

Analysis of IAEA Reports on North Korea's Nuclear Activities

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1. Introduction

North Korea's nuclear program is under the crucial threat of the international nuclear nonproliferation regime. Many organisations have analysed North Korea's nuclear activities; however, it is difficult to confirm direct nuclear programs due to the inability to access actual locations in North Korea. As an international organisation, the IAEA uses open-source information to submit reports to the United Nations on the application of safeguards measures to North Korea every year. The objective of this study is to summarise and analyse North Korea's nuclear activities, which have been addressed in major reports in the last three years published by the IAEA and others for analysis of IAEA's reports.

2. IAEA Reports on North Korea's Nuclear Activities [1]

The IAEA adopts a report on "Application of Safeguards in the DPRK" by the Board of Governors and addresses it to the General Conference in September every year. The IAEA has not been able to conduct all necessary safeguards activities under the DPRK's NPT Safeguards Agreement between the DPRK and the IAEA since 1994. Any verification activities were not able to be implemented in the field but the IAEA has continued to monitor the DPRK's nuclear activities and to evaluate all safeguards relevant information including open-source information such as satellite images.

For the Yongbyon experimental nuclear power plant (5MWe), the IAEA claimed as follows; there were no indications of reactor operation from early December 2018 to beginning of July 2021. However, since early July 2021, there have been indications, including the discharge of cooling water, consistent with operation of the reactor.

For the Radiochemical Laboratory, the IAEA explained as follows; the steam plant that serves the Radiochemical Laboratory operated for approximately five months, from mid-February 2021 until early July 2021. The duration of the operation of the steam plant and Radiochemical Laboratory in 2021 is significantly longer than that observed in the past during possible waste treatment or maintenance activities. The five-month timeframe is consistent with the time required to reprocess a complete core of irradiated fuel from the 5MWe reactor, according to design information for the Radiochemical Laboratory provided by the DPRK to the Agency in 1992. In 2003, 2005, and 2009, the

DPRK announced that it had conducted reprocessing campaigns at the Radiochemical Laboratory, each of which had lasted approximately five months.

For enrichment facility, during the reporting period, while regular vehicular movements were observed, there were indications, for the period, that the reported centrifuge enrichment facility was not in operation. Emissions have been observed at the UO₂ Production Process Building.

For ELWR (Experimental Light Water Reactor) under construction, the observations of activity near the LWR, including deliveries of materials and the presence of construction vehicles, indicate that internal construction work has continued during the reporting period. However, no additional transfers of major reactor components have been observed. No indications of reactor operation were observed, although there were indications of further testing of the infrastructure for cooling water in the late 2020, and again in March and in April 2021. According to the limited information, however, it is not possible to estimate when the reactor could become operational.

3. Other Reports on North Korea's Nuclear Activities

The 38North is one of the most influential organisations in the US which has expertise on North Korea issues and is most cited in domestic and foreign media. As mentioned above, the most useful source for obtaining information on North Korea, an inaccessible region, is satellite images, and 38North publishes many analysis reports with satellite image analysis.

In 2021, 38North published 16 analysis reports about North Korea's nuclear activities using satellite imagery information, which is listed in Table 1. [3]

Table 1. List of reports on North Korea's nuclear activities published by 38North in 2021

Area	Date issued	Title of Report
Yongbyon Nuclear Complex	2021-02-19	North Korea's Yongbyon Nuclear Center: Working Through Winter
Yongbyon Nuclear Complex	2021-03-03	North Korea's Yongbyon Nuclear Center: Signs of Activity at the Radiochemical Laboratory Facilities
Yongbyon Nuclear	2021-03-12	North Korea's Yongbyon Nuclear Center: Additional Activity at the

Complex		Radiochemical Laboratory and Uranium Enrichment Plant
Yongbyon Nuclear Complex	2021-04-07	North Korea's Yongbyon Nuclear Center: Reprocessing Status Remains Unclear
Yongbyon Nuclear Complex	2021-05-28	North Korea's Yongbyon Nuclear Scientific Research Center: Satellite Update
Punggye-ri Nuclear Test Site	2021-06-09	North Korea's Punggye-ri Nuclear Test Site: Three Years After Its Dismantlement
Yongbyon Nuclear Complex	2021-06-25	North Korea's Yongbyon Nuclear Complex: Assessing Activity at the Radiochemical Laboratory
Yongbyon Nuclear Complex	2021-07-16	Development of the Yongbyon Uranium Enrichment Plant Between 2009 and 2021
Yongbyon Nuclear Complex	2021-08-30	North Korea's Yongbyon Nuclear Complex: More Evidence the 5 MWe Reactor Appears to Have Restarted
Yongbyon Nuclear Complex	2021-09-16	Yongbyon Nuclear Research Center's UEP May Not Be Operating
Yongbyon Nuclear Complex	2021-09-17	Yongbyon Nuclear Research Center: Construction Activity Near ELWR
Yongbyon Nuclear Complex	2021-09-21	North Korea's Uranium Enrichment Plant: What to Make of New Construction
Yongbyon Nuclear Complex	2021-09-24	Dismantlement of Spent Fuel Storage Building at Yongbyon's 50 MWe Reactor
Yongbyon Nuclear Complex	2021-10-06	Construction Activity Continues at Yongbyon's Uranium Enrichment Plant
Yongbyon Nuclear Complex	2021-10-08	North Korea's Yongbyon Nuclear Complex: 5 MWe Reactor May Still be Operating
Yongbyon Nuclear Complex	2021-11-24	North Korea's Yongbyon Nuclear Complex: Further Evidence of 5 MWe Reactor Operations

4. Conclusion

In this study, the IAEA reports published in 2021 are summarized, and thus it could draw conclusions with technical and firm evidence which are possibly obtained by on-site inspection. Therefore, it is not possible to find out specific information that the agency observed from satellite images which were used. However, compared with reports of 38North, there were consistencies such as the possible operation of 5MWe reactor and radiochemical laboratory. But despite the lack of information, other activities such as new construction of buildings located in the southern part of the ELWR were not even addressed in IAEA reports.

From reports of IAEA and 38North, the fact with no question is that North Korea has continued its nuclear activities in the Yongbyon nuclear complex. It could be value of information on the Yongbyon complex when the negotiation for denuclearization re-starts. IAEA Director General Rafael Mariano Grossi also pointed out that North Korea continued its full nuclear program and Yongbyon nuclear complex is a center of its nuclear program [4].

REFERENCES

- [1] Application of Safeguards in the Democratic People's Republic of Korea (GOV/2021/40-GC(65)/22), 2021, available at <https://www.iaea.org/sites/default/files/gc/gc65-22.pdf>
- [2] <http://www.iaea.org>
- [3] <http://www.38north.org>
- [4] STIMSON center, <https://www.stimson.org/2021/live-interview-with-international-atomic-energy-agency-director-general-rafael-grossi>.