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North Korea's Sixth Nuclear Test: Evaluation and Future Outlooks

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North Korea has completed the technological advancement of nuclear explosive power by having conducted the sixth nuclear test. In other words, the North declared to have achieved its self-claimed goal of completing the nuclear force by entering its final stage. North Korea, from now on, will probably devote their time and energy to carrying out provocative nuclear tests with an aim for the actual deployment of nuclear weapons and their massive production. This paper sets out to offer technological and strategic analysis on the North's sixth nuclear test and lay out how its ramifications will shape future circumstances.

Analysis on North Korea's Sixth Nuclear Test

It makes the most sense to analyze North Korea's sixth nuclear test as a test for a boosted fission bomb rather than an H-bomb when all factors are considered, such as explosive power, manufacturing environment, technological capability, the stage of advancement, and the North's claim. The actual bomb yield is estimated to be roughly at 50~200kt after taking

into account the 5.7~6.2mb range of seismic waves and geological environment and errors in measurement of a nuclear test site. Such analysis is grounded in the fact that the yield of a standardized atomic bomb (nuclear fission bomb) is at around 20kt and that the yield of a boosted fission bomb with stronger explosive power, gained through the nuclear fission process at the first stage and the nuclear fusion process at the second stage, is about two to ten times higher than that of a standardized atomic bomb. North Korea has a manufacturing technology of tritium and lithium-6, materials needed for a boosted fission weapons test. Another basis for such evaluation, amongst others, is the North's claim that it has successfully tested an H-bomb with the use of nuclear fission technology after the sixth nuclear test, boasting about the detailed technological advancement. However, about 40~200kg of highly enriched uranium (HEU), a material that the North has in abundance, could demonstrate similar explosive power to that of the sixth nuclear test. That is why the US still holds off on making a final conclusion even when it has its own growing suspicion that North Korea does have an H-bomb. Complete scientific verification of the North's claim, though, might be impossible.

Why the North Decided on the Sixth Nuclear Test

A strong motive behind a miniaturized-H bomb test can be analyzed from military and political contexts. First, the North pressed ahead with the test as part of its step-wise approach toward realizing a goal of complete nuclear advancement. The Kim Jong-un regime, ever since the early days of being in power, has started to make gradual efforts in earnest to secure nuclear warhead technology and enhance missile capabilities. The first stage from 2013 to 2014 set a goal of strengthening nuclear detonation capability with the use of HEU and improving short-range ballistic missile (SRBM) performance. The second stage from 2015 to 2016 aimed to carry out tests of nuclear fusion technology in early phases and medium-range ballistic missile (MRBM) and to achieve the diversification of missiles. The current third stage from 2017 and onward sets out to secure the technological ability of an H-bomb

as well as the capability of IRBM and ICBM for actual deployment. The final fourth stage is assumed to deploy massive numbers of nuclear weapons and declare the completion of nuclear force to the international community.

Additionally, the North must have attempted to take the initiative in turning the situation around by putting pressure on the US. The Kim regime might have thought that the situations unfolding were not in their favor since last April when the Trump administration set ‘maximum pressure and engagement,’ an approach enabled by the US dominating power, as the basis of its North Korean policy and chose a more detailed, coercive strategy against both China and North Korea in dealing with North Korea. North Korea must have felt an unexpected strategic burden given the fact that China started to engage more actively in sanctions because of pressure from the US and that the progressive-leaning ROK government is improving ROK-US cooperation on North Korean nuclear issues. The North must have thought that the US is the one shaping such circumstances and is now attempting to resist the US through the strongest possible strategic provocation.

Ramifications of the Sixth Nuclear Test and Future Outlooks

What would be the effects of the sixth nuclear test on the North’s pursuit of nuclear advancement and circumstances in the future? The biggest ramification of the test is that Pyongyang has now made it into the final stage of completing nuclear force. It is analyzed that with the sixth test, the DPRK no longer needs to conduct further nuclear tests at the technological level and that the North has practically reached the objectives of nuclear warhead detonator among the stages necessary for the nuclear advancement. The advancement of the missile projectile - another pillar in North Korea’s nuclear advancement - is expected to be completed soon. The North, after having conducted a series of intensified tests since 2016, has established a diversified missile system with strengthened technology, such as high-powered engines, stage separation technology, the operational ability

for the use of solid fuel, and the improved stability, mobility, and stealthiness of mobile launchers. The missile advancement will also be completed after having some of the technicalities worked out in specific areas, such as the re-entry technology of warheads and the guided and controlling technology of missiles. All factors considered, North Korea seems to have completed nuclear advancement at a rapid rate, far earlier than initially anticipated, bringing the expected year for completion from 2022 down to 2020 and eventually to 2018.

Second, Pyongyang seems more likely to turn the nuclear weapons system into a miniaturized H-bomb (boosted fission bomb)-oriented system. The success of the sixth nuclear test has allowed North Korea to obtain far more destructive nuclear weapons with the use of less nuclear materials. In addition, a boosted fission bomb has an advantage in view of its miniaturized and light-weighted nature, compared to atomic bombs indicating that with the completion of ICBM-class miniaturized H-bombs, nuclear weapons will soon be mounted onto all of North Korea's ballistic missiles. Under the assumption that North Korea will start replacing all nuclear weapons with boosted fission bombs (H-bomb), it is estimated that by 2020 the North will have produced at maximum 88 atomic bombs and 46 miniaturized-H bombs, totalling 134 nuclear weapons. However, the actual number of nuclear weapons contained by North Korea will be much less than such estimates since that figure was calculated under the assumption that North Korea has secret nuclear manufacturing facilities and that it has weaponized all of its nuclear materials. What is clear, though, is that the number of nuclear weapons obtained by the North is not going to be that high and that it will attempt to increase the number of nuclear weapons in the short-term using the nuclear materials obtained so far and will start manufacturing nuclear warheads in earnest next year.

Third, for the time being the situation will play out in the intensified and escalated phase of "strong action vs strong counteraction" rather than the dialogue phase, trapped in the vicious cycle of the toughening of sanctions vs North Korea's repeated provocations. In the process, the dilemma of major stakeholders will deepen. The US will force China to cooperate by holding strategic interests hostage,

such as trade issues. In the process, it will also put pressure on the South to enforce stronger pressure-based measures against the North. North Korea will also confront its own dilemma regardless of whether US-Sino cooperation strengthens or weakens. In former case, Pyongyang could face an increased chance of forced pursuit of denuclearization agreed upon by Washington and Beijing. Should a US-Sino cooperation become weaker, the US could more actively consider adopting unilateral military actions. China will face an increased burden on choosing the intensity, scope, and means of cooperation with the US should it decide to go for cooperation. And Beijing also has to deter Russia from trying to expand its influence with North Korea. China's vulnerability to the real threat of the US being coercive on China will increasingly become a reality should it choose not to cooperate with the US.

Fourth, the possibility for dialogue on denuclearization between the US and China seems unlikely to gain momentum for the time being. And securing the drive for achieving denuclearization through the improvement of inter-Korean relations will also be a challenge. The US has lowered the conditions for resuming denuclearization talks from the measures of complete denuclearization to moratorium on nuclear and missile provocations. However, none of the conditions are satisfying to North Korea since the US fails to offer detailed incentives. The rapid transition to the dialogue phase will not be an easy task considering current circumstances because the resumption of talks is a viable option only if the US offers appealing incentives to North Korea or North Korea lowers its demands of the US. In addition, the situation is very likely to persist for some time that the North would not turn their eyes to the advancement of inter-Korean relations with the expectation of reaping some benefits because it believes that South Korea is not even capable of obstructing the process of achieving their goals and that the Kim regime does not need any help from South Korea in realizing the strategic goals.

The nuclear advancement of the North was once again confirmed through the sixth nuclear test. Currently there is no clear alternative solution than to resort to strong sanctions and pressure given the structural limitations of not being able

to weather the current challenges through dialogue. When the nuclear advancement is completed and the level of sanctions has reached its peak, the two sides could consider having a dialogue. However, technical advancement is not the ultimate goal for North Korea. Producing tested-and-proven nuclear weapons on a massive scale building on such advancement within a short period is more important for the DPRK. Even if North Korea were to opt for compromise through the nuclear freeze, that day will not come until after it has completed the nuclear advancement and obtained a significant amount of deployable nuclear weapons. Given the fact that the success or failure of sanctions hinge upon the period of their enforcement, it seems highly likely that the US could choose the pressure-oriented approach against North Korea instead of the short-term compromise through enormous concession approach. When considering such circumstances, the response strategies of South Korea and the US, aimed to induce North Korea into dialogue through strong sanctions and pressure, still remain effective. Thorough preparation is needed for the possible pro-longed phase of the sanctions regime since the possibility cannot be ruled out that the strategy of inducing the North into talks for the short-term could end up in failure.

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