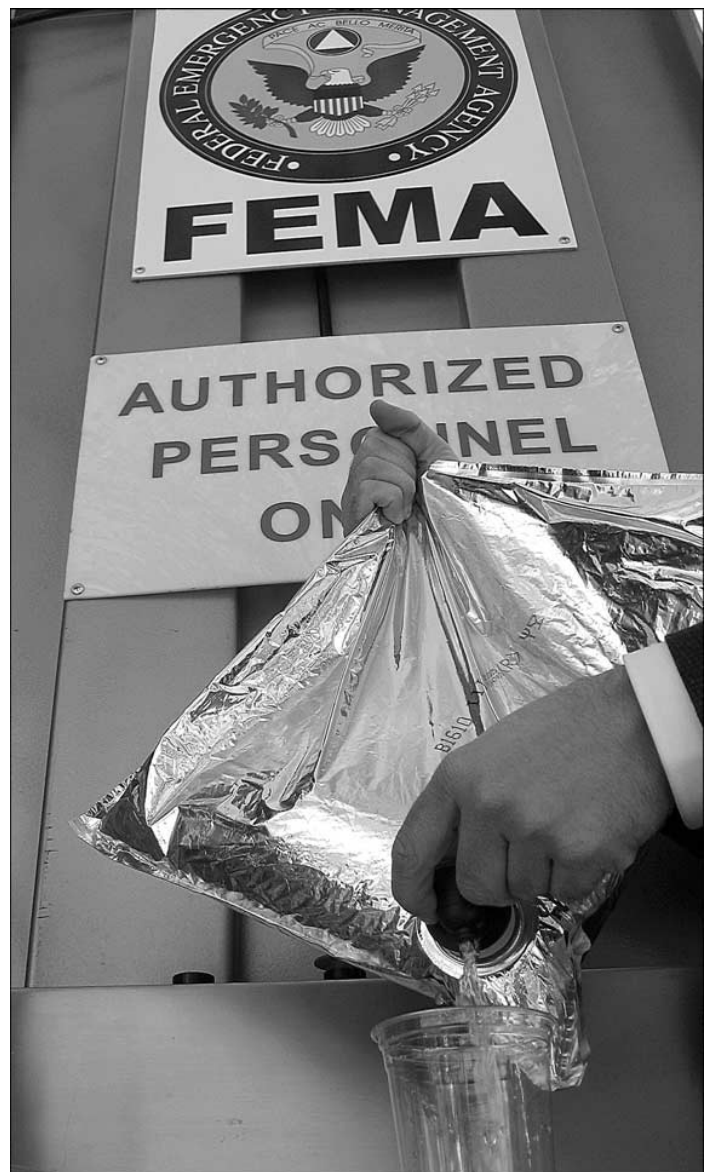
"We're not going to any existing source of water," he said. "We're going to the sky."

More than 5 million people worldwide die each year from lack of good water, according to the United Na-

tions. This new hygroscopic breakthrough could be a lifesaver for many, Sher says.

"The problem of water scarcity affects everyone on the

planet," he said. "Yet, our atmosphere surrounds the whole planet, and it's the last untapped source of water in the world." *(Continued)*



A FEMA official squeezes fresh water from a pouch, part of a water extraction system the agency bought from Aqua Sciences for use in emergencies.

Some of the world's largest companies have gotten active in aspects of the fast-rising water industry. They include General Electric^{GE}, Siemens^{SI}, Suez^{SZE} and Vivendi.

Aqua Sciences expects demand for its system to spread beyond disaster relief. Other possible markets include systems for humanitarian aid, commercial uses for homes and businesses, and military applications.

The U.S. Army's Tank-Automotive Research, Development and Engineering Center already is an Aqua Sciences customer. Tardec has a contract with Aqua Sciences to develop and

test the system for military uses.

Soldiers in a desert setting require three gallons of water per day each, at a weight of more than eight pounds per gallon. That creates a big logistical burden and cost for the military. Also, water tanker convoys are targets for attacks in Iraq.

Aqua Sciences' new water systems also could transform rural villages wracked by poverty and disease, says Ron Pernick, the head of Clean Edge, a market research firm for clean technologies. He says more than 1 billion people around the globe lack a steady source of potable

water. "Conceptually, this is a very compelling solution," Pernick said.

The hygroscopic technology does not work like a desalination plant, which takes the salt out of seawater. Desalination is expensive, with plants costing up to \$1 billion.

Twist On Usual Method

Rather, Aqua Sciences uses a salty solution to take water out of the air. It behaves much as salt in a shaker acts like a sponge, clumping up on humid days. The salt also helps to keep water clean, as it is a natural decontaminant.

Systems for filtration or desalination are based on clean-

ing up old sources of non-potable water. The new water plants do just the opposite — they extract new clean water from air.

"Our product starts out with pure water, so our goal is to keep that water pure and clean, not to clean up dirty water or salty water," Sher said.

Morris says he expects that FEMA in Florida can pay off the \$1 million price tag for its two mobile water systems within four days of a disaster response, due to the greatly reduced cost of water.

"This is the type of technology that the government has to look into," he said. "I want to get this technology battle-tested to show what it can really do."