Alliance for Nuclear Accountability
Ending the Nuclear Threat: Protecting Our Communities and Our World
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Reprocessing and Plutonium— Not the Basis for Clean Energy

Reprocessing Is Not Recycling

Reprocessing, a dirty and dangerous chemical process, is the fundamental link between a nuclear reactor and a plutonium bomb. Irradiated, or "spent," fuel is separated into its constituent ingredients. One of them, plutonium, can be used to make new reactor fuel -- or nuclear bombs. The Obama administration acknowledges that the current worldwide stockpile of separated civilian plutonium (250 tons and growing by 10 tons a year) is one of the greatest proliferation risks. Reprocessing also pollutes. Every year, France's reprocessing plant routinely discharges one million gallons of liquid radioactive waste into the English Channel. At Hanford, WA, Savannah River Site, SC, and the Idaho National Laboratory, millions of gallons of deadly liquid reprocessing waste sit in aging tanks, threatening vital water resources. Contrary to what the reprocessing supporters argue, reprocessing does not significantly reduce the nuclear waste burden, since the process itself creates new waste streams. Finally, reprocessing is uneconomical. It adds to final disposal costs, while using plutonium in reactor fuel is more expensive than using low-enriched uranium.

Fuel Cycle Research and Development

Shortly after taking office, President Obama cancelled a Department of Energy (DOE) plan for rapid construction of a new reprocessing plant. That was a wise and welcome move. Since then, officials in his administration in both the departments of Energy and State have sharply delineated reprocessing's drawbacks. So it is odd to see DOE now ask Congress for a 32% budget increase -- to $201 million -- for Fuel Cycle Research and Development focused on reusing radioactive waste. DOE hopes the program will lead to "nuclear fuel and waste management technologies that will enable a safe, secure, and economic fuel cycle."

The U.S. and a few other nuclear nations are well into the second half century of a failed attempt to develop a safe, secure, and economic nuclear fuel cycle. Continuing these dubious efforts impedes progress towards meeting the real grand challenge—clean, secure energy for our future.

Fast Reactor Folly

Even as Administration officials question current reprocessing technologies, they are supporting research and development on new high-temperature gas-cooled reactors and "fast" neutron reactors that might use reprocessing's separated plutonium, along with other isotopes, as a fuel. Sodium-cooled fast reactor technology is of particular concern. Besides depending on the dirty reprocessing of spent fuel, other problems abound. International efforts to develop sodium-cooled reactors have stumbled.

Recommendations

- **Cut the Fuel Cycle R&D program and terminate the reprocessing aspects of it.**
- **Eliminate funding for the construction of the MOX plant at the Savannah River Site and fund plutonium immobilization.**
- **Terminate production of tritium in commercial reactors and halt the processing of tritium rods.**

The French have just shut down Phenix, their last sodium-cooled reactor. Monju, Japan's prototype plutonium-producing sodium-cooled reactor, was shut down by an accident in 1995 and has not been able to restart. Despite the long record of problems, DOE's Small Modular Reactor program is looking at small sodium-cooled fast reactors. While DOE has dropped pursuit of construction of a larger prototype Sodium Fast Reactor, it will continue international collaboration on this reactor as part of its "Generation IV" reactor development.

Ominously, DOE has begun secret discussions to use the plutonium fuel (MOX) plant at the Savannah River Site to make the initial fuel for a fast reactor. This confirms long-held suspicions that DOE has plans for the MOX plant beyond the 20-year weapons plutonium disposition effort initially cited as the rationale for this plant.

Plutonium MOX Fuel Means Proliferation

In 2000, both Russia and the U.S. declared that large stockpiles of plutonium would never be used for weapons. However, instead of immobilizing the plutonium as waste – a cost effective disposition process, the weapons plutonium is to be made into plutonium fuel (MOX) for commercial reactors, raising proliferation and safety concerns.

Construction of the MOX fuel plant at Savannah River Site remains one of DOE's largest capital-intensive projects, pulling down a whopping $475 million in FY 2011. Yet, it faces a tenacious challenge by public interest groups to its Nuclear Regulatory Commission license and might never operate. DOE is now moving rapidly towards construction of two other facilities in the plutonium disposition program: the Pit Disassembly and Conversion Facility to dismantle the plutonium pits, or cores, of weapons; and the Waste Solidification Building to manage MOX waste. Along with $100 million for Russian plutonium disposition, the annual cost for the overall program has hit $1 billion. Instead of increasing proliferation risks by treating plutonium as a product to be introduced into commerce, DOE should focus on immobilization, which manages plutonium as a waste by vitrifying it in high-level radioactive waste.

Duke Energy has withdrawn from the program to use MOX fuel after a failed test of the experimental weapons-grade MOX in one of its power reactors. DOE is now turning to the Tennessee Valley Authority (TVA), but even if TVA is willing to risk its reactors and public safety by using experimental MOX fuel, there are years of delay ahead for TVA licensing, fabricating another MOX test assembly, and conducting the reactor test.

Weapons Tritium Crosses the Line

Tritium is a radioactive gas used in thermonuclear weapons to boost the blast's explosive power. Since 2003, the U.S. has produced tritium in the Watts Bar commercial nuclear reactor, owned by the Tennessee Valley Authority. The FY 2011 budget reveals that DOE is set to expand production of nuclear weapons material in civilian reactors, which runs counter to sound nonproliferation practice.

As part of its "Tritium Readiness" program, DOE's capacity to produce tritium is set to be tripled. In spite of a glut of tritium from dismantled weapons, DOE's budget request states that "plans are being initiated to bring additional production capacity on line using TVA's Sequoyah Unit #1 and #2 reactors to meet tritium production requirements specified in the Nuclear Weapons Stockpile Plan signed annually by the President." TVA irradiates "Tritium Producing Burnable Absorber Rods" (TPBARs) and ships them in casks to the Savannah River Site where the tritium is removed. The Idaho National Laboratory also has a role in developing new tritium rods; it is set to investigate why rods already irradiated in Watts Bar leaked tritium into the reactor cooling water.