

A Mutually Beneficial Policy on Plutonium Fuels

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The purpose of this paper is to present a mutually beneficial policy for China, Japan, and Republic of Korea on the development of plutonium fuel. Each of these countries has taken steps toward the eventual commercialization of plutonium technology.

The motivations for this policy recommendation are the security considerations that attach to any commercial plutonium production. Amounts of plutonium that are small in commercial terms can be of enormous significance in security terms. Commercial production levels are measured in tons. Amounts of plutonium needed for weapons are measured in kilograms. If each of these countries continues on its course toward plutonium commercialization and stockpiles plutonium, the security consequences could be grave. We do not have institutions in place that can protect against the rapid conversion of plutonium to military application.

Each of these countries seeks to gain the supposed energy advantages of pursuing plutonium fuels, but also is aware of and concerned about the security implications of the others proceeding with reprocessing. Each would ideally like to be free to pursue its energy options while placing restrictions on its neighbors. But this is unrealistic—the plutonium programs will either go forward in each of the three countries, or they will all abstain, at least for the time being. We have had indications that there are senior individuals in each of the countries that recognize that the only realistic solution is for these countries to mutually decide to hold off. And that is what we propose: a deferral of construction and operation of commercial plutonium fuel facilities until adequate means are in place to protect such development from diversion to military application.

Of course, in each of these countries and the United States, proponents of commercializing plutonium-based fuels insist that proceeding now is imperative. The use of plutonium fuels in current light water reactors, however, makes no economic sense, and never did because of the high cost of reprocessing spent fuel to extract plutonium. The original impetus for the development of plutonium fuel was to fuel fast breeder reactors that would become economic when the price of uranium became too high to operate current uranium-fueled light water reactors. In the United States, this thinking reflected a time when uranium was thought to be much scarcer than it turned out to be, when reprocessing costs were estimated to be a small fraction of today's costs, and when the projections for installation of uranium consuming power reactors was about ten times greater than it turns out to be. Under current world nuclear installation rates, even with the surge of Chinese orders, there is no remote danger of running out of uranium at reasonable prices, or any possibility that the more expensive fast breeder reactors could compete in the foreseeable future.

The argument is often made by nuclear research institutes that preparation for a transition to use of plutonium fuel could take decades and so they should be permitted to start now. The transition to plutonium fuels that the nuclear technologists project may or may not materialize. Their projections of nuclear futures have been consistently wrong for decades. Premature commercial commitment can be as costly as late commitment, both in terms of direct costs as well as locking into outdated technology. In any case, there would be plenty of time to adjust should uranium prices rise to unexpected levels.

Nor does reprocessing in any of its forms, current or advanced, help with nuclear waste disposal. Reprocessing advocates point to the reduction in waste volume that is obtained by separating the radioactive components—less than 5 percent of the total—from the spent fuel. This is an illusory advantage because reprocessing in many ways complicates waste management by producing its own waste streams and contaminating equipment.

Claims are made that various types of advanced reprocessing should be allowed to proceed because they are designed for a product that is not pure plutonium. The best answer to this comes from the Strategy Paper of the former Bush administration that advocated such advanced reprocessing for the United States. It made clear that such advanced forms of reprocessing may increase protection against misuse of the material by terrorist groups should they seize it but provided no significant technological barrier to separation of plutonium by the owner or operator of such a plant.

There is, in short, no getting away from the security implications of plutonium commercialization under current circumstances. We know that officials are aware of this in the three countries, but hesitate to propose putting off commercialization in their own country because this would appear to disadvantage their country at the expense of the others. Because this proposal comes from the United States, we think that the United States should participate in such arrangements as well by canceling the so-called MOX, or plutonium, fuel fabrication facility under construction in South Carolina. With this in mind, the complete proposal would be a simultaneous deferral of all plutonium commercialization in China, Japan, and the Republic of Korea, accompanied by the termination of the construction of the U.S. MOX fabrication plant. As a part of this proposal we also recommend that each of the countries cooperate in the development of less dangerous alternative interim and long-term methods of nuclear waste storage and disposition that do not involve plutonium recycling.

Such steps would be extremely beneficial. They would save each of the countries a great deal of money. More important, they would increase security and stability in Northeast Asia by capping a massive, potential build-up of nuclear weapons-usable material. Although taking such steps may be politically difficult for any one of the countries to do individually, simultaneous, informal adoption of a policy of commercial plutonium deferral by all of the countries should ease the way.