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Cleaning up a Cold War Mess

Kristen Philipkoski 

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The [US Department of Energy](#) is looking for a few good technologies to clean up a long legacy of nuclear weapons development.

The [Fernald Environmental Management Project](#) near Cincinnati, Ohio, is just one of the federal sites where contaminated land and warehouses -- filled with tanks, pipes, and other heavy equipment -- are waiting to be dismantled and disposed of. In conjunction with [Fluor Daniel Fernald](#), the DOE has been contracting work and soliciting new heavy-duty tools that can handle the unique job requirements.

"There are better mouse traps out there, and it's our job to do what's necessary to find them," says Mark Peters, a project manager at Fernald. What's necessary is a side-by-side comparison of each baseline technology, or a [Large Scale Technology Demonstration](#). With this kind of high-profile demonstration, "other contractors will lower their bids and the American taxpayer will pay less, and all undergoing [D&D](#) [Deactivation & Decommissioning] can benefit," Peters says. "You want to have the best tool in your tool box," he adds.

In 1989, the [Office of Environmental Restoration](#) was created to consolidate, centralize, and promote the cleanup of contaminated waste sites and surplus facilities within the DOE complex. Roughly 7,000 contaminated buildings need to be decommissioned throughout the United States, and the DOE plans to finish 700 of them over the next 50 years. The Fernald site, where the former Feed Materials Production Center produced uranium metals for nuclear weapons, is on a 10-year closure plan to be completed in 2005. At that point its officials say it will be nothing more than a green field. The budget for the cleanup of the Fernald plant is US\$11 million, with an additional \$3.1 million towards the technology demonstration.

The two-year technology demonstration at Fernald, scheduled to be completed this month, has showcased both off-the-shelf and custom-built technologies used to level the plant. During the demonstration, teams of contractors evaluate new technologies, comparing them to baseline tools to see which is safer, more economical, and/or faster. Marty Prochaska, a product manager at Fernald, points out that, as much as possible, significant cleanup happens during the demonstration.

To date, the Fernald team has evaluated 184 technologies for inclusion and has accepted [13 for demonstration](#). Prochaska says that there are three "stars of the show": the oxy-gasoline torch, the "cool suit," and the [VecLoader HEPA Vac](#).

"The oxy-gasoline torch is a simple tool but it beats the pants off the acetylene torch," Prochaska says. The former baseline method of segmenting large, thick pieces of metal, the acetylene torch costs about \$32 per day to fuel, while the oxy-gas costs only \$3. And while the acetylene torch can leave behind molten metal to fuse back together, the oxy-gas torch makes a clean cut. Plus it's faster: In the demonstration, it cut a 2-inch-thick

steel plate in 13 minutes, while the acetylene torch took 27 minutes. The Fernald project purchased a torch, developed by Petrogen International, for about \$1,000.

The Personal Ice Cooling System, known as the "cool suit," keeps workers comfortable in [thorium](#) warehouses where temperatures can reach 105 degrees. "The beautiful thing about this one is it's an easy technology," Prochaska says. The Cool Suit uses ordinary ice carried in a backpack, and a pump circulates water over the ice via tubing throughout the shirt, pants, and hood. Workers in the demonstration could stay inside four times as long using the 12-pound cool suit than with the heavier "ice vests" they used to wear. Fernald also purchased this outfit, developed by Delta Temax, for only \$1,100.

The [VecLoader High-Efficiency Particulate Air \(HEPA\) Vacuum](#) is a trailer-mounted beast that removes uranium-contaminated insulation. Instead of manually pulling the insulation from Fernald's walls, workers can stand up to 1,000 feet away with the VecLoader. Fibers are vacuumed into a fully enclosed, negative-pressure system and sent into a cyclone collector, then bagged. The VecLoader removed 220 square feet of fiber per hour in the demonstration, compared to 182 square feet manually.

Yet to be tested is the mobile work platform, developed by Eagle Tech in Solon, Ohio. It is revolutionary because it could replace one of the most difficult tasks of the deconstruction of any nuclear sites: segmenting and removing pipes up to 30 feet above the ground. This crane-like device has an arm that grabs the pipe and a cutter on each side. When the metal is cut, the arm lowers the segment to the ground. It can remove pieces from 17 inches to 10 feet in length.

Previously, workers used ladders, scaffolding, or lifts to reach the piping, then manually lowered the segments -- a time-consuming and dangerous process. The cost of one mobile work platform ranges from \$285,000 to \$600,000, depending on what attachments will go onto the end of the boom. For example, cutter devices, heavy duty grippers, a back hoe, shear, and sundry different attachments, all quick release, can be added to the main chassis," says Eagle Tech's president Victor Trost.

When asked about the feasibility of the 10-year cleanup plan, Todd Martin, a staff researcher at the [Hanford Education Action League](#), said, "Not even close." HEAL is a non-partisan citizens group that analyzes and disseminates information about the continuing effects of nuclear weapons production on health and the environment.

"People are supportive of technology as long as it's supportive of cleanup," Martin said, but added that technology demonstrations can be a diversion from real cleanup activities. "A failure of the DOE is to develop a nationwide technology development prioritizing site needs and allocating resources accordingly -- instead, all the sites get into a room and fight it out."

When all of the scrubbing and buffing is finished at Fernald, an on-site disposal facility will contain most of the contaminated waste. A small amount of more highly contaminated waste will be shipped off-site. Martin and other environmentalists would rather see all of the contamination left on-site. "It doesn't make sense, if we can isolate the waste in these places, to ship it somewhere else," he says.

"When the final remediation is complete, any contaminants will be below EPA standards, and what is considered clean ground water, soil, everything," Peters says. Prochaska adds that the land will be "essentially nothing but a green field, and used for redevelopment, perhaps for light industrial work or wild life areas."

"Sure, why not," says Martin. "It depends on the extent to which they clean it up. But the reality is that parts of each of these sites will be a natural sacrifice forever."

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