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Application of Safeguards in the Democratic People's Republic of Korea

Report by the Director General

A. Introduction

1. The Director General's report on the application of safeguards in the Democratic People's Republic of Korea (DPRK), issued on 27 August 2021, was submitted to the Board of Governors and to the 65th regular session of the General Conference in September 2021 (GOV/2021/40-GC(65)/22).
2. Having considered the report of August 2021, the General Conference adopted resolution GC(65)/RES/13 on 24 September 2021 and decided to remain seized of the matter and to include the item in the agenda for its 66th (2022) regular session.
3. This report of the Director General to the Board of Governors and the General Conference provides a detailed overview of the DPRK's nuclear programme. In September 2011, the Director General submitted an extensive report on the application of safeguards in the DPRK (the "2011 Report")¹ to the Board of Governors and the General Conference. In the following decade, the DPRK's nuclear programme continued to develop, in contravention of United Nations (UN) Security Council resolutions. In order to reflect the development of the DPRK nuclear programme, in particular since the 2011 Report, this report consolidates information from past reports, provides additional information on developments, and includes new information since the report of August 2021 (the current reporting period).

¹ GOV/2011/53-GC(55)/24.

B. Background

4. The Agency has not been able to verify the correctness and completeness of the DPRK's declarations under the Agreement between the DPRK and the Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (hereinafter referred to as the "NPT Safeguards Agreement").²

5. On 4 May 1992, the DPRK submitted to the Agency pursuant to its NPT Safeguards Agreement an initial report on nuclear material subject to safeguards and provided design information in respect of its existing facilities. In the same month, the Agency began carrying out ad hoc inspections to verify the information contained in the initial report provided by the DPRK.³

6. On 1 April 1993, the Board of Governors found, pursuant to Article 19 of the NPT Safeguards Agreement, that "the Agency is not able to verify that there has been no diversion of nuclear material required to be safeguarded under the terms of the Agreement to nuclear weapons or other nuclear explosive devices," and decided to report the DPRK's non-compliance and the Agency's inability to verify such non-diversion to all Member States of the Agency, to the UN Security Council and to the UN General Assembly.⁴

7. Under the Agreed Framework between the USA and the DPRK, signed on 21 October 1994 (INFCIRC/457), as authorized by the Board of Governors acting upon the UN Security Council request, the Agency maintained a continuous inspector presence at the Yongbyon site from November 1994 to December 2002, to monitor a freeze at five DPRK facilities: the 5MW(e) Experimental Nuclear Power Plant, the Nuclear Fuel Rod Fabrication Plant, the Radiochemical Laboratory (Reprocessing Plant), the 50MW(e) Nuclear Power Plant, and the 200MW(e) Nuclear Power Plant. The Agency continued to implement safeguards under the NPT Safeguards Agreement at four other facilities⁵ and the locations outside facilities (LOFs), which were not covered by the freeze.⁶

8. On 17 and 18 October 2002, the Agency wrote to the DPRK, requesting it to cooperate with the Agency and seeking clarification of reported information about a programme to enrich uranium,⁷ but received no response. The DPRK has not provided the Agency with any information or clarification concerning the reported uranium enrichment programme and other relevant nuclear fuel cycle facilities as requested by the Board of Governors in resolutions GOV/2002/60 and GOV/2003/3.⁸

² The DPRK concluded an agreement with the Agency, based on INFCIRC/66/Rev.2, for the application of safeguards in respect of a research reactor (INFCIRC/252) in July 1977. Under this item-specific safeguards agreement, safeguards were applied by the Agency to two nuclear research facilities in Yongbyon: the IRT Research Reactor and a critical assembly. Although the DPRK acceded to the NPT in December 1985, its NPT Safeguards Agreement with the Agency, based on INFCIRC/153 (Corrected), only entered into force in April 1992 (INFCIRC/403). As provided for in Article 23 of the NPT Safeguards Agreement, the application of safeguards under the earlier safeguards agreement (INFCIRC/252) is suspended while the NPT Safeguards Agreement is in force.

³ The Report by the Director General on the Implementation of the NPT Safeguards Agreement (INFCIRC/403) contained in GOV/2687 (16 September 1993) and its subsequent eight addenda, provide more details of the contemporaneous chronology of this issue in the period covering 1993 and 1994.

⁴ GOV/2645 (1993).

⁵ Facilities not covered by the freeze were the IRT Research Reactor, the Critical Assembly, the Sub-Critical Assembly and the Nuclear Fuel Rod Storage Facility.

⁶ GOV/2011/53-GC(55)/24, paras 15-17.

⁷ GOV/OR.1058 (2002), para. 10.

⁸ GOV/2011/53-GC(55)/24, para. 30.

9. In December 2002, the DPRK announced that it was lifting the freeze on nuclear facilities under the Agreed Framework, and requested Agency inspectors to remove all seals and surveillance equipment and depart the country.⁹ In a letter to the President of the UN Security Council dated 10 January 2003,¹⁰ and in a separate letter to the Director General of the same date, the DPRK stated that its withdrawal from the NPT would take effect one day later.¹¹

10. On 19 September 2005, the States parties in the Six Party Talks process - the People's Republic of China, the DPRK, Japan, the Republic of Korea, the Russian Federation and the USA - issued a Joint Statement in which the DPRK committed to abandoning all nuclear weapons and existing nuclear programmes and returning, at an early date, to the NPT and IAEA safeguards.¹² In February 2007, agreement was reached among the Six Parties on Initial Actions for the implementation of the Joint Statement of 19 September 2005, including that "the DPRK will shut down and seal for the purpose of eventual abandonment the Yongbyon nuclear facility, including the reprocessing facility, and invite back Agency personnel to conduct all necessary monitoring and verification as agreed between the IAEA and the DPRK".¹³ Following a visit to the DPRK by the Director General in March 2007, an Agency team reached an understanding with the DPRK, subsequently approved by the Board of Governors in July 2007, on an arrangement for monitoring and verification in connection with the Initial Actions.¹⁴

11. On 17 July 2007, the Agency confirmed the shutdown status of the facilities subject to the arrangement.¹⁵ Thereafter, the Agency maintained a continuous inspector presence at Yongbyon to monitor and verify the status of shut down or sealed facilities. The Agency was also able to observe and document the disabling work. On 14 April 2009, the DPRK informed the Agency inspectors at Yongbyon that it had decided to cease all cooperation with the Agency, and requested the inspectors to remove all containment and surveillance equipment and to depart the country. Agency inspectors departed the DPRK on 16 April 2009.¹⁶

12. Since 1994, the Agency has not been able to conduct all necessary safeguards activities provided for in the NPT Safeguards Agreement. From the end of 2002 until July 2007, the Agency was not able, and since April 2009 has not been able, to implement any safeguards measures in the DPRK.

13. Following the DPRK's nuclear tests in 2006, 2009, 2013, 2016 and 2017, the UN Security Council adopted resolutions 1718 (2006), 1874 (2009), 2094 (2013), 2270 (2016), 2321 (2016) and 2375 (2017). In these resolutions, the UN Security Council, inter alia: demanded that the DPRK return at an early date to the NPT and IAEA safeguards; decided that the DPRK shall abandon all nuclear weapons and its existing nuclear programme in a complete, verifiable and irreversible manner and immediately cease

⁹ GOV/2011/53-GC(55)/24, para. 18.

¹⁰ S/2003/91 (2003).

¹¹ In July 2003, the Director General informed the Board that, "until the legal status of the DPRK vis-à-vis the NPT is clarified, the Agency's safeguards responsibilities as regards the DPRK remain uncertain. If the DPRK is considered to still be a party to the NPT, then its comprehensive NPT safeguards agreement remains in force, its nuclear material and facilities should be declared to the Agency and the Agency should resume its verification of the correctness and completeness of the DPRK's declarations. However, if the DPRK is considered no longer to be a party to the NPT, the Agency's INFCIRC/66-type safeguards agreement with the DPRK would have to be implemented. The Director General has not yet received guidance in the matter from the States parties to the NPT". (GOV/OR.1206 (2008), para. 18).

¹² GOV/INF/2007/14 (2007).

¹³ GOV/INF/2007/6 (2007).

¹⁴ GOV/2007/36 (2007).

¹⁵ The same five facilities subject to the freeze under the Agreed Framework.

¹⁶ GOV/2011/53-GC(55)/24, paras 23-25.

all related activities and act strictly in accordance with the obligations applicable to parties under the NPT and the terms and conditions of its NPT Safeguards Agreement; and decided that the DPRK shall provide the Agency with transparency measures extending beyond these requirements, including such access to individuals, documentation, equipment and facilities as may be required and deemed necessary by the Agency. Contrary to the requirements of those resolutions, the DPRK has not abandoned its existing nuclear programme in a complete, verifiable and irreversible manner or ceased all related activities.

14. As the Agency remains unable to carry out verification activities in the DPRK, and as further nuclear activities continue to take place in the country, the Agency's knowledge of the DPRK's nuclear programme is limited. Nevertheless, it is important for the Agency to remain cognizant of developments in that programme to the fullest extent possible, especially in light of the General Conference's support of the Secretariat's continued enhanced readiness to play its essential role in verifying the DPRK's nuclear programme, including the capability to re-establish the implementation of safeguards related activities in the DPRK.¹⁷

C. Overview of the DPRK Nuclear Programme and Recent Developments

15. This section provides an overview of the DPRK nuclear programme and its development between September 2011 and August 2022, building on the Director General's reports during this period, incorporating the Agency's knowledge of the programme based on its previous experience in the DPRK and the Agency's evaluation of all safeguards relevant information available to it. As noted in paragraphs 11 and 12 above, the Agency has not had access to the Yongbyon site or to any other locations in the DPRK since April 2009.¹⁸ Without such access, the Agency cannot confirm either the operational status or the configuration/design features of the facilities or locations as described in this section, or the nature and purpose of the activities conducted therein.

C.1. Mining and Milling

16. In an appendix to its initial report to the Agency in May 1992, the DPRK included two uranium mines (Wolbisan Uranium Mine¹⁹ and Pyongsan Uranium Mine²⁰) and two uranium concentration plants (Pakchon Uranium Concentrate Pilot Plant and Pyongsan Uranium Concentrate Plant).²¹

17. Since the 2011 Report, there have been indications of mining, milling and concentration activities taking place on a seasonal basis at Pyongsan. Renovation of the Pyongsan Uranium Concentrate Plant was observed during 2014. There have also been ongoing indications of mining activity at the Wolbisan Uranium Mine. There are no indications that significant concentration activity has occurred at the

¹⁷ GC(65)/RES/13, paras 11-12.

¹⁸ The names of the nuclear facilities at the Yongbyon site are as previously declared by the DPRK to the Agency (GOV/2011/53-GC(55)/24, Annex), except for the Reported Centrifuge Enrichment Facility and the Light Water Reactor (LWR), which the DPRK has not declared to the Agency.

¹⁹ The Wolbisan Uranium Mine is also known as the Sunchon-Wolbisan Uranium Mine.

²⁰ Pyongsan is also known as Phyongsan.

²¹ GOV/2011/53-GC(55)/24, para. 28.

Pakchon Uranium Concentrate Pilot Plant since commercial high-resolution satellite imagery became available to the Agency in 2001.

18. During the reporting period, there were indications of ongoing mining, milling and concentration activities at the Pyongsan Uranium Mine and the Pyongsan Uranium Concentrate Plant.²²

C.2. Conversion and Fuel Fabrication

C.2.1. Conversion to Natural Uranium Metal and Production of Natural Uranium Metal Fuel Rods

19. Conversion of natural uranium and production of natural uranium metal fuel for the graphite reactors were carried out at the Nuclear Fuel Rod Fabrication Plant at Yongbyon from 1990 to 1994.²³ Several buildings of this plant were covered by the freeze under the Agreed Framework, from November 1994 to December 2002. Some of the key components of the plant were removed prior to the freeze and most of the remaining equipment was in poor condition and deteriorated further during the freeze.²⁴ In July 2007, when Agency inspectors returned to Yongbyon, the plant's equipment had further deteriorated and showed no signs of use in the period 2002-2007, with the exception of activities in the UO₂ Production Process Building.²⁵

20. The purification of uranium ore concentrate to U₃O₈ in the UO₂ Production Process Building was not subject to Agency safeguards and continued during the freeze. However, conversion of U₃O₈ to UO₂ was not conducted during the freeze.

21. In July 2007, Agency inspectors found that the process line in the UO₂ Production Process Building used to convert U₃O₈ to UO₂ was still in operation; however, it was not possible to estimate the UO₂ production over the period 2002-2007. The process line was disabled in 2007. Since 2009, however, there have been indications of the intermittent operation of processes in this building.

22. Production of UF₄ for conversion to natural uranium metal was conducted in the UF₄ Production Process Building²⁶ until October 1992 and was subject to the freeze. The Agency in 2002 observed that due to extensive corrosion of plant equipment and interior building fixtures the UF₄ Production Process Building would not have been operable without extensive refurbishment. In 2007, the Agency observed that the interior of the building and equipment had further deteriorated and the building showed no signs of use since 2002.

23. In July 2007, in the Ingot Production Process Building,²⁷ the Agency observed a UF₄ small-scale research and development conversion apparatus using a dry process.²⁸

24. The Nuclear Fuel Rod Fabrication Plant was not operable when Agency inspectors departed the DPRK in April 2009. While some parts of the natural uranium conversion and natural uranium metal

²² IAEA Director General's Introductory Statements to the Board of Governors: 6 June 2022; 7 March 2022; and 24 November 2021.

²³ For information on earlier conversion activities see GOV/2011/53-GC(55)/24, para. 29.

²⁴ GOV/2011/53-GC(55)/24 para. 29.

²⁵ Building 1 of the Nuclear Fuel Rod Fabrication Plant.

²⁶ Building 2 of the Nuclear Fuel Rod Fabrication Plant.

²⁷ Building 3 of the Nuclear Fuel Rod Fabrication Plant.

²⁸ GOV/2011/53-GC(55)/24, para. 29.

production process could have been restored, the complete production process could not be reconstituted with the equipment observed by the Agency to be present at the facility.

25. The DPRK's declared inventory of natural uranium metal fuel was last verified by the Agency in December 2002. In 2007, Agency inspectors were informed by the facility operator that natural uranium metal fuel rods equivalent to two full core loads had been transferred to the 5MW(e) reactor between 2003 and 2007, which was consistent with the Agency's estimates of the remaining uranium metal fuel inventory.²⁹ The remaining number of natural uranium metal fuel rods observed by Agency inspectors in 2009 would not have been sufficient to provide the three complete core fuel loads for the observed operation cycles of the 5MW(e) reactor since 2013. The Agency cannot determine the source of the natural uranium metal fuel used in the latest operation cycles.

26. During the reporting period, emissions have been observed by the Agency from the UO₂ Production Process Building. In addition, in July 2022, the Agency observed that dismantlement of the UF₄ Production Process Building had commenced.

C.2.2. Conversion to Natural Uranium Hexafluoride

27. As previously reported, there are indications that the DPRK had undeclared UF₆ conversion capabilities prior to 2001.³⁰

28. In November 2010, a group visiting Yongbyon was told that the DPRK was producing UF₆ as feed material for uranium enrichment gas centrifuges.³¹

C.2.3. Other Conversion and Fuel Fabrication Processes

29. As previously reported, in July 2007, the Agency observed that a line for converting PuO₂ to plutonium metal, which included fluorination, reduction and casting of plutonium metal, had been installed at the Radiochemical Laboratory. Further treatment of the plutonium metal was stated by the DPRK to have taken place elsewhere in the DPRK.³²

30. Indications of the infrequent, short-term operation of the IRT Research Reactor raise the possibility that the DPRK has developed an enriched uranium conversion and fuel fabrication capability for the IRT Research Reactor.

31. The group that visited Yongbyon in November 2010 was also shown a prototype light water reactor (LWR) under construction (see paragraph 45). They were told that the DPRK was developing the capability to produce LWR fuel.³³

32. From 2009 to 2012, the Agency observed the construction of new buildings in the south-eastern area of the Nuclear Fuel Rod Fabrication Plant; further construction and renovation of buildings was

²⁹ Under the terms of the February 2007 agreement among the Six Parties on Initial Actions for the implementation of the Joint Statement of 19 September 2005, the Agency had access to the Nuclear Fuel Rod Storage Facility (see FN 5), but was not able to conduct nuclear material verification activities at the facility.

³⁰ GOV/2011/53-GC(55)/24, para. 50.

³¹ Siegfried Hecker, 'A Return Trip to North Korea's Yongbyon Nuclear Complex', Center for International Security and Cooperation, Stanford University, 20 November 2010.

³² GOV/2011/53-GC(55)/24, para. 43.

³³ Siegfried Hecker, 'A Return Trip to North Korea's Yongbyon Nuclear Complex', Center for International Security and Cooperation, Stanford University, 20 November 2010.

observed in the same area between 2015 and early 2019.³⁴ There have been indications of chemical processing taking place in some of these buildings.³⁵ It is not possible for the Agency to determine which processes are taking place in these buildings, although, based on their location and configuration, they may be related to conversion and fuel fabrication.

33. During the reporting period, there were indications of ongoing activities at the buildings in the south-eastern area of the Nuclear Fuel Rod Fabrication Plant.

C.3. Enrichment

34. On 13 June 2009, following the adoption of UN Security Council resolution 1874 (2009), the DPRK's Ministry of Foreign Affairs announced that uranium enrichment would commence on an experimental basis and, on 4 September 2009, the DPRK's Permanent Representative to the UN stated that "experimental uranium enrichment has successfully been conducted to enter into completion phase".³⁶

C.3.1. Reported Centrifuge Enrichment Facility at Yongbyon

35. In November 2010, a group visiting Yongbyon was shown what appeared to be a centrifuge enrichment facility located in the Rod Production Process Plant of the Nuclear Fuel Rod Fabrication Plant.³⁷ The group was told that construction of the centrifuge facility had started in April 2009, that it contained approximately 2000 centrifuges arranged in six cascades with a capacity of 8000 separative work units (SWU) per year, and that it was operating and configured to produce low enriched uranium (LEU).³⁸

36. Although the reported centrifuge enrichment facility may have started operation earlier, the Agency observed indications consistent with its operation, including the operation of the cooling units, from early 2012 onwards.

37. On 2 April 2013, the General Department of Atomic Energy of the DPRK said it would take measures for "readjusting and restarting all the nuclear facilities in Nyongbyon³⁹ including uranium enrichment plant and 5MW[(e)] graphite moderated reactor".⁴⁰ In April 2013, the DPRK began the construction of an extension to the building housing the reported centrifuge enrichment facility, thereby effectively doubling the building's floor area. The Agency observed indications that the extension was in use by late 2014.⁴¹

38. During the reporting period, the Agency observed that the cooling cells serving the reported centrifuge enrichment facility were removed in late August 2021. Nevertheless, there were ongoing indications that the facility continued to operate, possibly using an alternative cooling system. In September 2021, construction commenced on a new annex, which increases the floor area of the building

³⁴ GOV/2018/34-GC(62)/12, para.15, GOV/2019/33-GC(63)/20, para. 14.

³⁵ GOV/2019/33-GC(63)/20, para. 14.

³⁶ GOV/2011/53-GC(55)/24, para. 32.

³⁷ Building 4 of the Nuclear Fuel Rod Fabrication Plant.

³⁸ GOV/2011/53-GC(55)/24, para. 33.

³⁹ Nyongbyon is also known as Yongbyon.

⁴⁰ GOV/2013/39-GC(57)/22 para. 8.

⁴¹ GOV/2015/49-GC(59)/22, para. 15.

by approximately one-third. The roof to this annex was installed in May 2022, and the annex is externally complete. It has not been possible for the Agency to determine the purpose of the annex.⁴²

C.3.2. Kangson Complex

39. The Agency has evaluated all safeguards relevant information, including satellite imagery and open source information, about a group of buildings within a security perimeter at Kangson, in the vicinity of Pyongyang. The construction of the Kangson complex took place before the construction of the reported centrifuge enrichment facility at Yongbyon, a sequence which is consistent with the Agency's assessed chronology of the development of the DPRK's reported uranium enrichment programme. In addition, the Kangson complex shares infrastructure characteristics with the reported centrifuge enrichment facility at Yongbyon.

40. During the reporting period, there were indications of ongoing activities at the Kangson complex.⁴³

C.4. IRT Research Reactor

41. In 1963, the USSR provided the DPRK with a 2MW(th) IRT-2000 pool-type research reactor and nuclear material for the reactor, the construction of which was completed in 1965, which were subject to safeguards pursuant to an item-specific safeguards agreement which entered into force in July 1977 (INFCIRC/252). The IRT Research Reactor was used for training and the production of radionuclides. In 1974, it was upgraded to 4MW(th) and in 1986 to 8MW(th), using 36% and 80% enriched uranium fuel. The last fuel imported for the reactor from the USSR was declared by the DPRK to the Agency in 1990. There have been indications that the IRT Research Reactor has operated only infrequently, for short periods.

42. Based on information provided to the Agency by the DPRK in 1992, the DPRK carried out small-scale reprocessing activities at the Isotope Production Laboratory (IPL) in 1975-1976 using fuel that was irradiated in the IRT Research Reactor in 1975. This led to the separation of a limited amount of plutonium prior to the entry into force of the safeguards agreement (INFCIRC/252).

C.5. Light Water Reactors

43. A project to construct two 1000MW(e) LWRs for nuclear power generation at Kumho, DPRK, initiated under the terms of the Agreed Framework, was terminated by the Korea Energy Development Organization (KEDO) on 31 May 2006.⁴⁴ At the time of the project's termination, some civil engineering work had already been carried out. Construction has not been resumed since 2006.

44. In November 2010, at the Yongbyon site, DPRK officials showed a group visiting the site what they described as a prototype LWR under construction, with a design capacity of 100MW(th), utilizing LEU fuel enriched to 3.5% U-235.⁴⁵

⁴² IAEA Director General's Introductory Statements to the Board of Governors: 13 September 2021; 24 November 2021; 7 March 2022; and 6 June 2022.

⁴³ IAEA Director General's Introductory Statements to the Board of Governors: 13 September 2021; 24 November 2021; 7 March 2022; and 6 June 2022.

⁴⁴ 'About Us: Our History', KEDO website, http://www.kedo.org/au_history.asp.

⁴⁵ GOV/2011/53-GC(55)/24, para. 37.

45. In 2012, the dome was emplaced on the reactor containment building⁴⁶ and external work on the building appeared to have been completed as of June 2013.⁴⁷ The construction of an electrical switchyard adjacent to the LWR's turbine hall was completed in December 2015.⁴⁸

46. During late September and early October 2018, the Agency observed activities consistent with the transfer of major reactor components into the LWR containment building. There were indications that these components were fabricated in a construction support yard near the reactor containment building.⁴⁹ Indications of tests of the cooling water system were observed on several occasions between March 2019 and April 2021.⁵⁰

47. During the reporting period, the Agency did not observe indications of operation of the LWR and, based on the information currently available, it is not possible to estimate when the reactor could become operational. Indications of a possible test of the cooling water system were observed in July 2022. Near the LWR compound, a new building, possibly to support the fabrication or maintenance of reactor components, was externally completed in December 2021, and two further, adjacent buildings, have been under construction since March 2022.⁵¹

C.6. Graphite Reactors

C.6.1. 5MW(e) Experimental Nuclear Power Plant

48. According to the DPRK's declarations, construction of the 5MW(e) Experimental Nuclear Power Plant began in 1979 and the initial core loading took place in 1985. The facility was shut down in early 1994 and was subject to the freeze under the Agreed Framework.⁵²

49. Further cycles of operation of the 5MW(e) reactor occurred from approximately January 2003 to March/April 2005, and from June 2005 to 15 July 2007.

50. Under the Initial Actions for the implementation of the Joint Statement of 19 September 2005 agreed as a result of the Six-Party Talks, the 5MW(e) reactor was shut down in July 2007, and in June 2008 its cooling tower was demolished as part of the disablement process. The reactor remained shut down when the Agency departed the DPRK in April 2009.⁵³

51. Following the DPRK General Department of Atomic Energy's statement on 2 April 2013 that it would take measures for "readjusting and restarting all the nuclear facilities in Nyongbyon including ...5MW[(e)] graphite moderated reactor",⁵⁴ a reconfiguration of the 5MW(e) reactor's cooling system was observed which enabled the reactor to operate without a cooling tower. The Agency observed

⁴⁶ GOV/2012/36-GC(56)/11, para. 12.

⁴⁷ GOV/2013/39-GC(57)/22, para. 12.

⁴⁸ GOV/2016/45-GC(60)/16, para. 18.

⁴⁹ GOV/2019/33-GC(63)/20, para. 15.

⁵⁰ GOV/2019/33-GC(63)/20, para. 15, GOV/2020/42-GC(64)/18, para. 12, GOV/2021/40-GC(65)/22, para. 12.

⁵¹ IAEA Director General's Introductory Statements to the Board of Governors: 24 November 2021; 7 March 2022; and 6 June 2022.

⁵² GOV/2011/53-GC(55)/24, para. 38.

⁵³ GOV/2011/53-GC(55)/24, para. 38.

⁵⁴ GOV/2013/39-GC(57)/22, para. 8.

indications of reactor operation between August 2013 and October 2015,⁵⁵ and again between December 2015 and December 2018;⁵⁶ these were the fourth and fifth cycles of operation of the reactor.

52. Construction activities in and near the Kuryong River were conducted in late 2017 and 2018, to install a dam across the river and to build a new pumphouse for the 5MW(e) reactor,⁵⁷ possibly to provide separate cooling systems for the 5MW(e) reactor and the LWR.

53. As previously reported, no further indications of operation of the 5MW(e) reactor were observed until early July 2021, when the reactor restarted operation and commenced its sixth cycle of operation.⁵⁸

54. During the reporting period, indications of reactor operation, including the discharge of cooling water, have continued, with the exception of short periods in late September 2021 and late March 2022.⁵⁹

C.6.2. Other Graphite Reactors

55. Construction of the 50MW(e) Nuclear Power Plant at Yongbyon and the 200MW(e) Nuclear Power Plant at Taechon was halted during the freeze and has not since been restarted.⁶⁰

56. During the reporting period, since mid-2021, the spent fuel pond building, power supply building and turbine and generator building at the 50MW(e) reactor have all been partially dismantled, and some pipes have been removed from the ground between the reactor building and the pumphouse by the Kuryong River. There are no indications that any work has been conducted to restart construction of the 50MW(e) Reactor or 200MW(e) Nuclear Power Plant.⁶¹

C.7. Reprocessing

57. The DPRK declared to the Agency that the cold testing of the Radiochemical Laboratory took place from January to March 1990 and that the hot test of this facility took place between March and May 1990. The DPRK declared that during this hot test, the reprocessing of irradiated fuel had been carried out. Apparent inconsistencies relating to separated plutonium product and waste led to the Agency's request for access to specific additional information and locations. These issues have yet to be resolved. During the inspections carried out between 1992 and 1994, and during the freeze under the Agreed Framework, no further reprocessing of irradiated fuel occurred at the Radiochemical Laboratory.⁶²

58. Following the breakdown of the Agreed Framework, the DPRK announced that reprocessing of the 8000 spent fuel rods from the 5MW(e) reactor had been completed by the end of June 2003. Between

⁵⁵ GOV/2013/39-GC(57)/22, para. 13, GOV/2014/42-GC(58)/21, para.12, GOV/2015/49-GC(59)/22, para. 14.

⁵⁶ GOV/2016/45-GC(60)/16, para. 15, GOV/2017/36-GC(61)/21, para. 15, GOV/2018/34-GC(62)/12, para. 15, GOV/2019/33-GC(63)/20, para 16.

⁵⁷ GOV/2018/34-GC(62)/12, para. 19, GOV/2019/33-GC(63)/20, para. 16.

⁵⁸ GOV/2021/40-GC(65)/22, para. 12.

⁵⁹ IAEA Director General's Introductory Statements to the Board of Governors: 13 September 2021; 24 November 2021; 7 March 2022; and 6 June 2022.

⁶⁰ GOV/2011/53-GC(55)/24, para. 39.

⁶¹ IAEA Director General's Introductory Statement to the Board of Governors, 6 June 2022.

⁶² GOV/2011/53-GC(55)/24, para. 40.

June and October 2005, a further reprocessing campaign was reportedly conducted of 8000 spent fuel rods discharged from the 5MW(e) reactor in April 2005.⁶³

59. On 25 April 2009, the DPRK announced that it had begun to reprocess the spent fuel rods which had been discharged from the 5MW(e) reactor. The reprocessing was reported to have been completed by the end of August 2009.⁶⁴

60. The reprocessing campaigns at the Radiochemical Laboratory announced by the DPRK in 2003, 2005, and 2009, each lasted four to five months. Between February and June 2016,⁶⁵ and again between mid-February 2021 and early July 2021,⁶⁶ there were multiple indications of the Radiochemical Laboratory's operation, including deliveries of chemicals and the operation of the associated steam plant.

61. The indications of operation observed by the Agency in 2016 and 2021 were consistent with previous reported reprocessing campaigns and with the time required to reprocess a complete core of irradiated fuel from the 5MW(e) reactor, based on the design information for the Radiochemical Laboratory.⁶⁷

62. The Agency observed a shorter period of operation of the steam plant that serves the Radiochemical Laboratory in April/May 2018.⁶⁸ In this case, the duration of the steam plant's operation was not sufficient to have supported the reprocessing of a complete core of irradiated fuel from the 5MW(e) reactor and this activity was indicative of waste treatment or maintenance.⁶⁹

63. During the reporting period, between late April and August 2022, there were indications of the intermittent operation of the steam plant that serves the Radiochemical Laboratory. This activity is consistent with waste treatment or maintenance.⁷⁰

C.8. Nuclear Infrastructure Plans

64. In addition to the construction of the LWR at Yongbyon, the DPRK has indicated in recent years that it has plans to develop a nuclear power industry.

65. On 1 January 2019, Kim Jong Un, General Secretary of the Workers' Party of Korea (WPK) and President of the State Affairs Commission, announced in his New Year Address that the DPRK would "create a capacity for generating tidal, wind and atomic power under a far-reaching plan".⁷¹

66. In his report to the Eighth WPK Congress held in January 2021, General Secretary Kim "mentioned the plans for launching in real earnest into the founding of the nuclear power industry to cope with the long-range demands and the subjective and objective changes in the future".⁷²

⁶³ GOV/2011/53-GC(55)/24, para. 41.

⁶⁴ GOV/2011/53-GC(55)/24, para. 44.

⁶⁵ GOV/2016/45-GC(60)/16, para. 16.

⁶⁶ GOV/2021/40-GC(65)/22, para. 12.

⁶⁷ GOV/2021/40-GC(65)/22, para. 12.

⁶⁸ GOV/2018/34-GC(62)/12, para. 16.

⁶⁹ GOV/2021/40-GC(65)/22, para. 12.

⁷⁰ IAEA Director General's Introductory Statement to the Board of Governors, 6 June 2022.

⁷¹ GOV/2019/33-GC(63)/20, para. 7.

⁷² 'On Report Made by Supreme Leader Kim Jong Un at 8th Party Congress of WPK', KCNA, 9 January 2021.

67. Separately, General Secretary Kim has noted the DPRK's plans to develop a nuclear-powered submarine, stating in his January 2021 report to the Eighth WPK Congress that "the design of new nuclear-powered submarine was researched and was in the stage of final examination".⁷³

C.9. Weaponization and Nuclear Testing

68. Over the course of 2006 to 2017, the DPRK reported on six occasions that it had detonated a nuclear device. The DPRK has made regular public announcements stressing the importance of its nuclear weapons programme and claiming advances in the areas of nuclear warhead miniaturization and nuclear weapon delivery systems. On 1 January 2018, the DPRK announced that during 2017 it had accomplished the goal of "perfecting the national nuclear forces".⁷⁴

69. The DPRK announced on 25 May 2018 that the "northern nuclear test ground of the DPRK was completely dismantled", and the Nuclear Weapons Institute of the DPRK noted in a separate statement that "[d]ismantling the nuclear test ground was done in such a way as to make all the tunnels of the test ground collapse by explosion and completely close the tunnel entrances".⁷⁵ On 1 January 2019, the DPRK announced that it "would neither make and test nuclear weapons any longer nor use and proliferate them".⁷⁶

70. Subsequently, on 1 January 2020, General Secretary Kim, when referring to the DPRK "halting its nuclear test and ICBM test-fire and shutting down the nuclear-test ground" stated "there is no ground for us to get unilaterally bound to the commitment any longer".⁷⁷

71. In his report to the Eighth WPK Congress held in January 2021, General Secretary Kim outlined the DPRK's achievements and further plans to develop its nuclear weapons programme. The report stated: "In the period under review the already accumulated nuclear technology developed to such a high degree as to miniaturize, lighten and standardize nuclear weapons and to make them tactical ones and to complete the development of a super-large hydrogen bomb".⁷⁸

72. During the reporting period, at a meeting of the Political Bureau of the Central Committee of the WPK on 19 January 2022, presided over by General Secretary Kim, in reference to the DPRK "halting its nuclear test and ICBM test-fire and shutting down the nuclear-test ground"⁷⁹ the Political Bureau "gave an instruction to a sector concerned to reconsider in an overall scale the trust-building measures that we took on our own initiative on a preferential ground and to promptly examine the issue of restarting all temporarily-suspended activities".⁸⁰

73. Furthermore, during a speech on 25 April 2022, General Secretary Kim said, inter alia, "The nuclear forces, the symbol of our national strength and the core of our military power, should be strengthened in terms of both quality and scale, so that they can perform nuclear combat capabilities in

⁷³ 'On Report Made by Supreme Leader Kim Jong Un at 8th Party Congress of WPK', KCNA, 9 January 2021.

⁷⁴ 'Kim Jong Un Makes New Year Address', KCNA, 1 January 2018.

⁷⁵ GOV/2018/34-GC(62)/12, para. 9.

⁷⁶ GOV/2019/33-GC(63)/20, para. 7.

⁷⁷ GOV/2020/42-GC(64)/18, para. 8.

⁷⁸ 'On Report Made by Supreme Leader Kim Jong Un at 8th Party Congress of WPK', KCNA, 9 January 2021.

⁷⁹ GOV/2020/42-GC(64)/18, para. 8.

⁸⁰ '6th Political Bureau Meeting of 8th C.C., WPK Held', KCNA, 20 January 2022.

any situations of warfare, according to purposes and missions of different operations and by various means”.⁸¹

74. In early-March 2022, excavation work commenced near Adit 3 at the nuclear test site located near the settlement of Punggye-ri, to reopen the test tunnel after its partial demolition in May 2018. Excavation work at Adit 3 was possibly completed by May 2022.⁸² Several timber support buildings were constructed concurrently near the entrance to Adit 3, and also in the support area located to the north.⁸³ The Agency observed work during June 2022 to shore up portions of the washed-out road that led from the support area to Adit 4 and Adit 2. After several weeks of inactivity, the road construction had resumed by late-August 2022.

C.10. Nuclear Assistance to Other States

75. As previously reported, the Agency has been provided with information alleging that the installation at the Dair Alzour site in the Syrian Arab Republic, which was destroyed in September 2007, and which was very likely to have been a nuclear reactor had been built with the assistance of the DPRK.⁸⁴

76. As previously reported, the Agency has assessed that it was very likely that natural UF₆ provided to the Socialist People’s Libyan Arab Jamahiriya prior to 2001, originated in the DPRK.⁸⁵

D. Agency Readiness Activities

77. Once a political agreement has been reached among the countries concerned, the Agency is ready to return promptly to the DPRK, if requested to do so by the DPRK and subject to approval by the Board of Governors. As previously reported, a DPRK Team was formed within the Department of Safeguards in August 2017 to enhance the Agency’s readiness to play its essential role in verifying the DPRK’s nuclear programme.⁸⁶ In September 2021, the DPRK Team was formalized as an organizational unit within the Division of Safeguards Operations A. During the reporting period, the Agency has continued to maintain its enhanced readiness to return to the DPRK and has undertaken, inter alia, the following activities:

- a. Continued and further refined its collection and analysis of safeguards relevant open source information on the DPRK’s nuclear programme.
- b. Increased its collection and analysis of a wide range of high-resolution commercial satellite imagery, both optical and radar, to monitor the DPRK’s nuclear programme.

⁸¹ ‘Respected Comrade Kim Jong Un Makes Speech at Military Parade Held in Celebration of 90th Founding Anniversary of KPRA’, KCNA, 26 April 2022.

⁸² IAEA Director General’s Introductory Statement to the Board of Governors, 6 June 2022.

⁸³ The adit numbering is taken from a presentation given by the DPRK to journalists at the ceremony for dismantling the northern nuclear test ground on 24 May 2018.

⁸⁴ GOV/2011/53-GC(55)/24, para. 49.

⁸⁵ GOV/2011/53-GC(55)/24, para. 50.

⁸⁶ GOV/2017/36-GC(61)/21, para. 12.

- c. Maintained equipment and supplies necessary to ensure that the Agency is prepared to promptly initiate verification and monitoring activities in the DPRK.
- d. Held training seminars to update staff on recent developments in the DPRK relevant to the nuclear programme.
- e. Continued to document the Agency's knowledge of the DPRK's nuclear programme, including through 3D modelling of facilities, information integration using a geospatial information system (GIS), and knowledge management activities, to ensure the Agency's experience from past activities in the DPRK is preserved and accessible.

78. All of these efforts related to the Agency's enhanced readiness have been conducted within available resources, including extrabudgetary contributions from a number of Member States.⁸⁷

E. Summary

79. Since 1994, the Agency has not been able to conduct all necessary safeguards activities provided for in the NPT Safeguards Agreement and since April 2009, Agency inspectors have not been present in the DPRK.

80. During the reporting period, there were indications consistent with the operation of the 5MW(e) Reactor, operation of the reported centrifuge enrichment facility at Yongbyon and activities at the Kangson complex. The cooling system of the LWR was tested again. New activities took place at Yongbyon, including building an annex to the reported centrifuge enrichment facility and constructing new buildings near the LWR, while older buildings were dismantled and building materials removed. At the nuclear test site near Punggye-ri, there were indications that the DPRK has reopened Adit 3 and built several new support buildings.

81. The DPRK's nuclear activities continue to be a cause for serious concern. The reopening of the nuclear test site is deeply troubling, as is the expansion of the reported centrifuge enrichment facility and the continued operation of the 5MW(e) reactor and other facilities. The continuation of the DPRK's nuclear programme is a clear violation of relevant UN Security Council resolutions and is deeply regrettable.

82. The Director General continues to call upon the DPRK to comply fully with its obligations under relevant UN Security Council resolutions, to cooperate promptly with the Agency in the full and effective implementation of its NPT Safeguards Agreement and to resolve all outstanding issues, especially those that have arisen during the absence of Agency inspectors from the DPRK.

83. The Agency continues to maintain its enhanced readiness to return to the DPRK and to strengthen its ability to play its essential role in verifying the DPRK's nuclear programme.

⁸⁷ All commercial satellite imagery of the DPRK, and equipment and supplies procured for possible verification and monitoring activities in the DPRK, have been purchased with extrabudgetary contributions from Member States.

Annex 1: Nuclear Facilities and Locations Outside Facilities (LOFs) Declared by the DPRK

Facility	INFCIRC/252 (Item-specific safeguards agreement)	INFCIRC/403 (NPT Safeguards Agreement)	Covered by the freeze under the Agreed Framework	Monitoring and verification in the connection with the Initial Actions agreed by the Six Parties	Last Agency access to Facility/LOFs	Paragraph Reference
IRT Research Reactor	Y	Y	N	N	19 December 2002	41
Critical Facility	Y (as part of IRT Research Reactor)	Y	N	N	20 December 2002	Footnote 2
Sub-Critical Assembly	N	Y	N	N	26 December 2022	Footnote 5
Yongbyon Nuclear Fuel Rod Fabrication Plant	N	Y	Y	Y	15 April 2009	19
Yongbyon Nuclear Fuel Rod Storage	N	Y	N	Y	15 April 2009	Footnote 5
Yongbyon Experimental Nuclear Power Plant (5MW(e))	N	Y	Y	Y	15 April 2009	48
Radiochemical Laboratory	N	Y	Y	Y	15 April 2009	57
Yongbyon Nuclear Power Plant (50MW(e))	N	Y	Y	Y	25 February 2009	55
Taechon Nuclear Power Plant (200MW(e))	N	Y	Y	Y	10 December 2008	55
Locations Outside Facilities	N	Y	N	N	16 August 2002	7

Annex 2: Other Relevant Locations Referred to in the Report

Name	Paragraph Reference	Comments
Wolbisan Uranium Mine	16	Included in an appendix to the DPRK's initial report to the Agency in May 1992.
Pyongsan Uranium Mine	16	Included in an appendix to the DPRK's initial report to the Agency in May 1992.
Pakchon Uranium Concentrate Pilot Plant	16	Included in an appendix to the DPRK's initial report to the Agency in May 1992.
Pyongsan Uranium Concentrate Plant	16	Included in an appendix to the DPRK's initial report to the Agency in May 1992.
Isotope Production Laboratory (IPL) at Yongbyon	42	The IPL was not included in the inventory under INFCIRC/252 nor declared under the NPT Safeguards Agreement (INFCIRC/403).
Reported Centrifuge Enrichment Facility at Yongbyon	35	First reported in GOV/2011/53-GC(55)/24.
Light Water Reactor at Yongbyon	44	First reported in GOV/2011/53-GC(55)/24.
Kangson Complex	39	First reported in GOV/2018/34-GC(62)/12.
Punggye-ri Nuclear Test Site	69	Referred to by the DPRK as the "northern nuclear test site." First reported in IAEA Director General's Introductory Statement to the Board of Governors, 6 June 2022.