

PRIMED AND READY: A South Korean soldier stands below a display of missiles in 2002.



Chung Sung-jun/Getty Images

If It Wanted to, South Korea Could Build Its Own Bomb

SEOUL, SOUTH KOREA

South Korea has one of the world's largest atomic energy industries and an immediate and growing existential threat on its border in the form of North Korea's nuclear arsenal. That Seoul thus far has chosen not to develop a nuclear weapon owes almost entirely to the nuclear deterrence guarantees made by the United States.

But South Korean confidence in the U.S. nuclear umbrella is wavering, at least among the country's conservatives. If Seoul decides to build its own nuke, how long would it take, given the country's existing atomic know-how and infrastructure?

The answer to that question may determine whether

lawmakers approve an updated nuclear trade deal with South Korea that could be submitted in 2021. U.S. lawmakers are increasingly leery of approving atomic energy export deals with countries such as Saudi Arabia that might seek to acquire a bomb.

Washington and Seoul agreed in 2015 to jointly conduct a technical study into a new form of nuclear waste reprocessing known as pyro-processing, which South Korea has pioneered. Proponents of the new technology argue it is more resistant to nuclear proliferation than traditional fuel recycling as the plutonium removed from the spent fuel would remain in a form poorly suited for fueling a

military-grade warhead.

"I've been worried that it's been turned into a playpen," says Princeton University physicist Frank von Hippel, a prominent nonproliferation expert. Work on the joint pyro-processing study, he says, is unfocused and dominated by scientists in the United States and South Korea who are advocates of the technology.

Not all South Korean nuclear scientists are behind the program. Among them is Hwang Yongsoo, a principal researcher at the Korea Atomic Energy Research Institute, who says the process of building a low-yield nuclear bomb from plutonium produced by pyro-processing may be time-consuming but "it can be done."

Because South Korea's nuclear energy program relies on U.S. reactor designs licensed under what's called a 123 nuclear trade agreement, the country needs U.S. government permission if it wants to engage in certain sensitive nuclear activities that can also be used to build a weapon.

In the United States, nuclear experts are largely unmoved by South Korea's environmental and economic arguments for why it should be allowed to have a reprocessing capability, seeing instead a nationalist desire by Seoul for any technology that its former colonizer Japan is allowed to have.

Washington granted Tokyo the right to use reprocessing technology years before India exploited such technology to build its own bomb, a move that caused the United States to become more cautious about granting access to the technology.

SECRET EXPERIMENTS

South Korea's own history of conducting illicit nuclear bomb experiments makes nonproliferation advocates leery. Seoul has disclosed the nature of the previous research, but the reason for why it was conducted is still unclear.

President Richard Nixon's 1970 decision to withdraw a U.S. Army division from South Korea helped spur the country's then-dictator Gen. Park Chung-hee to launch a secretive nuclear weapons research program known as the "890 Project," according to a March 2017 report by the National Security Archive. South Korea ended the official program when President Jimmy Carter

backed off a campaign pledge to withdraw all U.S. troops from the Korean Peninsula, but related experiments continued in fits and starts for several more years.

In 2004, South Korea revealed it had conducted experiments from 1979 to 1981 on the chemical enrichment of uranium; in the early 1980s on the separation of small amounts of plutonium; from 1983 to 1987 on the creation of depleted uranium armaments; and in 2000 on uranium enrichment tests, according to the NSA report.

Those activities violated International Atomic Energy Agency rules as well as nuclear cooperation agreements with the United States and others. The international community nonetheless agreed to essentially forgive and forget when Seoul came clean about the experiments.

As a junior officer at the CIA station in Seoul in the 1970s, Richard Lawless played a major role in uncovering and alerting Washington to the secret weapons program.

"The biggest missing component is why did they do it? What caused them to make this decision?" says Lawless, who went on to serve as a deputy undersecretary of Defense for Asian and Pacific Security in the George W. Bush administration.

The South Korean government has committed itself to peaceful nuclear energy uses, but questions remain about not only the motives of the Park Chung-hee government but also later independent experiments conducted by the Korea Atomic Energy Research Institute. Today, KAERI is



SEOUL LEGACY: In these 2004 photos, workers test for radiation and dismantle a reactor.



Chung Sung-jun/Getty Images

leading the pyro-processing research for the South Korean government.

Hwang estimates that 90 percent of his KAERI co-workers "hate" the current liberal Moon Jae-in government because of its anti-nuclear energy policies.

A PATH TO BREAKOUT

Hwang estimates it would take two to three years for South Korea to produce a nuclear bomb, including building some necessary infrastructure.

But for a comprehensive nuclear weapons program, the country doesn't have the per-

sonnel needed to build and run the back-end fuel cycle technologies required to produce the plutonium for a warhead.

However, South Korea could stop short of developing and testing a working warhead, which would bring with it retaliatory international sanctions, diplomatic backlash and military consequences from North Korea and China.

Seoul could walk to the edge — as Iran essentially did before the 2015 multinational deal on its nuclear program — by producing the fissile material that would allow them to build a warhead within a matter of months.

A reprocessing program — even a pyro-processing program — would help South Korea obtain that so-called breakout capability, which could be used as an implicit deterrent to its neighbors rather than the explicit threat of a nuclear arsenal.

Hwang Il-soon, a nuclear engineering professor at Seoul National University who supports his country having a pyro-processing capability, says South Korea would need a new reprocessing plant to produce weapons-grade plutonium. With that new plant, the country would need just one year to produce enough weapons-grade plutonium to fuel roughly 20 warheads, he says.

But should it go along with a weapons program, the South Korean atomic energy industry would jeopardize its licenses from the United States, Canada and elsewhere, which so much of the country's domestic reactors and export market rely on to operate, he says.

Yim Man-sung, a nuclear engineering professor at the Korea Advanced Institute of Science and Technology, estimates South Korea has a two-year technical time frame for developing a nuclear weapon. Political infighting, however, would slow down the process.

Unlike during Gen. Park's day, South Korea is now a democracy and acquiring a nuclear weapon would have to be debated at the national level. Even if the pro-nuclear side were to obtain sufficient public support to move forward, there would still be drawn-out legal fights at the local level on such divisive issues as where the nuclear testing would take place.

— Rachel Oswald