Direct disposal is better solution for South Carolina's plutonium problem

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Guest Columnists

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Earlier this month, U.S. Department of Energy officials testified before Congress on the myriad problems plaguing the mixed-oxide fuel fabrication facility now under construction at the DOE's Savannah River Site in South Carolina.

The facility's purpose is to fulfill U.S. obligations under a 2000 agreement with Russia in which each side committed to dispose of 34 tons of surplus plutonium from about 10,000 retired Cold War-era nuclear warheads. If completed, the MOX plant would mix plutonium and uranium oxides and produce fuel for commercial U.S. nuclear reactors.

IT WAS ABUNDANTLY clear from the hearing why the DOE believes the MOX program is unaffordable and is looking for a better alternative for disposing of its surplus plutonium. The DOE now believes the construction cost of the MOX plant will run $12 billion to $14 billion – more than 10 times its initial estimate – and it would cost at least $700 million a year to operate.

While $4.8 billion has already been spent building the facility, it emerged at the hearing that an estimated 25 percent of the construction was done incorrectly and would have to be "reworked" – that is, torn out and redone – resulting in further cost increases and delays.

The key witness at the hearing was Thom Mason, director of the Oak Ridge National Laboratory in Tennessee and head of an independent "Red Team" MOX program review that was delivered to Energy Secretary Ernest Moniz in August. The report found that the MOX project is in a "downward performance spiral … accompanied by an upward cost escalation spiral."

Even after making the most optimistic assumptions about the MOX facility's potential and pessimistic assumptions about the alternatives, the team found that direct disposal of the plutonium in the DOE's underground Waste Isolation Pilot Plant in New Mexico would cost about half as much as the MOX project's remaining life-cycle cost, which recent studies have estimated at $20 billion to $25 billion.

It remains to be seen, however, whether South Carolina's congressional delegation, led by Sen. Lindsey Graham and Rep. Joe Wilson, will finally stand down and allow the DOE to terminate the MOX project.

The South Carolina delegation has persuaded Congress to pass two budgets that forced the DOE to spend hundreds of millions of dollars a year on keeping the project on life support and study ways to reduce the MOX program's cost.

THE RED TEAM report looked at ways to cut costs and concluded that there "are no obvious silver bullets to reduce the (cost) of the MOX approach," and the WIPP disposal option would be considerably cheaper and far less risky.

It explained that it is unnecessary to purify the plutonium for disposal and that it would be much simpler to mix the plutonium with an inert substance for disposal than to manufacture tens of millions of high quality MOX fuel pellets that meet the exacting specifications for nuclear fuel.

The dilution-and-disposal alternative is not without its problems. The WIPP repository has been shut down since February 2014 as a result of two accidents, and the DOE has not announced a projected reopening date.

However, the authors of the Red Team report voiced confidence that a delay of even a few years in reopening WIPP would not have a significant impact on the viability of the dilution option and pointed out that a timely resumption of WIPP operations is critical to a number of other DOE programs.

There also is the issue of how Russia is holding up its end of the 2000 agreement. In 2010, Russia abandoned its own MOX program and decided to use its excess plutonium in fuel for prototype fast-breeder reactors, which it had long planned to construct on its own.

The United States – and most other advanced industrial countries – correctly determined decades ago that liquid-sodium-cooled breeder reactors would not be economically competitive with today's water-cooled reactors.

The United States also rejected building breeder reactors on nonproliferation grounds: They perpetuate the circulation of separated weapons-usable plutonium. For this reason, the nonproliferation benefits of Russia's parallel program are now marginal at best, and any objections from Russia should not deter the DOE from disposing of U.S. excess plutonium in the safest, most cost-effective manner.

THE BOTTOM line: Congress should stop forcing the DOE to throw good money after bad and allow it to develop a more sensible, affordable plutonium disposal policy. Adopting the down-blending approach would require the DOE to maintain its current level of spending on plutonium disposal at the Savannah River Site and also provide a pathway for plutonium to leave South Carolina more quickly than the delay-ridden MOX route. That would be the best solution for the DOE and South Carolina.

(The writers are, respectively, a senior scientist with the Union of Concerned Scientists' Global Security Program; and a senior research physicist at Princeton University. Dr. von Hippel also worked in the Clinton White House coordinating an examination of U.S. plutonium disposal options.)