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PROJECT ON MANAGING THE ATOM

North Korea's Nuclear Weapons: Future Strategy and Doctrine

BOTTOM LINES

- Nuclear weapons have become a core element of North Korea's national security strategy and it is unlikely to give them up.
- A future North Korean nuclear weapons force is likely to remain small and configured largely for maintaining a survivable deterrent capability.
- The dangers of a nuclear-armed North Korea will place added importance on a stable security environment in Northeast Asia along with a stable and secure North Korean nuclear posture.
- North Korea's efforts to develop a nuclear weapons capability will be difficult and costly; through sanctions and restrictions on technology transfer, the international community will be well served to make sure it stays that way.

By Terence Roehrig

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NORTH KOREA'S NUCLEAR WEAPONS PROGRAM

North Korea [Democratic People's Republic of Korea—DPRK] conducted its third nuclear weapons test on 12 February 2013 with a yield that most estimate was around 6 to 10 kilotons. The test came on the heels of a December 2012 missile launch that placed a satellite into orbit though reports soon indicated that the satellite was not functioning properly. Given North Korea's actions and apparent determination, any chance to achieve complete and verifiable denuclearization may be long gone.

Estimates of the number of nuclear weapons in the North Korean arsenal range from four to ten. With the announcement to restart operations at Yongbyon, North Korea may be able to produce one additional warhead per year. In 2002, indications of a second path to nuclear weapons surfaced when U.S. officials challenged North Korea with evidence it was pursuing a highly-enriched uranium (HEU) program. Pyongyang informed the UN Security Council in 2009 that the DPRK was ready to enter the final phase of uranium enrichment. The next year, North Korean officials revealed a modern uranium enrichment facility with close to 2,000 centrifuges to visiting Stanford physicist, Siegfried Hecker. Speculation was rife that the February test would use HEU but this was never confirmed and the extent of the DPRK's HEU program remains uncertain.

BALLISTIC MISSILES

North Korea's nuclear weapons ambitions are complemented by a robust ballistic missile program. The DPRK has over 600 short-range SCUD missiles that can reach most of the Korean Peninsula along with 200 medium-range Nodong missiles with

sufficient range to hit Japan. Reports have surfaced of other longer range missiles including the Musudan intermediate range missile and the longer range KN-08. Both are mounted on mobile launchers but are not yet operational. Work continues on a long-range ICBM that could reach the United States. A key challenge remaining for North Korean technicians is weaponizing a nuclear device to fit on a ballistic missile. An assessment by the Defense Intelligence Agency noted with "moderate confidence" that the "North currently has nuclear weapons capable of delivery by ballistic missiles however the reliability will be low." The Obama Administration backed away from the finding leaving in doubt the precise nature of the DPRK's progress on this important technology. If using HEU, the warhead is easier to miniaturize but it is also heavier than a plutonium warhead requiring greater lift capability, particularly for an intercontinental ballistic missile. DPRK technicians will also need to develop guidance systems and reentry vehicles capable of surviving both the launch and reentry. North Korea has developed some of this technology for the Nodong but longer range missiles are a greater challenge.

The precise direction of North Korea's nuclear weapons program is unclear. Given its rhetoric and continued testing of both nuclear weapons and ballistic missiles, Pyongyang will likely go beyond its current capability to pursue a small, operational program, perhaps 20–40 warheads though these figures are highly speculative. It is important to note that North Korea's ambitions for a nuclear deterrent will not be cheap or easy, and it will take much more time, money, and testing for the DPRK to develop a reliable nuclear weapons capability. A plethora of sanctions have also slowed North Korea's nuclear weapons development. These challenges will seriously constrain the scope of the DPRK program.

DPRK STRATEGY AND IMPLICATIONS

If North Korea does pursue a small operational nuclear weapons program, there are several serious implications that could result. First, North Korea will have a nuclear force that is too small and insufficiently accurate to use for a first strike that seeks to disarm an adversary through a counterforce strategy. Instead, Pyongyang will likely opt for a countervalue strategy that targets South Korean or Japanese cities along with U.S. military bases in Japan. If the DPRK is able to improve its long-range ballistic missiles, the U.S. mainland might be added to the target list, a serious change in the strategic landscape for Washington.

Second, North Korea will seek to maintain a second strike capability that ensures a part of its nuclear forces will survive an attack to retaliate. If North Korea chose to deploy its nuclear-tipped missiles on launch pads, these assets would be highly visible and vulnerable to preemption. To address this vulnerability, North Korea has two likely options for ensuring survivability: storing road-mobile missiles in hardened sites such as mountain tunnels and moving them out for launch; and moving road-mobile missiles around on a road net making them more difficult to target. One other dimension of "hardening" involves the construction of a missile launch facility in 2008 that is 40–50 km from the Chinese border. South Korea or the United States might hesitate striking this site given the close proximity to China.

Lastly, if North Korea has any doubts about the survivability of its nuclear forces, it may adopt a launch-on-warning (LOW) posture. Under LOW North Korea's nuclear forces are on hair-trigger alert to launch with little warning. Most of North Korea's missiles are liquid-fuel rather than solid-fuel, a significant complication to an LOW posture. However, it is reasonable to assume North Korea will move toward a solid fuel capability as its program progresses. Indeed, some reports note that the KN-08 is likely to be a solid-fuel missile making it much easier to launch on short notice.

If attacked, the DPRK would face a difficult decision, uncertain if an incoming strike were a limited action of punishment for some provocation or the prelude to regime change. If only a limited conventional strike and North Korea responded with nuclear weapons, this would be an escalation Seoul and Washington would not tolerate leading to the end of the DPRK

regime. Also, it may not matter if a South Korean or U.S. strike were conventional or nuclear since the result could have the same strategic effect for North Korea of taking out its nuclear weapons. If an attack on North Korea were indeed the start of regime change, North Korean leaders may believe they have little to lose in using nuclear weapons. All of these scenarios place a premium on crisis stability.

RECOMMENDATIONS

The future configuration of North Korea's nuclear weapons program is uncertain. Should the DPRK seek to develop a small, operational nuclear weapons capability there may be little that can be done other than make this a long and costly process. Given the remaining technical challenges facing Pyongyang, maintaining a working and reliable nuclear weapons capability will take time and a great deal of money. The United States, China, South Korea, and the rest of the international community should work to ensure growth of the North Korean program remains difficult and expensive by limiting as best as possible its access to crucial materials and technology. If denuclearization is out of reach, negotiators should continue work on capping Pyongyang's production of fissile material along with further testing of nuclear weapons and ballistic missiles. In addition, continued vigilance is critical to ensure North Korea is not able to transfer technology and materials to other aspiring states. U.S. and Chinese cooperation will be very important to slow the growth of North Korean capability.

Some continue to hope that the DPRK may yet be willing to relinquish its nuclear weapons for a suitable package of incentives, but that outcome appears increasingly unlikely. Perhaps it will be possible to negotiate some type of cap on North Korea's nuclear program but that will not be likely for some time though it will be worth the effort to try. A nuclear North Korea makes it crucial that all countries in Northeast Asia work hard at maintaining a stable security environment that avoids the dangers of a crisis while encouraging North Korea to adopt a nuclear strategy that retains its "no first use" pledge, a strong command and control system, and a stable nuclear weapons posture. Given its relationship with North Korea, China is best positioned to encourage DPRK leaders in these directions.

In the years ahead, deterrence on the Korean Peninsula is likely to have a new dimension—North Korean nuclear weapons. Whether this reality is recognized by the international community or not, all countries will need to figure out how to deal with a nuclear North Korea while maintaining peace and security in the region.

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Struckman, Dana and Terence Roehrig. "Not So Fast: Pyongyang's Nuclear Weapons Ambitions." *Georgetown Journal of International Affairs*, February 20, 2013.

Roehrig, Terence. "North Korea's Nuclear Weapons Program: Motivations, Strategy, and Doctrine." Chap. 5 in *Strategy in the Second Nuclear Age: Power, Ambition, and the Ultimate Weapon*. Washington, D.C.: Georgetown University Press, October 2012.

Zhang, Hui. "North Korea's Third Nuclear Test: Plutonium or Highly Enriched Uranium?" *Power & Policy Blog*, February 15, 2013.

Park, John S. "The Leap in North Korea's Ballistic Missile Program: The Iran Factor." *Policy Brief, National Bureau of Asian Research*, December 2012.

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The Project on Managing the Atom (MTA) at the Belfer Center for Science and International Affairs produces policy-relevant research about the future of nuclear weapons, nuclear energy, and the connections between the two. The project also hosts an international fellows program designed to help prepare the next generation of leaders for work on nuclear policy issues.

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