Researchers develop alternate method to dispose nuclear liquid waste

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An alternate method of processing certain liquid wastes into a solid form for safe disposal has been developed by researchers at Penn State University and the Savannah River National Laboratory. The solidified form has been called a hydroceramic and is an improved alternate to other forms and processes. This research is published in the *Journal of the American Ceramic Society*.

The new process uses low temperatures (less than or equal to 90°C) to solidify and stabilize high alkali, low-activity radioactive waste. The resulting form is a hydroceramic, which is strong, durable and has the potential to tie-up and hold minor radioactive components in its zeolitic structure. The preparation is similar to the rock formation process that occurs in nature.

The Department of Energy (DOE) is currently storing approximately 80 million gallons of radioactive waste in underground tanks at two sites: the Hanford Reservation in Richland, Washington and the Savannah River Site in Aiken, South Carolina. The simulant used in the study duplicated the composition of selected supernates at both sites. The supernate is one of the two kinds of waste found in the waste tanks. It coexists with a small amount of highly radioactive sludge which has settled to the bottom of the tank. The liquid supernate makes up most of the volume, but contains only a fraction of the radioactivity.

The Department of Energy is planning to remove both sludge and supernate from the tanks, clean the tanks and then fill them with a

cementitious material prior to decommissioning them. The highly radioactive sludge from Savannah River Site is currently being vitrified into a stable glass form, and Hanford is making plans to begin operation of their vitrification facility. The DOE is actively considering alternatives for processing the low-activity portion of the waste, i.e. properly treated supernate.

"Our research will give DOE a viable alternative to consider for treating their low-activity wastes," states lead researcher Yun Bao.

In the interim, researchers are also developing an equivalent hydroceramic concrete that could be used to fill empty waste tanks at both sites. Because of the unique adsorptive properties that a hydroceramic concrete might have, this new concrete will have the potential to not only support loads and fill space, but also to absorb traces of residual elements remaining in the tanks.

Source: Blackwell Publishing Ltd.

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