

North Korean Nuclear Reactor Safety: The Threat No One is Talking About

The ability of North Korea to safely operate its nuclear reactors, according to many experts, is increasingly being called into question given the North's isolation and lack of safety culture. Pyongyang's ability to respond to a nuclear accident in a timely fashion will make the difference between a small-scale event and a catastrophic disaster. And while the actual contamination would be localized, the lack of transparency from North Korea in dealing with the situation is likely to cause political panic in the region in excess of the actual radiological exposure and environmental impact. The opening of nuclear safety talks with the North to help prevent such an accident from occurring would provide a rare opportunity for regional dialogue and could pry open the door for realistic and productive discussions of North Korea's nuclear program.

A Disaster Waiting to Happen?

A video of Kim Jong Un smoking next to an untested liquid-fueled missile tells you everything you need to know about North Korea's nuclear safety culture. The remarkable 14-second clip shows the Supreme Leader taking a puff while a Hwasong-14 intercontinental ballistic missile is erected on the launch pad mere feet away—prompting a torrent of snarky Twitter commentary expressing regret that Kim's lit cigarette had not “solved the problem for us.” Kim's recklessness is certainly notable, and it hints at an underemphasized and potentially devastating possibility: the threat of a nuclear accident in North Korea.

At the March 2014 Nuclear Security Summit in The Hague, then-South Korean President Park Geun-hye claimed that Yongbyon, North Korea's primary nuclear research center, “is home to such a dense concentration of nuclear facilities that a fire in a single building could lead to a disaster potentially worse than Chernobyl.” While her damage assessment is likely an exaggeration—researchers from *38 North* assess Chernobyl's power output to have been 3,000 percent greater than Yongbyon—the potential for a nuclear accident is not.



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Niko Milonopoulos and Edward D. Blandford noted previously that a sudden fault in North Korea's outdated power grid could prevent the Yongbyon reactors from being adequately cooled and could potentially trigger a meltdown. Such an event could also be prompted by a natural disaster or abnormal weather patterns. Complementary analysis by Nick Hansen indicates that North Korea's 5 MWe plutonium production reactor had to be briefly shut down following a flood in July 2013 which destroyed parts of the cooling systems. He noted with concern that "if a major flood cuts off the cooling water supply to the reactors before they can be shut down, a major safety problem could occur." This is exactly what prompted the series of nuclear meltdowns at Fukushima.

In 2010, a team of Stanford scientists led by Dr. Siegfried Hecker visited North Korea's 25-30 MWe Experimental Light Water Reactor, which was still under construction at the time and will likely be operational soon. Their subsequent analysis expressed a lack of confidence in North Korea's ability to operate the site safely upon completion, citing insufficient concrete quality, the lack of an independent nuclear regulator, and the inexperience and isolation of the design team as particular concerns.

The isolation factor is especially critical. Years after Chernobyl, Russian nuclear scientists attributed the disaster to the fact that "Russian nuclear reactor designers, engineers, and operators had not had the opportunity to learn from their international peers." Today, this condition has been replicated to an even greater extent in North Korea's hermit kingdom.

If a crisis were to occur, North Korea's secretive nature would also hinder any kind of collective response to a nuclear accident. Reliable information would be scarce, as the regime would certainly attempt to suppress any reporting on the extent of the damage. Regional panic would set in, and governments in South

Korea, China and Japan would feel immense pressure to respond. Milonopoulos and Blandford imply that such panic is essentially unavoidable; it was widespread despite Japanese transparency in the wake of Fukushima.

It is extremely fortunate—and perhaps surprising—that a major nuclear accident has not yet occurred in North Korea. Outside of Yongbyon there have been minor incidents, perhaps the most notable being an alleged series of tunnel collapses immediately following North Korea's sixth nuclear test in September. The accident reportedly killed 200 workers and triggered some alarm along the Chinese border about potential radiation leakage, although this claim has yet to be corroborated. However, despite the replication and exacerbation of many factors which precipitated the Chernobyl and Fukushima disasters, we have yet to witness a similar accident on North Korean soil. And perhaps it can still be avoided.

There is Common Ground for Dialogue

It is in *everyone's* interest to prevent such an accident from occurring; ensuring nuclear safety is one of the few truly universal policy imperatives. Proactively addressing the threat of a nuclear accident could also help lessen the potential for a nuclear war. As policymakers frantically search for a solution to the North Korean crisis, scraping away the childish bluster on both sides would reveal a sliver of meaningful common ground.

It is tempting to assume that the DPRK's secretive nature would be the primary barrier to nuclear safety negotiations. After all, it's difficult to imagine the North Koreans allowing foreign scientists to examine their top-secret nuclear facilities. However, they have done so before, and such an agreement is certainly in their own interests today. A severe nuclear accident could pose an existential threat to the stability of the regime itself, so Pyongyang has every reason to seriously consider such an offer.

Additionally, North Korea has declared itself a "responsible" nuclear state, emphasizing its pledges of no-first-use, non-proliferation and eventual global disarmament. A commitment to nuclear safety would go a long way towards publicly demonstrating its adherence to these principles. In April 2013, a law promoting the "safekeeping and management" of nuclear weapons was adopted by the Supreme People's Assembly, which specifically notes Pyongyang's

willingness to cooperate on international efforts for nuclear safety and non-proliferation. However, the wording of the law implies that such cooperation would be conditional upon “the improvement of relations with hostile nuclear weapons states.” While it is certainly possible that the recent escalation of tensions with the US might obstruct a meaningful discussion on nuclear safety, Pyongyang might instead choose to accept a nuclear safety dialogue in order to regain some standing in the international community.

If nothing else, the opening of nuclear safety talks would provide a rare opportunity for regional dialogue. In his reflections on the Strategic Arms Limitation Talks between the United States and the Soviet Union, then-US Secretary of State Dean Rusk noted that “even if the deliberations went badly, ‘they provided a forum in which Soviet and American officials sat across from each other at long tables, sipped mineral water and discussed military matters that used to be the stuff spies were paid and shot for. [...] The process was the product.’”^[1] Today, the common ground is firm enough to build upon; an agreement to cooperate on nuclear safety would provide a concrete opportunity to establish a much-needed confidence-building measure between North Korea and its adversaries.

Such an arrangement could take any number of forms: perhaps an exchange of scientists or a multilateral agreement on incident response, in the event of a nuclear or radiological accident. North Korea actually signed two such conventions immediately following Chernobyl—INFCIRC/335 on Early Notification of a Nuclear Accident, and INFCIRC/336 on Assistance in the Case of a Nuclear Accident Or Radiological Emergency—but both were signed with reservations and have likely ceased to apply after North Korea ended its cooperation with the IAEA in 2009. The time is ripe for a reaffirmation of these basic safety principles.

Alternative to cooperating with an international organization like the IAEA, an agreement could perhaps take a bilateral form. There is precedent for such an arrangement between hostile nuclear powers: in 2007, India and Pakistan signed an Agreement on Reducing the Risk from Accidents Relating to Nuclear Weapons. The agreement obliges each party to notify the other in the event of a significant radiation release, emphasizing the utility of hotlines and other diplomatic channels to mitigate the risks and consequences of a nuclear accident. The five-year agreement was renewed in 2012 and again in February 2017.

Moving Washington Out of the Way

Perhaps contrary to prevailing assumptions, it would likely be Washington's stubbornness—rather than Pyongyang's secrecy—that would prevent such negotiations from taking place. However, the universality of the threat theoretically allows any regional actor to take the lead on negotiations, leaving an opening for the US to join in later on, after Washington eventually swaps its current posture of maximum pressure and isolation for one of constructive dialogue. China is especially well-placed to jumpstart these talks; not only are Chinese border regions disproportionately concerned about DPRK radiological leaks from North Korea's nuclear testing, but China may also be willing to make economic concessions in order to coax North Korea to the table. In truth, any talks on regional nuclear safety would be impossible without Chinese involvement. A nuclear safety dialogue—and perhaps subsequent negotiations—could be the beginning of a gradual opening of the Kim regime, and could perhaps form the keystone for a regionally acceptable deterrence relationship in the future.

Letting such a concrete opportunity be buried in the deluge of mutual bluff and bluster would be foolish. As Dr. Hecker advises, "Letting today's state of affairs persist because we are overly concerned about 'blinking' will only make a bad situation more dangerous."

On December 12, Secretary of State Tillerson indicated that the United States would finally be willing to speak with North Korea without preconditions. Echoing the spirit of Dean Rusk's remarks on process, Tillerson noted his desire to "at least sit down and see each other face to face." "We can talk about the weather if you want," he offered. "We can talk whether it is going to be a square table or a round table if that is what you are excited about."

I would add nuclear safety to the list of conversation topics.

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