

NUCLEAR MATERIAL STABILIZATION

Expectation:

Safely stabilize special nuclear materials at the Plutonium Finishing Plant (PFP) and then deactivate the facility to minimize risk to workers and the environment while decreasing cost to taxpayers.

Status:

- By making several key operational and process improvements, we thermally stabilized more than 650 plutonium-bearing material items this fiscal year. This is a more than four-fold increase over last year's production level. Five small ovens, called muffle furnaces, are now operating for this task.
- Successful partnering with the Department of Energy (DOE) and state regulators enabled early startup of residue packaging. About 3,000 items stored at PFP are already stable, require no further treatment and will be packaged and, ultimately, shipped offsite to the Waste Isolation Pilot Plant in New Mexico.



Packaging of residues is under way at PFP. Here, prior to startup, two certified nuclear chemical operators train a third worker on the packaging process. Inset shows the top of a so-called "pipe-and-go" overpack, which contains a can of plutonium residues inside a 55-gallon drum. The process, developed at DOE's Rocky Flats Site, eliminates unnecessary processing, reduces volume and minimizes dose rates to workers.

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Status: (continued)

- Started stabilizing plutonium nitrate solutions, using a magnesium hydroxide precipitation process. The process was customized by Fluor Hanford and the Pacific Northwest National Laboratory, working together, and is used to remove plutonium from the solutions and produce solids that can go right into the muffle furnaces for final stabilization.
- Began operating the first bagless transfer system for packaging stabilized plutonium material. The new method allows the material to be packaged in welded stainless containers without removing it from the glovebox, which is safer for workers and speeds packaging. Construction is under way for a second system, slated to be operational next spring.
- The Defense Nuclear Facilities Safety Board noted substantial improvements in the PFP criticality safety program. Improved areas include independent assessment and oversight, training and better ownership of operations with strong self-assessments.



A DOE facility representative monitors PFP's new solutions stabilization process, while a Fluor Hanford operator retrieves magnesium hydroxide from a barrel. The chemical is added to plutonium solutions in a process that produces solids that can be stabilized by baking in a muffle furnace.

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What's Next:

- Continue to work closely with the Westinghouse Savannah River Company, which is fabricating the bagless transfer packaging system, to explore opportunities to accelerate delivery of the second unit.
- Begin efficiently stabilizing PFP's remaining inventory of metals for storage this fall. Rather than convert all of the metals to oxide powder in the muffle furnaces, rust-like oxides on the outside of the metal will be brushed off and the stable metals placed directly into storage cans, using the new bagless transfer system. The brushed-off oxides will then be thermally treated in the furnaces.



In this 1980s-era photo, a Hanford worker safely holds a plutonium "button" produced at PFP for U.S. defense programs. Contrary to popular belief, the material is not always dangerous to touch. In this stable form, the worker only needs thin shielding. But much of PFP's inventory of plutonium must be stabilized before the PFP complex can be cleaned up and dismantled. Several stabilizing methods now under way will continue until the task is complete in mid-2004.

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