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# HRSD doesn't want to waste wastewater

By Dave Mayfield

*The Virginian-Pilot*

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## **SEAFORD**

Ted Henifin crouched next to a floor drain at the Hampton Roads Sanitation District's York County treatment plant. Into his palm ran a soft stream of clear water – clean enough, probably, to drink. But the lab results aren't back to confirm that. So, Henifin will hold off before he sips.

Waiting isn't exactly Henifin's style these days. He has dived into a project to prove that HRSD can turn what Hampton Roads flushes down

## **recycled**

The sanitation district wants to launch a \$1 billion, decadelong project that would refill the region's aquifers with treated wastewater.

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## WASTE

# PLAN COULD SAVE CITIES MILLIONS, SLOW SEA LEVEL RISE

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its toilets and rinses down its sinks into water that's drinkable. Once that's accomplished, he wants to inject 120 million gallons a day into the main aquifer that underlies the region.

The idea has excited local environmentalists, business leaders and elected officials. They hope adding so much water underground would slow the sinking of land throughout coastal Virginia. Geologists have attributed that subsidence to wells sucking water from the aquifer and estimate it accounts for more than half of the region's relative sea level rise over the past century.

With HRSD cutting its discharges of treated, but still-polluted, water into local rivers, Hampton Roads localities also could leap into compliance with the federal Chesapeake Bay cleanup mandate.

"There's so much happening so fast," said Henifin, HRSD's general manager. "But we really feel motivated that we have to have some answers early. It's critically important to the region and the Chesapeake Bay in so many ways that it seems like it's the right thing to do."

Much of the focus of HRSD's effort right now is the York County facility, where it is pilot testing the drinking-water-treatment options most likely to be used at the seven plants it is considering for the aquifer-replenishment project. The water already is extensively treated as part of HRSD's normal process. The agency added equipment to further cleanse it during the pilots.

One test involves reverse osmosis, in which water is streamed through a series of pressurized membranes. The other relies on activated carbon. Both employ ultraviolet light as a final cleansing weapon.

Charles Bott, HRSD's director of water technology and research, said the carbon-based pilot has been running for about a week, and the reverse-osmosis pilot for three.

Already, he said, the lat-

ter system is showing disadvantages. It uses 12 times as much electricity. It also typically removes all salt, so HRSD likely would have to add a significant amount back to the treated water before injecting it into the aquifer. That's because water going in should match as closely as possible the water already underground – and the aquifer contains salt, more so near the coast.

HRSD plans to demonstrate the drinkability of the test water at a Sept. 15 event at the York County plant; politicians and other "decision-makers" will be invited.

Henifin said he'll take the first gulp.

As for the others? He's hoping the "yuck factor" will be overcome by the novelty of being able to claim that they'd dared to imbibe.

By the time of the event, HRSD also may know if it will be able to inject water underground at the York County plant. It is atop or near the edge of the Chesapeake Bay crater, formed by the impact of a space object about 35 million years ago. It's not known where at this spot the Potomac aquifer lies beneath.

A rig was set up this week to begin drilling. If it doesn't find the aquifer, HRSD will consider piping water to a site where it could be injected – an option that might drive the cost of including the York County plant too high. The agency estimates the total project cost at about \$1 billion, when all the plants it is considering are included.

HRSD is more certain that what's beneath the six other candidate plants is suitable for aquifer injection.

The agency recently drilled at its Nansemond plant in northern Suffolk and hit the aquifer's top at about 400 feet down. Cuttings taken as the drilling continued 1,000 feet deeper will be analyzed to design a demonstration scheduled to begin by early 2018.

The injection well will have screens to release the water at various levels where the ground is deemed most permeable, Henifin said. The plan is to pump

1 million gallons a day for a year, using the results to guide full-scale injection systems for Nansemond and the other plants – two in Norfolk, and the rest on the Peninsula.

Assuming it gets the federal and state approvals it needs, HRSD aims to roll out the project over a decade ending around 2030.

Among agencies that have taken interest is the U.S. Geological Survey. It tracks subsidence, and the HRSD project has energized an initiative to improve monitoring in the area.

Henifin said HRSD agreed to foot the \$1 million needed for an instrument known as an extensometer that will be installed by the Geological Survey at the Nansemond plant beginning in August. A research team from the survey agency will drill a borehole until it reaches bedrock, which at this location is estimated to be about 2,000 feet down. Inside that well, it will lower a metal pipe adorned with electronic equipment that will continuously monitor for changes in the distance between the bottom of the borehole and the surface.

There are only two other such instruments in southeastern Virginia – one in Suffolk and another in Franklin, both of which were recently activated after being largely unmonitored for more than 20 years. The Hampton Roads Planning District Commission said in a March report that at least two more should be installed in the region. So far, only HRSD has stepped up to pay for one.

Henifin conceded it's in his agency's interest to improve monitoring, and he's optimistic that the measurements will show the aquifer injections slowing the sinking of land, perhaps even modestly reversing it.

"There's a lot of interest along the mid-Atlantic and southeast coast" in what happens, said Jack Eggelston, a Geological Survey hydrologist who has provided research assistance to HRSD.

Henifin said the HRSD project's potential for contributing to the Chesapeake

Bay cleanup also is significant.

His agency estimates that its discharges of nitrogen and phosphorus into the watershed's rivers would be cut 90 to 95 percent, were it to inject its treated wastewater into the aquifer instead.

The federal pollution credits that HRSD would earn under the bay cleanup plan are widely anticipated to be enough to relieve local cities and counties from required major improvements in stormwater management systems. Some local officials have said savings could run into the hundreds of millions of dollars – perhaps more than \$1 billion – over the next few decades.

Henifin said HRSD and its ratepayers can't foot the cost of the aquifer replenishment, however, while simultaneously paying an estimated \$2 billion to comply with a 2010 federal consent decree requiring it to reduce sewer-system overflows during heavy rains.

He said HRSD soon will formally ask the U.S. Environmental Protection Agency to put off most steps required under that "wet weather" decree until after the replenishment project is completed. HRSD reported 18 such overflows totaling about 414,000 gallons in 2015.

Even if the federal agency agrees, Henifin said, HRSD would track overflows and strive to minimize leaks. He said it's in HRSD's interest, for example, to find places where saltwater is intruding into pipes. That's because elevated levels of salt in the water coming into its treatment plants might make it harder to match what's in the aquifer.

Some environmental activists have expressed concern about a potential delay in sewer-overflow fixes. But Henifin said the benefits pale to those possible in the water-recycling initiative. He's optimistic the EPA will grant a reprieve: "They've been agreeable to at least entertain a look at that."

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