

Disposal of Weapons-Grade Plutonium: Current Plans and Controversy

Between 1944 and 1994, the U.S. government produced 99.5 metric tons of plutonium for use in an estimated 70,000 nuclear weapons. Today, roughly 80% of the U.S. nuclear arsenal has been discarded, and the United States is struggling to dispose of the surplus plutonium. Currently, a total of [61.2 tons of plutonium](#) is declared excess to the needs of the U.S. government, of which [53.4 tons](#) is weapons-grade.

After amassing this massive stockpile of fissile material, the U.S. government was left with two options: either find other uses for the plutonium; or geologically isolate the plutonium for 10,000 years according to [federal standards](#). Today, the first option has been ruled out due to costs.

Facility to repurpose surplus plutonium is shuttered

The Mixed Oxide (MOX) Fuel Fabrication Facility at Savannah River, South Carolina was intended to manufacture nuclear fuel from surplus weapons-grade plutonium for use in commercial nuclear energy reactors. The MOX facility was designed to repurpose [3.5 tons](#) of surplus weapons-grade plutonium yearly. The facility also intended to play a key role in the United States' fulfillment of the 2000 Plutonium Management and Disposition Agreement (PMDA) between Russia and the United States, which affirms both countries' commitment to dispose of 34 metric tons of plutonium, enough collectively for 17,000 nuclear weapons.

However, the project faced serious delays, massive cost overruns and currently has [no customers](#) for its proposed fuel. The MOX facility's anticipated date of operation was 2007, with plutonium disposition set to [end in 2020](#). Yet, multiple delays in construction led to significant cost overruns with beginning operations delayed until [2019](#). Initially valued at [\\$2.898 billion](#) (in 2016 dollars), the total cost of the project skyrocketed to [\\$15.683 billion](#) as a result of construction delays and program mismanagement. This estimate also assumed a steady rate of funding, and fluctuations in [funding levels](#) could have further exacerbated delays and cost overruns.

In the end, it was determined that the cost of testing and updating existing reactors was prohibitive. Critics labeled the project the ["nuclear bridge to nowhere,"](#) and the Obama administration decided the project was unsustainable. As a result, the facility was shuttered for a more cost-efficient option.

Dilute-and-dispose for 10,000 years

In 2016, the U.S. Energy Department decided to transfer diluted plutonium to the Waste Isolation Pilot Plant (WIPP) in New Mexico in order to quarantine the radioactive byproducts of nuclear reactors. The process would down-blend the plutonium with an inert material for direct disposal at the deep underground depository. WIPP is the nation's only geologic burial site for radiological waste and is currently planned to isolate 48.2 metric tons of plutonium. The site was initially opened in 1999 for the disposal of equipment, clothing and soil contaminated with transuranic elements from within the nation's nuclear weapons complex.

However, Russian President Vladimir Putin called foul when the United States decided it was now pursuing dilute-and-disposal instead of repurposing the plutonium because, in theory, the plutonium could be recovered. It is a less proliferation resistant solution than MOX fuel fabrication, which has a 300-year radiation barrier. However, the salt formation at WIPP is expected to slowly collapse and seal off the drums of waste. Just the same, in October 2016, President Putin [suspended implementation](#) of the PMDA agreement with the United States "due to Washington's unfriendly actions toward Russia." Revival of the PMDA remains uncertain.