

The Implication of the Latest DPRK Nuclear and Delivery System Development and Its Implication to the Nuclear Sectors in the ROK

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1. Introduction

The year 2020 and the beginning of the year 2021 is the period of uncertainties in dealing with the DPRK WMD issues. There were two big military parades in the last October and January of 2021 demonstrating the strong will of the DPRK over the strong deterrence with nuclear weapons and corresponding delivery systems as well as the latest series of precision short range missiles such as KN 23 and K24 in addition to the series of the new KN 25 Multiple Rocket Launching Systems. Also, the DPRK demonstrated the new armored vehicles and tanks during the parades.

Still, there were no field tests of the new nuclear bombs and the long-range missiles including ICBM's for a long period of time. But there was no progress at all over the denuclearization during the last year of the Trump Administration and the 1st quarter of the new Biden Administration at all. In the meanwhile, the DPRK economy is essentially in great recession due to the continuation of the international sanctions and the everlasting self-quarantine against the Covid-19. Even though there have been a series of reports that the DPRK began to export the coals to the outside, the big blow significantly reducing the export and import between the DPRK and the PRC has impacted the DPRK domestic market significantly. Many government-driven construction campaigns such as the new resort complex in Wonsan and the new Pyongyang General Hospital are not completed yet.

Recently, Mr Kim Jong Un, the supreme leader in the DPRK reiterated the importance of the economy and the strong and candid will to the party leaders to boost the economy in many occasions. Following the willful statements to revitalize the economy, many core leaders in the critical national industries such as the three key leaders in the famous 3 giant steel-making companies in the DPRK announced their readiness to re-boost the core facilities with the maximum capacity.

The year 2021 shall be the year with greater uncertainties if we are not fully prepared. The new Biden Administration is expected to announce her strategic policy to deal with the DPRK soon. Even though it shall be significantly different from the so-called "Strategic Patience" of the Obama Administration, it will be quite different from that in the Trump Administration. Also, the new comprehensive policy to deal with the PRC with allies in the Indo-Pacific Region probably in the form of QUAD or QUAD+ shall be announced along with the newly updated Nuclear Posture Review and others.

The immanent re-orientation of the US policy along

with the dwindling economy in the DPRK shall open the new world for the confrontation and peace-talk throughout the remaining of the 1st year in the Biden Administration.

In this summary paper, authors summarize the followings;

- (1) The current status of the DPRK Nuclear Activities and Delivery Systems,
- (2) The energy issues in the DPRK, and
- (3) The potential of the ROK nuclear sectors to assist the global effort of the denuclearization in Korean Peninsula.

2. Current Status

As stated, there was no field test of the nuclear bombs during the last year. Poonggyeri site has been generally calm without any continuous actions after the demolition campaign in May of 2018. Still, the DPRK repeatedly announced the importance of the role of the nuclear weapons. The processes over the miniaturization and multiple nuclear war-head development cannot be confirmed even though the KCNA in Pyongyang repeatedly announced her success in this mission. Many of the key facilities in Yongbyon Atomic Energy Center(YAEC) have been quiet. Many international recognized entities claim that the 5 MWe Magnox Reactor at YAEC has been idle. Due to the significant flooding in 2020, many sections of the YAEC were damaged. Still, the research reactor remains at good conditions by look at this moment. There was a rumor at the beginning of 2019 that the DPRK was ready for another reprocessing campaign using the spent nuclear fuels stored in the pool adjacent to the reactor building. But there was no follow-up news for the reprocessing. Again, in March of 2021, many entities including IAEA, the international watch dog for nuclear activities expressed their worry over the resumption of the reprocessing campaign at YAEC.

The only evidence at this moment is the steam plums from the Thermal Plant at the south of the Radiochemistry Lab site. The continued effort to check the movement of special vehicles and the transportation between buildings and the Building 500, the waste storage building next to the Lab is needed. In practice, the DPRK might have technical difficulty to maintain the Magnox spent fuels in the wet storage pool. Unlike the US, the DPRK does not have the technology to manage the Magnox spent fuel for a long time as actively discussed throughout the AF(Agreed Framework) negotiation. To practically terminate the

potential reprocessing campaigns, the international cooperation is recommended.

There have been continuous efforts for the uranium enrichment in the UEP(Uranium Enrichment Plant) in the southern part of the YAEC. Many international institutes agreed the continued operation of the centrifuge installations in this section. Still there are many great uncertainties to fully understand the capability of uranium enrichment, the nature of the enrichment in this complex and the operation and maintenance of the core components and etc of the entire UEP facilities. Even though the observation of operating temperatures of the blue color roof building illustrates the continuous operation without any major break, many prominent international experts do not trust the full operation of that building throughout the year.

In addition, it has been more than a decade since the visit of the team of Dr S Hecker to watch the successful operation of the UEP. Now, by tradition, it is quite natural to replace the old key components with new ones possibly updating the functions and the capacities of the six cascades installed throughout two staged construction campaigns. For the real refurbishment, the supporting activities are required to test the new core parts such as rotors and bellows, the new entire centrifuges, and the entire cascades before the main installations. The authors do not exactly know where the DPRK conducted these missions nor where manufactured the key components and the necessary materials. One of the possibilities might be to use the Kangson clandestine facility between Pyongyang and Nampo. The future verification is needed to fully understand the entire infrastructure of the uranium enrichment installation nationwide in the DPRK throughout the effort of the denuclearization

Some international scholars claimed that the suspicious facilities at Yongdeok-Dong, Wollo-Ri, and Yungjeo-Ri(or Dong) are the places to store the stockpiles of weapon grade fissile materials and or the nuclear war heads. There is no real evidence to fully back up these claims in the open domain sources yet. The only evidences released publicly so far are the existence of the UGFs(Underground Facilities) in these sites. More hard evidences are needed if necessary to fully understand the real functions of these installations.

3. Energy Crisis

According to the MOTIE[1], the electricity generation in the DPRK is limited to the 1/24 level of that in the ROK. Many old fossil fuel power generation installations such as Bukchang, Pyongyang, Dongpyongyang and Unggi are outdated and experiencing chronic shortage of the fuel supply. Even though the National President Kim has continuously emphasized the new installations and achieved a certain success in Heecheon River and Urang-cheon Areas, it is still far short to meet the national electricity demand at this moment.

The DPRK needs the ambitious grand plan to revitalize the electricity supply chains throughout the denuclearization processes. Otherwise, the traditional heavy industries such as chemical engineering in Heungnam and steel making business cannot be fully supported. Also, the proper installation of insulation systems such as weather strips and others are needed to limit the energy losses in the high rising building in Pyongyang.

4. Role of the ROK Nuclear Sectors

There have been the series of the sporadic activities in the ROK nuclear sectors to provide the nuclear energy systems in the DPRK. Even though some of these efforts include the good practical solutions, the authors recommend to develop the comprehensive packages for the comprehensive energy solution including the generation and distribution for the immediate, short-, mid- and long-term perspectives[2] and the plan for the peaceful job transition for WMD workers in the DPRK.

In practice, how to supply the nuclear power generation systems in timely matter is the key to get the international as well as the domestic support. The new systems which shall require lengthy time for the designing and licensing shall be excluded to meet the urgency of the energy demand from the DPRK. Also, the proper measures to discourage the EnR in the DPRK while promoting the peaceful application of the nuclear energy should be seriously double checked.

The so-called Cooperative Monitoring and Verification is the good measures for the ROK experts. The core inspections over the weapon grade materials and military products shall be fully conducted by the IAEA and the concerned P5 states under the cooperation with the DPRK. Therefore, it is not the role of the nuclear community in the ROK. Still there will be enough rooms for the ROK experts to contribute the other activities in the general aspects of the verification processes.

The detailed action plans for the D&D activities for the YAEC and the subsequent waste management shall be discussed separately in the future.

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