



## A Freeze of North Korea's Nuclear Program: Finding a Definition More Fitting of Today's Reality

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The Trump administration has announced that it has created a new North Korea policy that is aimed at exerting maximal pressure on Pyongyang but also achieving negotiations to denuclearize North Korea. However, denuclearization negotiations do not appear imminent. The Trump administration has stated that now is the time for focusing on creating greater pressure on North Korea, and North Korea has signaled little interest in negotiations and much more interest in developing and keeping its nuclear weapons, comprised of both the warheads and missiles. But it is not too early to discuss what negotiations should look like. Many have stated that the denuclearization process should start with the creation of a freeze of North Korea's nuclear program, as was done in previous North Korean negotiations. A freeze, albeit limited, was also the starting point for the negotiation of the Joint Comprehensive Plan of Action (JCPOA), or Iran nuclear deal. But what should this freeze look like in new North Korean negotiations, given all its nuclear advances in the last several years?

It should be noted that denuclearization negotiations premised on a freeze carries risks of legitimizing North Korea's nuclear weapons. Japan and others worry about accepting a freeze in the current NK nuclear arsenal. They are concerned that a freeze could end up being the end state, with no denuclearization achieved or negotiations stretching out for years and North Korea becoming a *de facto* nuclear weapons state like Pakistan or India. These concerns are certainly justified. I estimate North Korea has about 13-30 nuclear weapons as of the end of 2016, some of which can reach Japan. As a result, other types of denuclearization negotiating strategies should be explored that can avoid this two-step process of negotiating a freeze followed by actual denuclearization negotiations. However, short of the emergence of a new approach, the two-step approach is often discussed and requires a more systematic analysis.

The previous freezes embedded in the 1994 Agreed Framework, the Six Party Talks agreements, and the failed 2012 Leap Day deal were essentially monitored halts to key nuclear activities at the main Yongbyon nuclear center and since 2006 remote monitoring of a halt to nuclear testing at the Punggye-ri nuclear test site. Given all the progress North Korea has made in creating a nuclear weapons production complex, however, a freeze today needs to be more comprehensive than past ones.

Although in the past, a freeze just at Yongbyon (combined with no more nuclear testing or missile launches) made sense, such a limited freeze is unacceptable today. A significant problem is that such a freeze could leave North Korea making a considerable amount of weapon-grade uranium at one or more secret sites and then fashioning it into nuclear warheads at other secret sites. These warheads could become more sophisticated at well-established, and largely unknown, nuclear weapons research and development facilities. Following its last nuclear test, North Korea announced that it can make nuclear warheads from nuclear explosive materials, where it emphasized the plural in materials, implying that it can use plutonium or weapon-grade uranium in its nuclear warheads. Thus, accepting North Korea's statement, a freeze limited to Yongbyon would allow North Korea to make nuclear warheads, from weapon-grade uranium and mate a significant number of them to its existing missiles and new ones if the freeze does not include a halt to further missile production. This reality about weapon-grade uranium is one of the important differences from earlier days. For example, during the negotiations of the Leap Day deal in 2011 and early 2012, there was a willingness to set aside concerns about a secret enrichment plant because of skepticism about the plant's existence and North Korea's ability to weaponize weapon-grade uranium into additional warheads for missiles. More generally, in the past, a freeze limited mostly to Yongbyon could be justified because the parts of the nuclear weapons program outside Yongbyon were judged as small (1994 Agreed Framework) or relatively small or in doubt (Six Party agreements and Leap Day deal). The dangerous parts outside Yongbyon today may not be small and they are no longer in doubt.

Those who want to use the Iran deal as a model should remember what its limited freeze was built upon. The 2014 Joint Plan of Action (JPA), which formalized this freeze, was only possible because Iran's nuclear fuel cycle program was understood, its declared nuclear facilities were well monitored by international inspectors, it was universally recognized that Iran had not built any nuclear weapons, most judged that Iran did not have large-scale, functioning nuclear weapons development facilities, and Tehran mollified concerns it was constructing a secret enrichment plant. This model would lead to a conclusion that a freeze limited to Yongbyon is a wholly inadequate basis to start a negotiation. The United States could not have proceeded with negotiating with Iran if the U.S. government believed Iran had a secret enrichment plant outside the limited freeze established by the Joint Plan of Action, let alone significant functioning nuclear weapons development and production facilities. Another lesson worth keeping in mind when considering negotiations with North Korea is that sanctions on Iran were not rescinded when the freeze started under the JPA, only after a final deal was negotiated and implemented.

A freeze approach needs to start with clarity about what is included in North Korea's nuclear program -- a clarity we currently lack. It is imperative to learn where North Korea makes weapon-grade uranium and nuclear weapons. If North Korea is willing to ensure that we know its industrial infrastructure for making nuclear warheads and mating them to its delivery systems, a freeze could be a useful part of a negotiating strategy.

One way to quantify the problem of a partial freeze is to consider estimates of North Korea's nuclear weapons production. My most recent estimates are that North Korea currently makes

enough plutonium and weapon-grade uranium to manufacture about 3-5 nuclear weapons per year. The range in the annual nuclear weapons production estimate largely reflects my ongoing skepticism about the capability of a secret enrichment plant. However, I have not found a Western government that shares this skepticism anymore. Setting that debate aside and recognizing that negotiations require a more forward leaning view of North Korea's nuclear capabilities, for the purposes of this discussion, this range allows a discussion of the implications of different freeze concepts. The lower bound captures the weapons potential of Yongbyon, which is about three weapons per year. If Yongbyon were frozen, North Korea could still retain a capability to make about two weapons per year. For those who believe in a secret enrichment plant, this 'could' becomes a 'would.' Thus, a freeze at Yongbyon would only reduce annual nuclear weapons production by slightly better than roughly half the current rate. Limiting a freeze to Yongbyon is not a meaningful freeze in North Korea's nuclear weapons production.

North Korea could make a freeze discussion more credible by revealing its other weapon-grade uranium production capabilities and information about its nuclear weapons development and production capabilities. Of course, its statements would need to be verified. A freeze that includes these sites would need to be monitored by the negotiating states or the International Atomic Energy Agency (IAEA).

In the past, North Korea balked at allowing monitoring beyond Yongbyon or revealing its other enrichment facilities and nuclear weapons production sites. North Korea also has resisted another critical need in undertaking a freeze, namely the United States or others taking samples at Yongbyon facilities that could reveal information about the size of North Korea's plutonium stock, let alone allowing sampling measures to get a handle on its weapon-grade uranium stock. Although the plutonium stock questions are manageable particularly since all the plutonium production and separation facilities are believed to be at Yongbyon, questions about North Korea's stock of weapon-grade uranium are a fundamental challenge. My and other estimates of North Korea's inventory of weapon grade uranium have very broad ranges, far greater than ranges on North Korea's plutonium stock. A freeze limited to Yongbyon would greatly exacerbate the challenge of understanding the size and weapons potential of its inventory of weapon-grade uranium.

No one said negotiations with North Korea are ever easy. But the United States and its allies should approach any negotiations with an awareness of what has changed from previous negotiations. A comprehensive, monitored freeze of North Korea's nuclear weapons production complex can be an important starting point for denuclearization negotiations. North Korea should be made aware of just what a freeze would need to entail. This type of freeze will not be easy to establish and must be part of a credible denuclearization negotiation. If negotiations are ever to start, the responsibility is on North Korea to reveal more of its nuclear program and open itself to the type of monitoring it has resisted in the past. Short of these steps and a willingness to negotiate denuclearization, the Trump administration has plenty of ways to increase the pressure on Pyongyang.