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Vegetable oil new Hanford cleanup tool

by Associated Press

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YAKIMA, Wash. (AP) - Researchers at the nation's most contaminated nuclear site last year injected 5,000 gallons of molasses into the soil to try to clean up toxic groundwater near the Pacific Northwest's largest waterway.

This week, they're trying their hands at vegetable oil.

Who knew the answers to ridding the Hanford nuclear reservation of wastewater might be in the kitchen? State officials who have long pressured the federal government to clean up Hanford, call the cooking oil a good idea.

"We support these tests, they're actually pretty inexpensive," said John Price, project manager of environmental restoration for the Washington Department of Ecology. "We'd like to see them scale up to a full system, beyond just tests, sooner rather than later."

The federal government created Hanford in the 1940s as part of the top-secret Manhattan Project to build the atomic bomb. Plutonium production for the nation's nuclear weapons program continued there for four decades, leaving a mess of radioactive and hazardous waste.

High on the cleanup list at the south-central Washington site: an estimated 80 square miles of groundwater, contaminated at levels exceeding state and federal drinking water standards.

Federal officials announced earlier this year they would step up groundwater efforts, particularly for a plume of hexavalent chromium that stretches for 1 1/4 miles along the rivershore. A cancer-causing agent that was used as a corrosion inhibitor in nuclear reactors, the contaminant moves easily with water and is particularly dangerous to salmon in the Columbia River.

Very little of the contamination closest to the river exceeds the federal drinking water standard of 100 parts per billion. However, the area closest to the river exceeds the more stringent standard for fresh-water aquatic life - 10 parts per billion.

Workers installed new wells and additional equipment to triple the amount of groundwater that can be treated. An iron barrier installed in the soil about five years ago breaks down the chromium to a nontoxic form, where it is less mobile and less likely to travel in groundwater to the river.

But scientists also have been researching ways to supplement those treatment methods.

In what was believed to be the first such effort at a nuclear site, they injected 5,000 gallons of molasses mixed with 200,000 gallons of water into a test well last September. The goal was to increase the food supply for natural microbes and remove oxygen from the groundwater, thereby enabling the chromium to convert to the nontoxic form.

So far, the results have been good. After 10 months, levels of toxic chromium in the area of the test well have declined, said Mike Truex, senior program manager for Pacific Northwest National Laboratory.

However, the molasses might have to be injected every couple of years, he said, whereas vegetable oil could provide the same results over a longer period of time.

"The difference is, we have molasses that degrades very quickly, or oil that dissolves very slowly but provides enough dissolved material to feed the bacteria to do the same job," he said.

Researchers believe an injection of 1,500 gallons of vegetable oil, mixed with 50,000 gallons of water, could work for up to seven years.

It's not the first time vegetable oil has been tried. Near Barstow, Calif., workers injected a number of organic materials, including lactate, ethanol and vegetable oil, into the soil at a Pacific Gas and Electric Co. site contaminated with hexavalent chromium. The Hinkley site was the subject of the hit Julia Roberts movie, "Erin Brockovich."

Early results showed lactate, basically milk sugar, to be most effective, because the vegetable oil wasn't as mobile, said Chuck Curtis, supervising engineer for the Lahontan Regional Water Quality Board, which oversees the cleanup.

"Using vegetable oil, it was definitely effective, it just didn't have easy distribution they wanted throughout the aquifer," he said.

Various organic materials, including sugar waters, and vegetable oil have been used before in commercial cleanup activities, said Mike Thompson, hydrogeologist for the U.S. Department of Energy's Richland Operations Office. This spring, workers at the Savannah River nuclear site in South Carolina also injected vegetable oil into the ground to treat contaminated groundwater.

At Hanford, researchers want to study their options before implementing a large-scale project, in hopes of getting the best results, he said.

"Our goal is to do this as fast as we can, because we do measure (hexavalent chromium) in the environment, and that's not acceptable to us," he said.