Disposal of Plutonium From U.S.-Russian Disarmament Is Likely to Take Decades

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WASHINGTON — The plutonium that is the key ingredient in thousands of nuclear weapons sidelined in the new arms control treaty between the United States and Russia is likely to be around for decades at least, according to experts. They say the process for destroying plutonium has not yet started to whittle down the surplus already created by previous agreements.

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Plutonium can be consumed in nuclear power reactors, creating the possibility of a swords-to-plowshares conversion that would have the added benefit of making redeployment of the weapons impossible. But converting the weapons plutonium for civilian reactor use has proved much slower than expected.

Since the late 1990s, the United States has been trying to build a factory at the Savannah River Site, near Aiken, S.C., that would convert the plutonium to reactor fuel. Government officials once hoped that such fuel could be loaded into reactors in 2002. But construction did not begin until 2007 and even if all goes well, the plant will not be finished until 2016. The cost of the plant, once estimated at $2.3 billion, is now $4.8 billion. The plant is the largest nuclear construction project in the country.

The plan is to use the amount already declared surplus, 34 tons, over about 15 years, so if the new arms agreement results in more plutonium being declared surplus, it would not start to be converted to fuel until the 2030s, at the earliest, people involved in the project say.

“If we’re going to dismantle more warheads based on a new agreement, you’d have to stretch out the time,” said Alan Hanson, a vice president of Areva, a French company participating in the plant construction. “We’re stuck with the geometry of the building that’s under construction right now.”

Energy officials said the effort had slowed because of its expense. They must also build a factory that will take the plutonium metal from the bombs and convert it into a powdered oxide, the form in which it can be fashioned into fuel pellets, but there is not enough money to do all this at once, officials say.

And the civilian nuclear power industry is unenthusiastic about the product, which would substitute for the uranium they ordinarily use.

Duke Energy signed a contract to use some of the plutonium fuel assemblies on a test basis, but let the contract expire in 2008 because it wanted guarantees that the factory would deliver the fuel on schedule. The Energy Department would not agree.

And the Duke test uncovered a flaw in the fuel assembly design. Metals used in reactors tend to expand as they are bombarded with radiation, because the subatomic particles that

tal. But the test assemblies, built for the pected. Engineers are now considering

ting with the Tennessee Valley Authority, a rs. Current reactors are limited in how much l fuel, uranium, so the department needs half output of the fuel factory, 3.5 tons a year. A m about 150 weapons a year.

onium at a discount, to replace the uranium

"It's frankly not as attractive" as uranium, said Ken Bromberg, assistant deputy administrator for fissile materials at the National Nuclear Security Administration, part of the Energy Department.

Opponents of the plutonium conversion technology say plutonium creates security concerns, because stolen plutonium fuel assemblies could be reprocessed into bombs, unlike stolen uranium fuel assemblies.

In the Clinton administration, the Energy Department proposed a quicker route to disposal. The department has tanks filled with millions of gallons of high-level liquid waste, that it is slowly mixing with molten glass, to solidify for eventual burial. It proposed mixing the plutonium in with the glass.

But Mr. Bromberg said the Russians objected to that method because it seemed less permanent than using the plutonium in reactor fuel, where much of it would be broken down into materials that are hard to handle, and useless for bombs.

The Russians were supposed to destroy a like amount of plutonium, 34 tons, in parallel, and their program has also been delayed for years, partly because Western countries promised to raise $2 billion to pay for the Russian program, but never did. The plan now is for Russia to consume the plutonium in a reactor that is already running and is designed to use plutonium; the United States is paying for modifications to the plant so it does not create more plutonium than it consumes.

Whether the American queue of weapons plutonium awaiting conversion into reactor fuel will grow longer is not clear; first, a president would have to declare additional material as surplus. The new agreement with the Russians is over launchers and delivery systems, and does not require the dismantlement of weapons.

But eliminating weapons-usable material is a long-term goal, and the United States already has such a large plutonium surplus that it may be running out of storage places.

The inspector general of the Energy Department concluded in January 2009 that the Energy Department plant that disassembled the bombs, in Amarillo, Tex., may be filling up. The plant, called Pantex (for Panhandle of Texas), stores the plutonium "pits," the softball-sized spheres at the heart of the bombs, in bunkers built by the Army in the 1930s for artillery shells. But the audit said the storage capacity was unclear because plant managers did not know how much space had already been consumed.

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