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Opinion

A nuclear waste solution

Yucca Mountain may never be used, but a physicist lays out his argument favoring repositories over costly reprocessing.

By Frank von Hippel

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The Yucca Mountain nuclear waste repository project is now comatose, if not dead. And that puts us back at square one on a crucial question: What are we going to do with all the radioactive waste being discharged by U.S. nuclear power reactors?

Many conservatives on Capitol Hill favor the French "solution": spent-fuel reprocessing. But reprocessing isn't a solution at all: It's a very expensive and dangerous detour.

Reprocessing takes used or "spent" nuclear fuel and dissolves it to separate the uranium and plutonium from the highly radioactive fission products. The plutonium and uranium are then recycled to make new reactor fuel, thereby reducing the amount of fresh uranium required by about 20%. But based on French and Japanese experience, the cost of producing this recycled fuel is several times that of producing fresh uranium reactor fuel.

In the past, about half of France's reprocessing capacity was used to process spent fuel from foreign reactors. Because of the high cost, however, virtually all of those foreign customers have decided to follow the U.S. example and simply store their used reactor fuel.

The French reprocessing company AREVA claims that its method reduces the volume and longevity of the radioactive waste produced by nuclear power reactors. But when you take into account the additional radioactive waste streams created by reprocessing and plutonium recycling, the volume of the long-lived radioactive waste is not reduced. And most of the recycled plutonium is neither destroyed nor reused. Its isotopic makeup makes it difficult to use in existing reactors, so AREVA simply stores most of it at the reprocessing plant.

All in all, reprocessing as practiced in France amounts to an expensive way to shift France's radioactive waste problem from its reactor sites to the reprocessing plant.

For some of AREVA's customers, that is the point. When I asked the fuel managers of Japan's nuclear



utilities why they reprocess, their answer was that they would love to store their spent fuel on site as the U.S. does until an underground radioactive waste repository becomes available. But local governments have vetoed dry-cask storage at their nuclear power plants. The stark choice for the industry, therefore, is to either pay for reprocessing or shut down all of Japan's 53 power reactors.

Reprocessing is enormously dangerous. The amount of radioactivity in the liquid waste stored at France's plant is more than 100 times that released by the Chernobyl accident. That is why France's government set up anti-aircraft missile batteries around its reprocessing plant after the 9/11 attacks.

Even more dangerous, however, is the fact that reprocessing provides access to plutonium, a nuclear weapon material. That is why the U.S. turned against it after 1974, the year India used the first plutonium separated with U.S.-provided reprocessing for a nuclear explosion. President Gerald Ford and Henry Kissinger, his secretary of State, managed to intervene before France and Germany sold reprocessing plants to South Korea, Pakistan and Brazil, all of which had secret weapons programs at the time.

Since that time, the U.S. government's argument that "we don't reprocess, you don't need to either," has been extremely successful. Japan is the only non-nuclear weapon state that still does today. If the U.S. began to reprocess again, that would legitimize another route to the bomb for nuclear weapon wannabes.

The U.S. made the mistake with Yucca Mountain of trying to force a repository on an unwilling state. One alternative would be to follow the path of Finland and Sweden, which have placed their underground repositories in communities that already host nuclear power plants. They have found that once people in a community have accepted a nuclear facility, they view the addition of an underground repository as a relatively minor issue.

In the meantime, spent fuel can be safely stored on site in dry casks for decades. It is not a permanent solution, but there is no reason to panic until we can build more permanent facilities. Reprocessing would be a panic solution.

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