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HRSD proposes refilling aquifer

by Tom Chillemi

Using water once is not enough.

The Hampton Roads Sanitation District (HRSD) is proposing to inject wastewater, which has been treated to drinking water quality, back into the Potomac Aquifer from which it came.

The aquifer provides the drinking water for Middlesex County and the majority of eastern Virginia.

Direct injection will “recharge” the Potomac Aquifer, which has no natural water source to refill it, explained HRSD general manager Ted Henfin during a detailed presentation to the Middlesex Board of Supervisors during its retreat meeting on Monday, November 16, at the Deltaville Maritime Museum.

The idea of injecting treated wastewater back into the ground is nothing new. Groundwater recharging with direct injection has been done in El Paso, Texas, since 1985, in California since 1993, and in Scottsdale, Arizona, since 1999, states HRSD’s report. HRSD’s proposal would be the first time direct injection of water would be done in Virginia, said Henfin.

Water levels in the Potomac Aquifer have been sinking for decades. Geologic maps show “cones of depression” that radiate around two large water users in the Tidewater area—one is the RockTenn paper mill in West Point, the other is International Paper’s mill in Franklin. The aquifer around these paper mills sank more than 150 feet in the last 100 years.

Added to this withdrawal is population growth that has increased water usage.

“Total permitted withdrawals are unsustainable,” stated the HRSD presentation.

Saltwater intrusion

As the aquifer water level drops, saltwater from the Chesapeake Bay flows “downhill” into the aquifer. Saltwater intrusion is one reason some properties in eastern Middlesex have poor drinking water. Refilling the aquifer would provide pressure to keep saltwater out.

Sinking land

As the aquifer level drops, the land above it is not supported and sinks. Just as a boat floats on water, so does the earth.

By injecting 120 million gallons of water per day into the aquifer, land subsidence will be slowed, said Henfin.

He said when the paper mill in Franklin reduced its water use between 2002 and 2015, the land actually raised measurably, according to the nearby U.S. Geologic Survey monitoring station.

Containing nutrients

Another major benefit of injecting water back into the aquifer is that the treated wastewater will not go into bodies of water that flow into the bay. Nutrients are extremely hard to remove from wastewater. These nutrients feed algae that “bloom” in summer and block sunlight from reaching underwater grasses. When the algae die, their decomposition uses oxygen to the detriment of aquatic life.

Henfin said HRSD has spent \$750 million trying to remove nutrients from wastewater to meet state regulations. HRSD may have to spend \$1 billion more to meet further regulations, he added.

To emphasize how difficult it is to clean water to meet current state regulations, Jim Pyne, who has retired from HRSD, explained more than a year ago that if a copper penny is dipped into a glass of water, that water would contain too much copper to be discharged legally. Many houses, especially older ones, have copper pipes.

Schedule

Henfin said HRSD’s water injection plan will seek the endorsement of the Department of Environmental Quality (DEQ) and the Virginia Health Department.

HRSD's aggressive schedule calls for a one million gallons per day demonstration pilot system by 2018.

By 2021, HRSD hopes to inject 20 million gallons per day back into the aquifer.

If all goes well, HRSD could be injecting 120 million gallons per day of clean water back into the aquifer by 2030.

The cost to build six treatment plants to treat water until it is "drinking water quality" is estimated at \$1 billion—about the same as costs to develop stricter nutrient removal.

More than once

Reusing water is the norm, said Henifin. He explained that people withdraw water from a river, use it, treat it, and put it back into the river, where someone downstream withdraws it to use again. "Almost no water is new water," he said.

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