South Korea's Nuclear Waste Storage Filling Up

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ULSAN, South Korea (AP) — North Korea's weapons program is not the only nuclear headache for South Korea. The country's radioactive waste storage is filling up as its nuclear power industry burgeons, but what South Korea sees as its best solution — reprocessing the spent fuel so it can be used again — faces stiff opposition from its U.S. ally.

South Korea fired up its first reactor in 1978 and since then the resource poor nation's reliance on atomic energy has steadily grown. It is now the world's fifth-largest nuclear energy producer, operating 23 reactors. But unlike the rapid growth of its nuclear industry, its nuclear waste management plan has been moving at a snail's pace.

A commission will be launched before this summer to start public discussion on the permanent storage of spent nuclear fuel rods, which must be locked away for tens of thousands of years. Temporary storage for used rods in spent fuel pools at nuclear power plants is more than 70 percent full.

Undeterred by Japan's Fukushima disaster or recent local safety failings, South Korea plans to boost nuclear to 40 percent of its energy needs with the addition of 11 new reactors by 2024.

South Korea also has big ambitions to export its nuclear knowhow, originally transferred from the U.S. under a 1973 treaty that governs how its East Asian ally uses nuclear technology and explicitly bars reprocessing. The treaty also prohibits enrichment of uranium, a process that uranium must undergo to become a viable nuclear fuel, so South Korea has to get countries such as the U.S. and France to do enrichment for it.

That treaty is at the heart of Seoul's current dilemma. It wants reprocessing rights to reduce radioactive waste and the right to enrich uranium, which would reduce a hefty import bill and aid its reactor export business. The catch: the technologies that South Korea covets can also be used to develop nuclear weapons.

Accommodating Seoul's agenda would run counter to the Obama administration's efforts to prevent the spread of nuclear weapons and also potentially undermine its arguments against North Korea's attempts to develop warheads and Iran's suspected nuclear weapons program. South Korea, with its history of dabbling in nuclear weapons development in the 1970s and in reprocessing in the early 1980s, might itself face renewed international suspicion.

"For the United States, this is a nonproliferation issue. For South Korea, this is the issue of high-level radioactive waste management and energy security," said Song Myung-jae, chief executive officer of state-run Korea Radioactive Waste

Management Corp. "For a small country like South Korea, reducing the quantity of waste even just a little is very important."

President Park Geun-hye made revision of the 38-year-old treaty one of her top election pledges in campaigning last year. The treaty expires in March 2014 and a new iteration has to be submitted to Congress before the summer. The two sides have not narrowed their differences on reprocessing and enrichment by much despite ongoing talks.

South Korea also argues that uranium enrichment rights will make it a more competitive exporter of nuclear reactors as the buyers of its reactors have to import enriched uranium separately while rivals such as France and Japan can provide it. It is already big business after a South Korean consortium in 2009 won a $20 billion contract to supply reactors to the United Arab Emirates. Former President Lee Myung-bak set a target of exporting one nuclear reactor a year, which would make South Korea one of the world's biggest reactor exporters.

Doing South Korea a favor would be a huge exception for the U.S. Congress, which has never given such consent to non-nuclear weapon states that do not already have reprocessing or enrichment technology.

"It is not the case that we think Korea will divert the material. It's not a question of trust or mistrust," Sharon Squassoni, director of the Proliferation Prevention Program at the Center for Strategic and International Studies in Washington, said on the sideline of Asian Nuclear Forum in Seoul last month. "It's a question of global policies."

Nuclear waste storage is highly contentious in densely populated South Korea, as no one welcomes a nuclear waste dump in their backyard. Temporary storage for spent nuclear fuel rods at South Korea's nuclear plants was 71 percent full in June with one site in Ulsan, which is the heartland of South Korea's nuclear industry, to be at full capacity in 2016.

To accommodate the 100,000 tons of nuclear waste that South Korea is expected to generate this century, it needs a disposal vault of 20 square kilometers in rock caverns some 500 meters underground, according to a 2011 study by analyst Seongho Sheen published in the Korean Journal of Defense Analysis. "Finding such a space in South Korea, a country the size of the state of Virginia, and with a population of about 50 million, would be enormously difficult," it said.

The country's first permanent site to dump less risky, low level nuclear waste such as protective clothes and shoes worn by plant workers will be completed next year after the government pacified opposition from residents of Gyeongju city, South Korea's ancient capital, with 300 billion won ($274 million) cash, new jobs and other economic benefits for the World Heritage city. The 2.1 million square meter dump will eventually hold 800,000 drums of nuclear waste.

"Opponents were concerned that the nuclear dump would hurt the reputation of the ancient capital," said Kim Ik-jung, a medical professor at the Dongguk University in

Gyeongju.

To make its demands more palatable to the U.S., South Korea is emphasizing a fledgling technology called pyroprocessing that it hopes will douse concerns about proliferation because the fissile elements that are used in nuclear weapons remained mixed together rather than being separated.

South Korea's Atomic Energy Research Institute said pyroprocessing technology could reduce waste by 95 percent compared with 20 to 50 percent from existing reprocessing technology.

The U.S. has agreed to conduct joint research with South Korea on managing spent nuclear fuel, including pyroprocessing, but some scientists say the focus on an emerging technology that may not be economically feasible is eclipsing the more urgent need to address permanent storage of spent nuclear fuel.

"Even under the most optimistic scenario, pyroprocessing and the associated fast reactors will not be available options for dealing with South Korea's spent fuel on a large scale for several decades," said Ferenc Dalnoki-Veress, Miles Pomper and Stephanie Lieggi in a joint report for James Martin Center for Nonproliferation Studies, Monetary Institute of International Studies. "With or without pyroprocessing, South Korea will need additional storage capacity."

But for South Korea, researching and developing the technology is a bet worth making.

"The U.S. does not need nuclear energy as desperately as South Korea," said Sheen, a professor at Seoul National University.

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