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Technology » Reuters

As Nuclear Waste Piles Up, South Korea Faces Storage Crisis

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REUTERS

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By Meeyoung Cho

SEOUL (Reuters) - Among the usual commercials for beer, noodles and cars on South Korean TV, one item stands in marked contrast.

A short film by a government advisory body carries a stark message: the nation faces a crisis over storing its spent nuclear fuel after running reactors for decades.

The world's fifth-largest user of nuclear power has around 70 percent, or nearly 9,000 tonnes, of its used fuel stacked in temporary storage pools originally intended to hold it for five or six years, with some sites due to fill by the end of 2016.

It plans to cram those sites with more fuel than they were originally intended to hold while it looks for a permanent solution, suggesting little has been learned from the Fukushima disaster in neighboring Japan.

In the Fukushima crisis in 2011, the storage of large amounts of spent nuclear fuel in elevated pools posed a threat of massive radioactive release on top of meltdowns at three reactors. Spent fuel rods heated up after a quake knocked out water-cooling pumps, underlining the dangers of holding troves of radioactive material in relatively exposed cooling ponds.

"We cannot keep stacking waste while dragging our feet," said Park Ji-young, director of the science and technology unit at respected think tank the Asan Institute for Policy Studies.

"If we fail to reach a conclusion (on how to manage spent fuel), it would be time to debate if we should stop nuclear power generation."

With South Koreans still spooked by Fukushima and a scandal at home over fake safety certificates for nuclear equipment, the commission has its work cut out to come up with more than a temporary fix to the storage crunch in a report due by year-end. [ID:nL4N0QK3LC]

BUYING TIME

The 23 nuclear reactors in Asia's fourth-biggest economy add a total of 750 tonnes of spent fuel every year to the 13,300 tonnes that filled 71 percent of its wet and dry storage capacity as of last year, according to reactor operator Korea Hydro and Nuclear Power Co Ltd, owned by state-run Korea Electric Power Corp.

That means storage could fill by 2021, with some pools in danger of reaching capacity by the end of 2016.

Seoul hopes to win time by stacking spent fuel more densely in those concrete-covered pools next to reactor buildings, and by moving waste to pools at 11 new power plants that are set to be built by 2024.

But experts warn that leaving spent fuel in water could be fraught with danger, even in a country that is not anywhere near as seismically active as Japan. They note that the buildings that house pools are typically not as strong as those that hold reactors, which have steel vessels inside concrete domes.

"Spent fuel in a concrete building next to reactor buildings is vulnerable to missile or other attacks from the outside," said one expert, who declined to be identified due to the sensitivity of the matter.

He said that stacking fuel more densely would compound any risk as it would reduce air circulation.

"Air circulation helps lower chances of spent fuel meltdown if water drains or water-cooling pumps are broken when hit by natural disaster or terror attack."

OUT OF FAVOR

A permanent solution remains elusive, with experts dismissing as unrealistic hopes that Seoul will be able to revise a 40-year-old nuclear agreement with Washington so it can reprocess spent fuel.

U.S. and South Korean government officials declined to comment on the issue.

Reprocessing is a costly and technologically challenging solution that has fallen out of favor in Britain, France and elsewhere.

It is also diplomatically thorny given concerns about nuclear proliferation, especially on the Korean peninsula, where North Korea is trying to develop nuclear weapons.

A medium-term, safer solution could be to store spent fuel in metal and concrete-covered dry casks, which could hold it for up to 100 years. Building casks for the country's existing spent fuel would cost up to $2.6 billion, according to Reuters calculations based on industry figures.

But persuading people to live next to such facilities would be a huge task in an Indiana-sized country with a population of 50 million, with many already bitter about the presence of reactors.

"As a resident, we are concerned as we live near such dangerous materials," said a woman who runs a sushi restaurant 10 km (6 miles) from the country's oldest nuclear reactor near the southeast coast. She did not give her name.

"It is hard to know the situation at the reactor as we usually learn of any developments via media reports."

Underlining the difficulty authorities face winning over the public is the case of a new site to store low- and medium-level radioactive

waste such as contaminated clothing and tools. The facility, in the southeastern city of Gyeongju, is yet to open after years of delay as opponents questioned its safety.

In Samcheok, another southeastern city, 85 percent of nearly 29,000 participants in a non-binding ballot last Thursday voted against plans to launch a new reactor, emphasizing anti-nuclear sentiment in the country.

LONGER-TERM SOLUTION

So-called pyroprocessing could offer some relief further down the line, with the United States and South Korea working together to develop the technology to produce nuclear energy without separating plutonium, meaning any waste would be burnt away in special reactors.

But that remains a distant prospect. The two nations plan to finish a technological feasibility study by 2020, with commercialization in 2040, said officials at South Korea's science ministry.

"With more nuclear power plants down the road, the government should have plans for spent fuel management by now," said Lee Heon-seok, a representative of activist group Energy Justice Actions.

"We have no place and technology to dispose of spent nuclear fuel, while residents are asking that it be taken out."

A spokesman for Korea Hydro and Nuclear Power said it had not been given policy guidelines for spent fuel management in a country that gets a third of its power from nuclear.

The energy ministry declined to comment.

In the ad running three times a day on TV, Public Engagement Commission Chairman Hong Doo-seung strikes a calm and engaging tone as he urges public consensus on working towards a solution to the storage crunch.

"We can no longer delay. We should prepare measures for spent nuclear fuel," he warns.

(Additional reporting by Chris Lee and Yena Park in Seoul, Aaron Sheldrick in Tokyo; Editing by Tony Munroe and Joseph Radford)

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