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Terrorism

Water Utility Officials Fear 'Backflow' From Reservoirs May Be Safe, but House Pipes Can Be Used to Push Toxins Into a

Neighborhood

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In St. Petersburg, Fla., water authorities are keeping a closer eye on system-wide water pressure. In Cleveland, officials are weighing whether to add more chlorine to their water so larger amounts of the chemical will linger in their pipes. In Portland, Ore., alarms are now triggered by smaller drops in water pressure than in the past.

Across the country, water utility officials are taking steps to prevent terrorists from reversing the flow of water into a home or business—which can be accomplished with a vacuum cleaner or bicycle pump—and using the resulting “backflow” to push poisons into a local water-distribution system. Such an attack would use utility pipes for the opposite of their intended purpose: Instead of carrying water out of a tap, the pipes would spread toxins to nearby homes or businesses.

Water utility officials say the backflow threat dominates their post-Sept. 11 discussions with law-enforcement personnel. Although utilities have posted extra guards to patrol reservoirs and treatment plants, officials say the biggest threat to the nation's water supply may be from the pipes that carry the water, not facilities that store or purify it.

“There's no question that the distribution system is the most vulnerable spot we have,” says John Sullivan, chief engineer for the Boston Water & Sewer Commission and president of the Association of Metropolitan Water Agencies. “Our reservoirs are really well protected. Our water-treatment plants can be surrounded by cops and guards. But if there's an intentional attempt to create a backflow, there's no way to totally prevent it.”

Most reservoirs hold between three million and 30 million gallons of water, which would dilute any poison so significantly that terrorists would have to release enormous quantities to do serious damage. And most poison would be destroyed when the water was purified at a treatment plant. A backflow attack, by contrast, could spread highly concentrated amounts of poison to a few thousand homes or businesses, making the toxin far more effective.

Down the Pipes?

The federal government devotes little money to protecting the nation's water supply system, which many law enforcement officials see as a potential terrorist target.

- Amount of money spent by the Environmental Protection Agency to combat bioterrorism in fiscal year ended Sept. 30, 2001: **\$2.5 million** (the agency spent \$10,000 on the issue in 1998, no money on it in 1999, and \$100,000 in 2000).
- Amount that municipal and private water-system officials wanted to see the agency spend on the issue in the current fiscal year: **\$155 million**.
- Amount the EPA will spend in the current fiscal year, according to recently passed emergency spending legislation: **\$90.3 million**.
- Total amount of money that water-system officials want Congress to devote to improving drinking-water and wastewater plants: **\$5 billion**.
- Total number of municipal water systems across the country: **54,064**.
- Total number of Americans served by the systems: **263.9 million**.
- Amount water systems would receive for immediate security projects, according to a just passed Senate bill: **\$50 million**.

Sources: EPA, American Water Works Association, WSJ research.

So far, the only backflow incidents on record have been accidental. Four years ago, dozens of gallons of fire-fighting foam backed up through the hoses of firefighters in Charlotte, N.C., and made its way into the city's water system, prompting officials to order thousands of residents not to shower or drink tap water for several days. In 1998, workers at a United Technologies Corp. Sikorsky helicopter plant in Bridgeport, Conn., added chemicals to the facility's fire prevention system to guard against corrosion. Some of the chemicals backed into the town's water system, deluging area homes with contaminated water that residents were told not to drink or use for washing or bathing.

There were no serious injuries in either case, but the incidents rattled many water officials. Even before the Sept. 11 attacks, fears of an accidental backflow incident led to the creation of a group called the American Backflow Prevention Association, which works with lawmakers, water officials and engineers across the country. The group publishes a newsletter and an educational comic book for children that features a character named Buster Backflow.

Still, experts have long feared that a terrorist would try an intentional attack. As Gay Porter DeNileon—a journalist who

serves on the National Critical Infrastructure Protection Advisory Group, a water-industry organization—put it in the May issue of the journal of the American Water Works Association, “One sociopath who understands hydraulics and has access to a drum of toxic chemicals could inflict serious damage pretty quickly.”

Utility officials say that it is difficult to fully prevent a backflow incident, but they are hopeful that they can limit the damage through early detection. The beginning of a backflow attack probably would be marked by a sudden drop in water pressure in a targeted neighborhood as terrorists stopped the flow of water into a home or business. The pressure would then climb as attackers reversed the flow of water and began using it to carry poison.

Utilities regularly monitor system-wide water pressure, because a sharp and unanticipated decrease—at times other than, say, halftime of the Superbowl, when tens of millions of American toilets flush—can indicate that a pipe has burst. Most utilities monitor pressure at water-treatment plants and inside the underground pipes that carry the water to nearby homes and businesses; some use advanced telemetric sensors inside pipes.

In recent weeks, many utilities say they have increased the frequency of their checks. “A small drop-off would attract

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attention it wouldn't have even a short time ago," says Michelle Clements, a spokeswoman for Oregon's Portland Water District, which serves 190,000 customers.

But officials concede that it might be difficult for them to actually spot the minor drop in pressure that could be the start of a backflow attack. Jeffrey Danneels, who specializes in infrastructure security at Sandia National Laboratory in New Mexico, says that water officials might have a hard time detecting a backflow attack originating in a single home or apartment building. "The smaller the pipe, the harder it would be to notice," he says.

Another way to protect the public is to increase the amounts of chlorine or other chemicals added to water so that more of the chemical will remain in the pipes, providing residual protection against some toxins, according to Tom Curtis, deputy director of the American Water Works Association, which represents 4,300 public and private water utilities.

At the Cleveland Division of Water, officials are considering adding more chlorine in areas where residual levels are low, says Julius Ciaccia Jr., Cleveland's water commissioner. Even before the Sept. 11 attacks, some utilities had begun replacing the chlorine with chloramine, a related substance made from the combination of chlorine and ammonia that is believed to linger in pipes longer. Increasing the chemicals has drawbacks, however. "You can only go so far before people begin to complain about the taste," says Mr. Curtis.

The only sure way of preventing a backflow attack, water officials says, is installing valves to prevent water from flowing back into the pipes. Many homes have such valves on toilets and boilers. But virtually none have them on sinks, in part because water officials long assumed that the biggest threat they faced was natural, such as an earthquake, flood or hurricane carrying debris into a reservoir or pipe. Water officials say retrofitting existing structures with the valves would be prohibitively expensive.

"We're used to natural incidents. We're ready for them," says Mr. Sullivan of the Association of Metropolitan Water Agencies. "But we've never really looked at what could happen if someone really wanted to come and get us. And that's a hard adjustment to make."

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