DOE Eyeing Spent Fuel Reprocessing Overseas As Industry Interest Mounts

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With the nation making little headway on a repository for disposal of spent nuclear fuel, the Energy Department is once again looking at reprocessing the radioactive material as one prong of its nuclear waste strategy, including a sure-to-be-controversial idea of hiring overseas firms to recover nuclear material and handle associated waste streams.

Rita Baranwal, assistant DOE secretary for nuclear energy, revealed on May 14 that her office is “looking at” the plan to ship U.S. used fuel to other countries that have facilities to separate uranium and plutonium from spent fuel for refabrication into new fuel.

Baranwal’s disclosure comes amid other recent indications that DOE and, somewhat surprisingly, some U.S. nuclear industry officials are warming to reprocessing, even though traditional chemical reprocessing is hugely expensive and typically generates large amounts of radioactive and toxic waste without providing any permanent disposal.

Nuclear Regulatory Commission officials also cited renewed DOE interest in reprocessing at a March 4 public meeting called by the agency to review whether to proceed with a dormant rulemaking that would lead to licensing procedures for reprocessing facilities. NRC staff said it had learned that DOE was “going to pursue low-level efforts to look at recycling and reprocessing options.” And two companies—GE Hitachi and Orano—both said clearly that they were interested in reprocessing and saw a business case for deploying such technology, which both have developed.

The level of interest seemed to catch the industry’s trade group, the Nuclear Energy Institute, by surprise. At the meeting, NEI Senior Project Manager for Fuel and Decommissioning Mark Richter said NEI was “fully supportive of the technology around reprocessing” but “also believe[s] that there's no current economic driver” for advancing the reprocessing rulemaking “at this time.”

Two days later, Richter sent an email to NRC staff, saying: “Relative to the differing if not conflicting perspectives regarding the subject rulemaking presented by industry at the public meeting, NEI will be circling back with our members to reassess industry position.”

However, the most startling recent comments on reprocessing came from Baranwal during a webinar hosted by the Organization for Economic Cooperation and Development’s Nuclear Energy Agency.
“We can collaborate with entities that currently recycle used fuel and not necessarily need to have our own recycling plant in-country, so that is certainly an option that my group is looking at,” she said.

Baranwal suggested she favored recycling as a tool in DOE’s national spent fuel management system, and also thinks it would help U.S. reactor vendors compete for overseas sales.

“One of the main drivers of why we are looking at recycling is that we want our developers to be able to compete globally with other international competitors in offering nuclear reactor technologies to different countries, and right now our competition is offering a couple of things that we cannot, and one of those is fuel take-back,” said Baranwal.

“And to be able to take that fuel back, we have to do something with it, and right now in the U.S. we are discussing interim storage, but I would argue that there’s another option that we should also be pursuing and that is looking at recycling,” she said.

Baranwal was referring to two privately funded projects underway in Texas and New Mexico to provide interim storage for the nation’s spent fuel. Those projects have emerged as the most realistic near-term option for U.S. spent fuel management because DOE’s planned repository in Yucca Mountain, Nevada, has been blocked by officials in that state and other opponents.

DOE’s look at spent fuel reprocessing marks another turn in the nation’s on-again, off-again relationship with the technology, which is controversial because it creates fresh nuclear waste for which there is no disposal strategy. Reprocessing also separates weapons-usable nuclear material, raising proliferation issues. Additionally, refabricated fuel is typically far more expensive than new fuel, especially given very low current prices for raw uranium and fuel manufacturing services.

DOE has long operated reprocessing facilities to produce material for nuclear warheads, but the United States has little experience with commercial reprocessing. A small commercial reprocessing facility was run in West Valley, N.Y., from 1966 to 1972, but it shut down without gaining any market traction.

President Jimmy Carter banned reprocessing in 1977, citing nuclear proliferation risks, a move that sank a large commercial reprocessing plant that was under construction in Barnwell, S.C., at the time.

President Ronald Reagan later lifted the ban, and under President George W. Bush, DOE looked at re-kindling reprocessing under the proposed Global Nuclear Energy Partnership (GNEP), which was intended to develop new spent fuel recycling technologies that proponents said could resolve several problems hindering the growth of nuclear power, including waste disposal and proliferation concerns.
Under that program, supplier countries with well-developed nuclear programs—like the United States and Japan—were to supply nuclear fuel services to countries that agreed to forego development of their own uranium enrichment or spent fuel processing facilities. However, the hugely ambitious program eventually fizzled out.

One outgrowth of GNEP, however, was NRC’s reprocessing rulemaking, which the agency convened the March 4 meeting to discuss.

GE-Hitachi’s Eric Loewen urged NRC to pursue the rulemaking, and said if it’s done right GE-Hitachi sees a business opportunity in reprocessing.

“We encourage the NRC to continue with this rulemaking, and that allows the NRC the diversity to regulate all facets of the supply chain from mining all the way to different options for used fuel, be it deep geological repositories or fuel recycling,” said Loewen. “We think if those conditions are right in the licensing and the policy framework, that there [are] economic drivers for the recycling of used fuel.”

NRC heard roughly the same message for Orano, which runs a reprocessing facility at La Hague, France.

“Orano supports the continued work on NRC reprocessing rulemaking...because we think, as elaborated by GE, this will become an important part of evaluating a future back-end solution for the U.S. fuel cycle facilities,” said Svan Bader, an advisory engineer at Orano.

But Tom Clements, an antinuclear activist and director of Savannah River Site Watch, urged NRC not to proceed, suggesting the nation’s history with reprocessing suggests it makes little sense and that further agency consideration would just waste taxpayer money.