

**Testimony of David Albright,
President of the
Institute for Science and International Security,
before the House Foreign Affairs
Subcommittee on Asia and the Pacific**

**Hearing Title: “North Korea’s Perpetual Provocations:
Another Dangerous, Escalatory Nuclear Test”**

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North Korea’s September 9, 2016 nuclear test, its second this year, demonstrates its resolve and commitment to developing a nuclear arsenal able to strike its enemies. Reversing that growing threat must be a greater United States priority.

This test, its largest to date, combined with a number of recent ballistic missile tests, should also lead the United States and its partners to accept that North Korea can strike its neighbors with nuclear weapons and is making progress on building a long-range nuclear-capable force. Although we share the assessment that North Korea will likely need several more years before it can deploy a nuclear-tipped intercontinental ballistic missile (ICBM) that can strike the United States, North Korea appears embarked on a path to succeed in that endeavor.

Diplomatic efforts so far have proven inadequate to stop North Korea’s progress. However, when agreements were reached, they improved transparency over North Korea’s nuclear programs, slowed its progress, and led to fewer regional provocations by the regime. In short, negotiating with North Korea is a strategy that can yield both short and long term gains. The United States needs to reinvigorate its efforts to seek the dismantlement of North Korea’s nuclear arsenal. With regards to that endeavor, it has to be recognized that China is not going to deliver North Korea’s denuclearization. Unless China dramatically changes its current policies, it is not going to institute sanctions or other measures that it views as risking the collapse of the North Korean regime. Although we support increasing pressure on China to apply more effective sanctions on North Korea, the United States cannot rely on China to press hard enough to get North Korea to make significant nuclear concessions. The United States needs to find additional ways to influence North Korea, including direct negotiations.

North Korea does face limitations and hardships in further mastering nuclear weapons and building more advanced ones. There is room for counterproliferation efforts to learn about and inhibit its nuclear weapons program and for international efforts to disrupt its progress. As demonstrated by its growing capabilities, there is a dire need to reevaluate and reenergize current policies aimed at denuclearizing the Korean Peninsula. If US policy does not become more effective, North Korea will likely succeed in eventually creating a much larger, deadlier nuclear force – my Institute estimates up to 50-100 nuclear weapons in the next five years – and perhaps proliferate its capabilities to other nations, while increasing its provocations regionally. This is a threat that the United States must do more to head off.

Recent Test

The September 9 nuclear test had the largest seismic signal of any of North Korea's five confirmed tests. My Institute preliminarily estimates the explosive yield as 10-15 kilotons, where the upper value is about the same as the Hiroshima blast. However, beyond the seismic signal, scientific data about the test at least publicly remain unavailable. Questions include: was the test one that used only plutonium or weapon-grade uranium, or both? Was there any thermonuclear material involved that increased the yield of the test?

A North Korean statement issued soon after the test, which should be greeted with skepticism absent other information, allows our preliminary interpretation. Our interpretation can be summarized as follows:

North Korea appears to have a family of relatively reliable, miniaturized fission weapons with the destructive force rivalling the size of the Hiroshima blast that can use plutonium or weapon-grade uranium and fit on a number of ballistic missiles.

More data are needed to confirm the various parts of our interpretation but we see no evidence contradicting this assessment. The statement implies that North Korea could have learned to use weapon-grade uranium in what it has called the "standardization of the nuclear warhead." This opens the path to building a large number of miniaturized nuclear weapons using weapon-grade uranium. North Korea is likely to be able to produce considerably more weapon-grade uranium than plutonium.

It should be noted that the recent North Korean statement is very different in nature than the one following its January 2016 test, where it proclaimed it had detonated a thermonuclear weapon. The seismic evidence supports that the explosive yield was not in line with a thermonuclear weapon. But even in the absence of a successful thermonuclear test, one should take note of the direction of North Korea's nuclear weapons effort and it is reasonable to skeptically accept that North Korea is working on some type of thermonuclear device, likely one aimed at using thermonuclear materials to significantly boost the yield of a fission device. Earlier, in a worst-case assessment, we projected that North Korea could field a crude thermonuclear weapon with a yield approaching 100 kilotons soon after 2020. If North Korea continues its aggressive nuclear testing program, it could achieve that goal sooner.

Estimated Number of Nuclear Weapons

North Korea has an extensive nuclear program aimed at producing nuclear explosive materials for making nuclear weapons. Many of its nuclear facilities, e.g. those at Yongbyon, are known. However, a great deal of its nuclear capability is unknown or just suspected. Its nuclear capability has also depended on wide ranging overseas illicit procurements.

North Korea has developed successfully both the means to produce plutonium and weapon-grade uranium. Its stock of plutonium appears limited, but it appears to have a substantial capacity to produce weapon-grade uranium at both known and suspected locations.

As of June 2016, before the latest test, my Institute estimated that North Korea had about 13-21 nuclear weapons made from either plutonium or weapon-grade uranium. In this estimate, we ignored the potential production of weapon-grade uranium at a second, unknown enrichment plant, which using our methodology would increase the upper bound of nuclear weapons above 21 but not increase the lower bound. (The lower bound assumes that a second plant does not exist or contributes minimally to the total quantity of WGU, such as if the plant only took low enriched uranium produced at the Yongbyon enrichment plant and further enriched it to weapon-grade uranium).

Taking account of the recent test, the estimate becomes a total of 12-20 nuclear weapons. This estimate, despite not being comprehensive, suggests that North Korea is able to produce a sizeable number of nuclear weapons.

The estimate of North Korea's arsenal depends on an assumption that North Korea makes nuclear weapons using weapon-grade uranium. Its plutonium supply is limited. As such, this estimate remains uncertain, since so little is known about its enrichment activities or use of weapon-grade uranium in nuclear weapons. However, as mentioned above, another reason to be concerned about this recent test is that North Korea's statement implies that its nuclear weapons are no longer just plutonium based. But overall, more information about North Korea's ability to make plutonium, weapon-grade uranium, and nuclear weapons is needed.

Over the next five years, we have projected that under a certain set of conditions, that North Korea could achieve a nuclear arsenal of up to 50-100 nuclear weapons. Its pace of nuclear testing supports such a projection.

Foreign Procurements for its Nuclear Programs

North Korea has depended on illegal or questionable procurements for decades for its nuclear and other military programs, in particular seeking European, Japanese, and US goods. When it could no longer base its operations in Europe in the early 2000s, it shifted its operations to China where such operations have been centered since then. Operating in China, it has acquired a wide range of goods from Chinese companies and middlemen, as well as from US, Japanese, and European subsidiaries, which have been deceived into thinking they were selling to Chinese end users. China has not done an adequate job of enforcing its export control and sanctions laws against these illegal exports and retransfers to North Korea.

A new United Nations Security Council (UNSC) sanctions resolution, Resolution 2270, passed in March 2016, has put additional pressure on China to stem this flow of goods to North Korea. It is too early to judge the effects of the new sanctions on inhibiting North Korea's efforts to outfit its nuclear programs. However, preliminary information suggests that China is still not doing enough.

There remains plenty of room to improve and strengthen the sanctions on North Korea. The idea that they have failed or somehow improved North Korea's illicit procurement capabilities is

false; more accurately, the sanctions have simply not been implemented strongly enough by China, North Korea's main illicit procurement source.

To my Institute, the immediate priority is the United States sanctioning Chinese companies involved in providing controlled or sensitive goods to North Korea. My Institute has the name of at least one company engaged in recent illicit activity that deserves immediate sanctioning. There are likely many others known to the US government that could be sanctioned. The US government should use its authority to sanction illicit actors in China that supply North Korea's nuclear, missile, and other military programs.

In addition, in order to prevent the further expansion of North Korea's nuclear programs, more coordination is needed among allies to thwart North Korea's overseas purchases for its nuclear programs. It is also useful to step up sanctioning of banks and financial institutions involved in business with North Korean nuclear, missile, and military programs.

Negotiations

Reestablishing meaningful negotiations with North Korea will not be easy but it should be a major US priority. Over the last 25 years, there have been several efforts that have successfully delayed North Korea's nuclear progress or come close to making real progress on denuclearization. But they ultimately failed. Generally, these negotiations were premised on North Korea either not having nuclear weapons or having at most a few. That assumption is no longer viable and the negotiating strategy needs to reflect this shift.

There may be a temptation to replace the long-established goal of North Korean denuclearization with the goal of focusing on limiting North Korea's nuclear advances. But dropping or de-emphasizing denuclearization risks legitimizing North Korea's nuclear weapons programs while offering little in the way of preventing further nuclear proliferation or even military conflict in the region. Although achieving denuclearization looks bleak today, it should remain the fundamental driving goal of the United States.

How to achieve negotiations and what they should cover requires much deeper study. The current model of essentially relying on a reluctant China to rein in North Korea has not worked and is unlikely to do so as North Korea grows its nuclear capabilities. Although increasing sanctions and pressure on North Korea makes sense, it no longer seems that such a policy can work outside a broader, targeted US approach aimed at achieving nuclear limitations and reductions.

Establishing intermediate limits on North Korea's nuclear weapons program has to be part of any denuclearization strategy. However, as mentioned above, they should avoid legitimizing in any way North Korea's nuclear weapons, as happened after the 1998 nuclear tests by Pakistan and India.

Although the North Korean nuclear situation is in many ways unique and certainly has a long and tortuous history, we should look for lessons in the cases of South Africa's and Libya's denuclearization rather than the cases of India and Pakistan, or even Iran. Critical to South

Africa's denuclearization was the parallel negotiations on resolving or mitigating regional security issues that inflamed nuclear weapon ambitions. How such discussions could be established in North Asia needs a fresh look.

Another lesson of South Africa is that a nuclear warhead cannot be meaningfully isolated from its delivery systems, such as ballistic missiles. Both are needed for a nuclear arsenal. Any negotiations involving North Korea must include its ballistic missiles.

Establishing international verification in North Korea, even initially, will need to include declarations about North Korea's uranium pathway to the bomb. Too much of North Korea's capability to make nuclear explosive materials and nuclear weapons remains hidden. Any negotiations should emphasize early the need for a broader North Korean declaration of its nuclear infrastructure, including previously undeclared nuclear facilities and nuclear weapons.

The old models of focusing on freezing or disabling and then monitoring nuclear activity only at the Yongbyon site are no longer practical. New arrangements will need more robust inspections than the traditional, weak monitoring associated with past agreements and have access to sites outside Yongbyon.

As the United States strives for negotiations, allied governments need to cooperate more in order to determine North Korea's undeclared nuclear infrastructure and estimate with more certainty the size of its nuclear arsenal. Much more of this work should be made public.

Any negotiations need to obtain North Korean assurances early in the process that it is not spreading dangerous weapons, materials, and technologies abroad and is not engaging in nuclear and missile cooperation with Iran.

Conclusion

Congress has an important role in establishing US sanctions and sanctions policy on North Korea. It should encourage the administration to use its authorities given in the North Korean Sanctions and Policy Enhancement Act of 2016. It should also explore more ways to encourage China to apply sanctions on North Korea.

However, the United States should not depend solely on China. It also needs to develop other ways to influence North Korea to denuclearize.

Engaging North Korea has historically shown that it yields limitations and more transparency into North Korea's nuclear activities compared to a policy of ignoring the threat while it grows. Combined with greater efforts to reign in its illicit activities and addressing regional security concerns, changing the status quo of North Korea's ongoing dangerous provocations is possible. New thinking is needed to re-engage this dangerous regime and make steps toward the goal of denuclearization.

What should one make of the January 6, 2016 test and North Korea's claims about thermonuclear weapons?

North Korea announced after its January 2016 test that it had detonated a thermonuclear weapon but this announcement was greeted with great disbelief. Seismic data did not reveal a large explosion; a larger yield would be expected for a thermonuclear or boosted device. However, the test was detonated at about double the depth of the test in 2013. This could imply that North Korea expected a larger yield and the design failed.

So far, there is no data from radioactive releases that could shed light on the nature of the January test. Nonetheless, it is reasonable to skeptically accept that North Korea is working on some type of thermonuclear device.

Indirect evidence for work on thermonuclear weapons includes:

- North Korea has constructed a plant to make lithium 6, a key material to produce thermonuclear weapons.
- North Korea is also assessed as pursuing tritium production and separation.
- It has expressed interest in statements and via procurements of tritium capabilities.
- The 5 megawatt-thermal (MWth) reactor has channels for isotope production, including tritium production in lithium 6 targets
- Its IRT reactor may be operational again, which can make small quantities of tritium.
- North Korea has a capability to separate tritium in the Isotope Production Laboratory near the IRT reactor.
- It may be building an isotope separation plant at Yongbyon able to separate tritium from lithium-6 targets.

Realistically, North Korea is unlikely to be close to testing an H bomb, which is generally considered to be a two-stage fission-fusion-fission device. Such a device is highly sophisticated and capable of achieving 1000s of kilotons of explosive yield. The US type of boosted fission device with a tritium/deuterium gas injected into the center of the device also appears beyond the reach of North Korea today.

What seems more within North Korea's capabilities includes the type of device South Africa explored in its nuclear weapons program, namely a device with a lithium-deuterium-tritium tablet at the center of an atomic device with a goal to achieve a device with 60-100 kilotons. North Korea could also be seeking to use a more sophisticated version of that idea by considering shells of thermonuclear material placed around a fission design. A more sophisticated example, and one possibly achievable by North Korea if it continues nuclear testing, is a one stage thermonuclear device. This design would use a plutonium core with thermonuclear material in shells around the plutonium core and also with shells of weapon-grade uranium. A British one-stage thermonuclear device tested in mid-1950s with a plutonium core, thermonuclear material, and 100 kg of weapon-grade uranium in shells achieved an explosive yield of several hundred kilotons.