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

*Report by the Director General*

## **A. Introduction**

1. This report of the Director General to the Board of Governors and the General Conference is on the application of safeguards in the Democratic People's Republic of Korea (DPRK). It provides a historical overview and update on those recent developments of direct relevance to the Agency, along with information on the DPRK's nuclear programme and an Annex listing the nuclear facilities and locations outside facilities (LOFs) declared to the Agency by the DPRK.

## **B. Overview of Safeguards Agreements and their Implementation**

2. The DPRK became a member of the Agency on 18 September 1974.<sup>1</sup> In July 1977, 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). Under this item-specific safeguards agreement, safeguards were applied by the Agency to two nuclear research facilities in Yongbyon:<sup>2</sup> the IRT Research Reactor and a Critical Assembly.

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<sup>1</sup> INFCIRC/2/Rev.43 (1994).

<sup>2</sup> Also known as Nyongbyon.

3. On 12 December 1985, the DPRK acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). However, the required Agreement between the DPRK and the Agency for the Application of Safeguards in Connection with the NPT (hereinafter referred to as the "Safeguards Agreement"), based on INFCIRC/153 (Corrected), entered into force only on 10 April 1992 (INFCIRC/403). As provided for in Article 23 of the Safeguards Agreement, the application of safeguards under the earlier safeguards agreement (INFCIRC/252) is suspended while the Safeguards Agreement is in force. On 4 May 1992, the DPRK submitted to the Agency an initial report on nuclear material subject to safeguards and provided design information on its nuclear facilities to the Agency. In the same month, the Agency began carrying out ad hoc inspections to verify the correctness and completeness of the information provided by the DPRK.<sup>3</sup>

4. Analysis of information gathered and samples taken during six ad hoc inspections, carried out by the Agency between May 1992 and February 1993, revealed inconsistencies between the DPRK's declarations and the Agency's findings. Measurements and analyses by the Agency led to the conclusion that the separated plutonium product and the waste that the DPRK presented for verification did not originate from the same irradiated nuclear material or from the same reprocessing activity as had been declared by the DPRK, indicating that more plutonium than that declared by the DPRK had been recovered. The Agency, therefore, could not confirm the correctness and completeness of the DPRK's initial report on nuclear material subject to safeguards.

5. On 9 February 1993, the Director General requested the DPRK, pursuant to the provisions for special inspections in Articles 73 (b) and 77 of the Safeguards Agreement, to provide access to specific additional information and to two locations where the Agency had reason to believe there existed nuclear waste of safeguards relevance. In response to that request, the DPRK agreed to continue discussions about inconsistencies, but declined to grant the Agency access to the additional locations. On 25 February 1993, the Board of Governors adopted resolution GOV/2636 in which, inter alia, it decided that access to the additional information and locations was essential and urgent in order to resolve differences and to ensure verification of compliance with INFCIRC/403, and called upon the DPRK urgently to extend full cooperation to the Agency to enable it to fully discharge its responsibilities under the Safeguards Agreement. On 26 February 1993, the Director General again requested that the DPRK agree to receive an inspection mission to the waste locations.

6. On 12 March 1993, the DPRK notified the President of the United Nations Security Council of its decision to withdraw from the NPT.<sup>4</sup> On the same date, the Director General wrote to the DPRK advising it that the Safeguards Agreement remained in force until withdrawal from the NPT took effect, and that a declaration of intention to withdraw from the NPT should not impede the implementation of the Safeguards Agreement.<sup>5</sup>

7. On 16 March 1993, in its reply to the Director General's request of 26 February 1993, the DPRK stated that, on the grounds that the locations to be inspected were non-nuclear and military, it could not receive the Agency inspection team. On 18 March 1993, the Board of Governors adopted resolution GOV/2639, in which, inter alia, it confirmed that the Safeguards Agreement remained in force and that it was essential and urgent that the DPRK enable the Agency to take the necessary measures to resolve differences and to ensure verification of compliance with the Safeguards Agreement. In his report to the Board of Governors on 30 March 1993, the Director General stated that because it continued to deny access both to the additional information and to the locations as requested by the Director General and determined by the Board of

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<sup>3</sup> The Report by the Director General on the Implementation of the Agreement between the Government of the Democratic People's Republic of Korea and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (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.

<sup>4</sup> S/25405 (1993).

<sup>5</sup> GOV/INF/683 (1993), Annex 5.

Governors, the DPRK continued to be in non-compliance with its general obligation to cooperate in the implementation of its Safeguards Agreement. As a result, the Agency was unable to verify that there had been no diversion of nuclear material required to be safeguarded under the Safeguards Agreement to nuclear weapons or nuclear explosive devices.<sup>6</sup>

8. On 1 April 1993, the Board of Governors adopted a further resolution<sup>7</sup> in which, *inter alia*, it found, pursuant to Article 19 of the Safeguards Agreement, that the Agency was not able to verify that there had been no diversion of nuclear material required to be safeguarded under the terms of the Safeguards 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 Members of the Agency, to the Security Council and to the General Assembly of the United Nations.

9. On 6 April 1993, as required in Article XII.C of the Agency's Statute, and in accordance with Article 19 of the Safeguards Agreement, the Director General, on behalf of the Board of Governors, reported the DPRK's non-compliance with its Safeguards Agreement to the Security Council. The Security Council adopted resolution 825 (1993) calling upon the DPRK to reconsider its decision to withdraw from the NPT and to comply with its Safeguards Agreement. On 11 June 1993, one day before the DPRK's withdrawal from the NPT was to have come into effect, in a Joint Statement with the USA, the DPRK stated that it had "decided unilaterally to suspend as long as it considered necessary the effectuation of its withdrawal from the Treaty on the Non-Proliferation of Nuclear Weapons". The Joint Statement also noted that the DPRK and the USA had agreed to principles which included the "impartial application of full-scope safeguards".<sup>8</sup> Between May 1993 and March 1994 the Agency performed limited safeguards activities in the DPRK related to technical work and the maintenance of containment and surveillance systems.<sup>9</sup>

10. On 7 May 1994, the DPRK began discharging irradiated fuel rods from the 5 MW(e) Experimental Nuclear Power Plant without allowing the Agency to perform certain verification activities that would have provided information on the core history and, hence, on the correctness and completeness of the DPRK's initial report. The Board of Governors reported the matter to the Security Council, which, on 30 May 1994, urged the DPRK to proceed with the discharge operation in accordance with the Agency's requirements.<sup>10</sup>

11. The DPRK refused to comply with the request of the Agency and the Security Council, and continued the core discharge until its completion on 21 June 1994.

12. On 10 June 1994, the Board of Governors adopted resolution GOV/2742 in which, *inter alia*, it deplored the DPRK's failure to implement essential elements of Board of Governors and General Conference resolutions and found the DPRK to be continuing to widen its non-compliance with its Safeguards Agreement. The Board of Governors decided, in conformity with the provisions of Article XII.C of the Statute of the Agency, to suspend non-medical Agency assistance to the DPRK.

13. On 15 June 1994, the USA, as the depository of the Statute of the Agency, notified the Agency that the DPRK had decided to withdraw from the Agency with effect from 13 June 1994.<sup>11</sup> As indicated in the Director General's report to the Board of Governors on 9 September 1994 (GOV/2687/Add.8), the DPRK's withdrawal from Agency membership did not affect the validity of the Safeguards Agreement, which remained in force.

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<sup>6</sup> GOV/2643 (1993), para. 12.

<sup>7</sup> GOV/2645 (1993).

<sup>8</sup> Joint Statement of the DPRK and the USA, New York, 11 June 1993.

<sup>9</sup> GOV/INF/718 (1993); GOV/2687/Add.4 (1994).

<sup>10</sup> GOV/INF/748 (1994); S/PRST/1994/28 (1994).

<sup>11</sup> GOV/INF/748 (1994).

## C. Monitoring Activities under the Agreed Framework

14. The Agreed Framework between the USA and the DPRK, signed on 21 October 1994 (INFCIRC/457), envisaged specific functions for the Agency, notably to monitor a “freeze on the DPRK graphite-moderated reactors and related facilities”; to continue with verification activities at facilities not covered by the freeze; and to take measures required with a view to “verifying the accuracy and completeness of the DPRK’s initial report on all nuclear material in the DPRK”.<sup>12</sup> On 25 October 1994, the Director General informed the Members of the Agency, and on 28 October 1994 the Members of the Security Council, that the Agreed Framework could not replace, supersede or detract from the Safeguards Agreement.

15. On 4 November 1994, the President of the Security Council issued a Statement in which, inter alia, the Security Council requested the Agency to take all steps it may deem necessary as a consequence of the Agreed Framework to monitor the freeze and to continue to report to the Security Council on the implementation of the Safeguards Agreement until the DPRK had come into full compliance with that Agreement.<sup>13</sup>

16. In November 1994, having been authorized by the Board of Governors to act upon the Security Council’s request and in accordance with the Agreed Framework, the Agency began to monitor the freeze at five facilities: the 5 MW(e) Experimental Nuclear Power Plant, the Nuclear Fuel Rod Fabrication Plant, the Radiochemical Laboratory (Reprocessing Plant), the 50 MW(e) Nuclear Power Plant, and the 200 MW(e) Nuclear Power Plant. Monitoring of the freeze, as requested by the Security Council and as understood by the Agency, would have also been performed by the Agency in the course of implementing safeguards in the DPRK.<sup>14</sup> Although the DPRK accepted a number of verification measures requested by the Agency, it did not agree to certain others, such as the taking of samples and some non-destructive analysis measurements. Nor did the DPRK submit accounting reports to the Agency for those facilities covered by the freeze. The Agency continued to implement safeguards under the Safeguards Agreement at four other facilities<sup>15</sup> and the LOFs, which were not covered by the freeze.

17. From May 1994 to December 2002, the Agency maintained a continuous inspector presence at the Yongbyon site, conducted inspections at the IRT Research Reactor, the Critical Assembly, the Sub-Critical Assembly, and at the Nuclear Fuel Rod Storage Facility, in accordance with the Safeguards Agreement, and implemented safeguards measures required to monitor the freeze on the DPRK’s graphite-moderated reactors and related facilities.

18. On 12 December 2002, following allegations by the USA that there was a uranium enrichment programme in the DPRK, the DPRK announced that it was lifting the freeze on nuclear facilities under the Agreed Framework and requested the Agency to take the necessary measures to remove all its seals and surveillance equipment. On 21 December 2002, the DPRK began cutting seals and impeding the functioning of surveillance equipment. On 31 December 2002, following a request from the DPRK, the Agency’s inspectors departed the DPRK.

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<sup>12</sup> GOV/2687/Add.9 (1994), para. 3.

<sup>13</sup> S/PRST/1994/64 (1994).

<sup>14</sup> GOV/2687/Add.9, para. 6: “The Agency understanding of the freeze to which the Agreed Framework and the Statement by the President of the Security Council refer is that there will be no operations at the facilities covered by the freeze and no construction work of any kind, either at existing facilities or new, related facilities”.

<sup>15</sup> Facilities not subject to the freeze were the IRT Research Reactor, the Critical Assembly, the Sub-Critical Assembly and the Nuclear Fuel Rod Storage Facility.

19. In a letter to the President of the Security Council dated 10 January 2003,<sup>16</sup> 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.

20. During January and February 2003, the Board of Governors adopted two resolutions<sup>17</sup> in which, inter alia, it deplored in the strongest terms the expulsion of the inspectors from the DPRK, reiterated previous calls on the DPRK to comply promptly and fully with its Safeguards Agreement, which remained binding and in force, and called upon the DPRK to cooperate urgently and fully with the Agency by enabling the Agency to verify that all nuclear material in the DPRK is declared and is subject to safeguards. In resolution GOV/2003/14, the Board of Governors decided to report, as required in Article XII.C of the Statute, through the Director General, the DPRK's non-compliance and the Agency's inability to verify non-diversion of nuclear material subject to safeguards, to all members of the Agency and to the Security Council and General Assembly of the United Nations.<sup>18</sup>

## **D. Six-Party Talks and Agency activities in the DPRK**

21. In August 2003, the first round of Six-Party Talks took place involving the People's Republic of China, the DPRK, Japan, the Republic of Korea, the Russian Federation and the USA, with the aim of finding a peaceful resolution to security concerns in the Korean Peninsula region.<sup>19</sup> On 19 September 2005, the Six Parties 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 in exchange for economic and security guarantees.<sup>20</sup>

22. On 9 October 2006, the DPRK reported that it had conducted a test of a nuclear explosive device.<sup>21</sup> Thereafter, the Security Council, acting under Chapter VII of the United Nations Charter, adopted resolution 1718 (2006), in which, inter alia: it demanded that the DPRK return to the NPT and Agency safeguards; and decided that the DPRK shall abandon all nuclear weapons and existing nuclear programmes in a complete, verifiable and irreversible manner and immediately cease all related activities, act strictly in accordance with the obligations applicable to parties under the NPT and the terms and conditions of its Safeguards Agreement and 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.

23. 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

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<sup>16</sup> S/2003/91 (2003).

<sup>17</sup> GOV/2003/3 (2003); GOV/2003/14 (2003).

<sup>18</sup> As indicated by the Director General in his statement to the Board on 2 June 2008. 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).

<sup>19</sup> The Agency is not party to the Six-Party Talks.

<sup>20</sup> GOV/INF/2007/14 (2007).

<sup>21</sup> 'DPRK Successfully Conducts Underground Nuclear Test', Korean Central News Agency (KCNA), 9 October 2006.

facility, and invite back Agency personnel to conduct all necessary monitoring and verification as agreed between the IAEA and the DPRK".<sup>22</sup> 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.<sup>23</sup> The monitoring and verification arrangement agreed between the DPRK and Agency did not include the accounting for, or verification of, nuclear material. While monitoring and verifying the status of shut down or sealed facilities, the Agency was able to observe and document the disabling work. On 17 July 2007, the Agency confirmed the shutdown status of the facilities subject to the arrangement.<sup>24</sup>

24. On 14 April 2009, subsequent to the Security Council's condemnation<sup>25</sup> of the DPRK's rocket launch,<sup>26</sup> the DPRK informed the Agency inspectors at Yongbyon that it had decided: to cease all cooperation immediately with the Agency; to request Agency personnel at the site to remove all Agency containment and surveillance equipment from the facilities; not to allow Agency inspectors access to the facilities thereafter; and that the inspectors should leave the DPRK at the earliest possible time. The DPRK also informed the inspectors that it had decided to reactivate all facilities and to go ahead with the reprocessing of spent fuel.<sup>27</sup>

25. On 15 April 2009, the Agency inspectors at Yongbyon removed all Agency seals, switched off the surveillance cameras and departed the DPRK the following day.<sup>28</sup> As a result, since then the Agency has not been able to carry out any verification activities in the DPRK.

26. On 25 May 2009, the DPRK reported that a successful nuclear test had been conducted on the same day.<sup>29</sup> Thereafter, the Security Council, acting under Chapter VII of the United Nations Charter, adopted resolution 1874 (2009), in which, inter alia, it reaffirmed the requirements of resolution 1718 (2006) as noted in paragraph 22 above.

## **E. Other Information on the DPRK's Nuclear Programme**

27. As the Agency is no longer able to carry out verification activities in the DPRK, its knowledge of the DPRK's nuclear programme is limited. Nevertheless, this section summarizes what the Agency does know about elements of that programme, based on its previous experience in the DPRK and evaluation of other sources of information, including satellite imagery analysis of the DPRK's nuclear facilities. It is important for the Agency to remain cognizant of this programme to the fullest extent possible, especially in light of the General Conference's encouragement to the Secretariat to maintain the capability to re-establish the implementation of safeguards-related activities in the DPRK.<sup>30</sup>

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<sup>22</sup> GOV/INF/2007/6 (2007).

<sup>23</sup> GOV/2007/36 (2007).

<sup>24</sup> Specifically, the Nuclear Fuel Rod Fabrication Plant, the Radiochemical Laboratory (the reprocessing plant), the 5 MW(e) Experimental Nuclear Power Plant and the 50 MW(e) Nuclear Power Plant, all located at Yongbyon, and the 200 MW(e) Nuclear Power Plant, located at Taechon.

<sup>25</sup> S/PRST/2009/7 (2009).

<sup>26</sup> 'KCNA on DPRK's Successful Launch of Satellite Kwangmyongsong-2', KCNA, 5 April 2009.

<sup>27</sup> GOV/INF/2009/5 (2009).

<sup>28</sup> GOV/INF/2009/6 (2009).

<sup>29</sup> 'KCNA Report on One More Successful Underground Nuclear Test', KCNA, 25 May 2009.

<sup>30</sup> GC(54)/RES/12 (2010), para. 8.

## **E.1. Mining and Milling**

28. In an appendix to its initial report to the Agency in May 1992,<sup>31</sup> the DPRK included two uranium mines (Wolbisan Uranium Mine, Pyongsan Uranium Mine) and two uranium concentration plants (Pakchon Uranium Concentrate Pilot Plant, Pyongsan Uranium Concentrate Plant). On 14 May 1992, the Director General visited the Pakchon Uranium Concentrate Pilot Plant and the Pyongsan Uranium Concentration Plant: the latter was observed to be in operation at the time of that visit. The Agency has not visited these locations since 1992, but through satellite imagery continues to monitor them along with locations of alleged uranium mines and/or concentration plants.

## **E.2. Conversion**

29. The DPRK has declared that it operated a pilot fuel fabrication plant from 1983 until 1986, at which time it was decommissioned. The plant was not under Agency safeguards and the Agency was informed that all operating records had been destroyed in 1991 prior to the entry into force of the Safeguards Agreement. Conversion of UO<sub>2</sub> to UF<sub>4</sub> and to metal was carried out at the Nuclear Fuel Rod Fabrication Plant at Yongbyon from 1990 to 1994. Several buildings of this plant were covered by the freeze under the Agreed Framework. Some of the key components of the uranium metal fuel fabrication line were removed from the buildings prior to the freeze. The remaining equipment and buildings of the line were in poor condition and deteriorated further during the freeze. In July 2007, the Agency, for the first time, observed a small scale research and development (R&D) UF<sub>4</sub> conversion apparatus using a dry process.

## **E.3. Enrichment**

30. On 16 October 2002, the USA reported that DPRK officials had acknowledged the existence of a uranium enrichment programme.<sup>32</sup> The DPRK denied the report in August 2003.<sup>33</sup> 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,<sup>34</sup> but received no response. On 29 November 2002, the Board of Governors adopted resolution GOV/2002/60 in which, inter alia, it noted with extreme concern reports of an unsafeguarded DPRK uranium enrichment programme and urged the DPRK to provide all relevant information concerning the reported uranium enrichment programme, and other relevant nuclear fuel cycle facilities, and to cooperate with the Agency with a view to opening immediately all relevant facilities to Agency inspection and safeguards, as required under the Safeguards Agreement. However, the DPRK has not provided the Agency with any information or clarifications concerning its 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. Contrary to the requirements of Security Council resolutions 1718 (2006) and 1874 (2009), the DPRK has not abandoned its existing nuclear programme in a complete, verifiable and irreversible manner or ceased all related activities.

31. On 29 April 2009, in response to the Security Council's Presidential Statement of 24 April 2009, the DPRK reportedly stated that it would "make a decision to build a light water reactor power plant and start the technological development for ensuring self-production of nuclear fuel as its first process without delay".<sup>35</sup>

32. On 13 June 2009, following the adoption of Security Council resolution 1874 (2009), the DPRK Ministry of Foreign Affairs announced that uranium enrichment would commence on an experimental

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<sup>31</sup> Appendix No. 4, 'List of Nuclear Facilities Related to Nuclear Industry', letter of Choi Hak Gun, Minister of Atomic Energy of the DPRK to IAEA Director General, 1 May 1992.

<sup>32</sup> 'North Korean Nuclear Program', US State Department Press Release, 16 October 2002.

<sup>33</sup> 'Keynote Speeches Made at Six-way talks', KCNA, 29 August 2003.

<sup>34</sup> GOV/OR.1058 (2002), para. 10.

<sup>35</sup> 'UNSC Urged to Retract Anti-DPRK Steps', KCNA, 29 April 2009.

basis,<sup>36</sup> and on 4 September 2009, the DPRK's Permanent Representative to the United Nations stated that "experimental uranium enrichment has successfully been conducted to enter into completion phase".<sup>37</sup>

33. At the invitation of the DPRK, a small group of individuals visited the DPRK and were shown what appeared to be a centrifuge enrichment facility at the Yongbyon site on 12 November 2010. The group reported that it was told that construction of the centrifuge facility had started in April 2009, immediately after the expulsion of the Agency inspectors. According to the group's observations and its discussions with DPRK officials during the visit, the enrichment facility contained approximately 2000 centrifuges arranged in six cascades with a capacity of 8000 separative work units (SWU) per year. The group was told by the DPRK officials, that the facility was operating and was configured to produce low enriched uranium (LEU).<sup>38</sup>

34. The Agency interviewed Dr Siegfried Hecker, a member of the group who visited the centrifuge enrichment plant, and conducted a technical review of his observations. The construction and renovation activity necessary to establish the centrifuge enrichment facility, located in Building 4 of the Nuclear Fuel Rod Fabrication Plant, took place after the departure of Agency inspectors on 15 April 2009. The layout of the centrifuge cascade and the size of the centrifuge casings observed by the group were broadly consistent with a design which has been disseminated through a clandestine supply network. However, as the Agency has no design information and no access to the facility in order to conduct design information verification, the configuration and operational status of the enrichment facility observed by the group cannot be confirmed by the Agency.

35. Information available to the Agency indicates that some of the technology and information required for a uranium enrichment programme was acquired through the same clandestine supply network referred to below (paragraph 50), and that the DPRK has attempted to procure from a wide range of suppliers material and equipment suitable for use within an enrichment programme, such as vacuum components, electronic equipment and dual-use, computer numerically controlled machine tools.

#### **E.4. Light Water Reactors**

36. A project to construct two 1000 MW(e) light water reactors (LWRs) at Kumho, DPRK, initiated under the terms of the Agreed Framework, was terminated by the Korea Energy Development Organization (KEDO) on 31 May 2006.<sup>39</sup> At the time of the project's termination, some civil engineering work had already been carried out.

37. In November 2010, at the Yongbyon site, two visiting groups<sup>40</sup> were shown what was described by DPRK officials as a prototype LWR under construction, the design capacity of which was approximately 100 MW(th) utilizing LEU fuel enriched to 3.5% U-235. The Agency is monitoring its construction through satellite imagery.

#### **E.5. Graphite Reactors**

38. According to the DPRK's declarations, construction of the 5 MW(e) Experimental Nuclear Power Plant began in 1979 and the initial core loading took place in 1985. As noted above, the facility was subject to the freeze between 1994 and 2002. Under the monitoring and verification arrangement agreed as a result of the

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<sup>36</sup> 'DPRK Foreign Ministry Declares Strong Counter-Measures against UNSC's "Resolution 1874"', KCNA, 13 June 2009.

<sup>37</sup> 'DPRK Permanent Representative Sends Letter to President of UNSC', KCNA, 4 September 2009.

<sup>38</sup> Siegfried Hecker, 'A Return Trip to North Korea's Yongbyon Nuclear Complex', Center for International Security and Cooperation, Stanford University, 20 November 2010.

<sup>39</sup> 'About Us: Our History', KEDO website, [http://www.kedo.org/au\\_history.asp](http://www.kedo.org/au_history.asp).

<sup>40</sup> These two groups were: the aforementioned group containing Dr Hecker and another small group of individuals led by Jack Pritchard of the Korea Economic Institute.

Six-Party Talks, the facility was shutdown in July 2007, and in June 2008 its cooling tower was demolished as part of the disablement process. The Agency's satellite imagery analysis does not indicate any reconstruction of the cooling tower and the facility appears to remain shut down.

39. The 50 MW(e) Nuclear Power Plant at Yongbyon and the 200 MW(e) Nuclear Power Plant at Taechon were under construction at the time the freeze was initiated in 1994 and construction has not been resumed. Dr. Hecker reported that the 50 MW(e) Nuclear Power Plant was "being dismantled with large cranes" during his visit in November 2010. The Agency continues to monitor these facilities via satellite imagery.

## **E.6. Reprocessing**

40. Based on information provided by the DPRK in 1992, the DPRK carried out reprocessing activities at the Radiochemical Laboratory which led to the separation of a limited amount of plutonium prior to the entry into force of its Safeguards Agreement. The DPRK declared that only one campaign involving the reprocessing of irradiated fuel had been carried out, which took place in 1990.<sup>41</sup> Apparent inconsistencies relating to separated plutonium, product and waste led to the Agency's request for access to specific additional information and locations referred to in Section B above: these issues have yet to be resolved. During the inspections carried out between 1992 and 1994, and monitoring between 1994 and 2002 (the period of the Agreed Framework), no further reprocessing of irradiated fuel occurred at the Radiochemical Laboratory.

41. Following the breakdown of the Agreed Framework, the DPRK announced that reprocessing of the 8000 spent fuel rods had been completed by the end of June 2003, and that it had "made a switchover in the use of plutonium obtained in the course of reprocessing those spent fuel rods in the direction of increasing its nuclear deterrent force".<sup>42</sup> Between June and October 2005, a further reprocessing campaign was reportedly conducted of 8000 spent fuel rods discharged from the 5 MW(e) Experimental Nuclear Power Plant in April 2005.<sup>43</sup>

42. Following the return of Agency inspectors to the DPRK in July 2007, the Agency was able to confirm that no reprocessing activities were performed at the Radiochemical Laboratory between July 2007 and April 2009.

43. In July 2007, the Agency noted that design changes had been made at the Radiochemical Laboratory. These included the installation of a pulse column for plutonium-uranium co-extraction and equipment for the conversion of PuO<sub>2</sub> to plutonium metal. The plutonium metal line at the facility included fluorination, reduction and casting, but no further treatment of metal, which was stated by the DPRK to have taken place elsewhere. The Agency was not given access to such material following its return to the DPRK in July 2007.<sup>44</sup>

44. On 25 April 2009, ten days after the departure of Agency inspectors from Yongbyon, the DPRK announced that it had begun to reprocess the spent fuel rods which had been discharged from the 5 MW(e) Experimental Nuclear Power Plant.<sup>45</sup> The reprocessing was reported to have been completed by the end of August 2009.<sup>46</sup>

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<sup>41</sup> GOV/INF/684, Annex 7 (1993).

<sup>42</sup> 'KCNA Report on Nuclear Activities in DPRK', KCNA, 3 October 2003.

<sup>43</sup> S. Hecker, 'Technical Summary of DPRK Nuclear Programme', PowerPoint Presentation, Carnegie International Non-Proliferation Conference, Washington D.C., 8 November 2005.

<sup>44</sup> During his visit to the Radiochemical Laboratory in January 2004, Dr. Hecker was shown a sample, said by the DPRK to be, of plutonium metal. Dr. Hecker reported that visibly the material was consistent with moderately oxidised plutonium metal.

<sup>45</sup> 'Foreign Ministry Spokesman on Reprocessing of Spent Fuel Rods', KCNA, 25 April 2009.

<sup>46</sup> 'DPRK Completes Reprocessing of Spent Fuel Rods,' KCNA, 3 November 2009.

45. Since April 2009, the Agency has not been in a position to confirm any of the activities that may be taking place at the Radiochemical Laboratory, nor is it able to confirm the quantity of separated plutonium produced from earlier reprocessing campaigns.

## **E.7. Weaponization and Nuclear Testing**

46. In recent years, through the use of satellite imagery, the Agency has been monitoring locations that may be relevant to possible nuclear weapon development. However, without access to those locations, it is unable to provide any further technical assessment on the purpose of these locations or the possible use of nuclear material at those locations.

47. As previously stated, in October 2006 and May 2009, the DPRK reportedly conducted two nuclear tests.

48. Although the Agency has no independent information regarding the type of nuclear material used in either of the nuclear tests, the use of plutonium would be consistent with the Agency's knowledge of the DPRK's nuclear capabilities.

## **E.8. Nuclear Assistance to other States**

49. On 2 June 2008, the Director General informed the Board of Governors that the Agency had been provided with information alleging that an installation at the Dair Alzour site in the Syrian Arab Republic, destroyed in September 2007, had been a nuclear reactor. The information further alleged that the reactor was under construction but not operational at the time of its destruction, and that it had been built with the assistance of the DPRK. On 24 May 2011, the Director General informed the Board of Governors that the Agency had assessed that the building destroyed at the Dair Alzour site was very likely to have been a nuclear reactor which should have been declared to the Agency.<sup>47</sup>

50. In December 2003, the Socialist People's Libyan Arab Jamahiriya informed the Agency that it had imported from the same clandestine supply network that had also assisted it with centrifuge enrichment technology and information on weapon design and development, two small cylinders containing UF<sub>6</sub> in September 2000, and one large cylinder containing UF<sub>6</sub> in February 2001.<sup>48</sup> Libya stated that the original agreement with the clandestine network had been for the provision of 20 tonnes of UF<sub>6</sub>.<sup>49</sup> The Agency's sampling and analysis of the UF<sub>6</sub> indicated that one small cylinder contained natural uranium and the other contained depleted uranium; the large cylinder contained natural uranium. The Agency has established the route of transport of the UF<sub>6</sub> cylinders,<sup>50</sup> all three of which were present in the DPRK prior to their transfer to Libya. Although the Agency cannot confirm the origin of the UF<sub>6</sub> in the cylinders, it is very likely that the natural UF<sub>6</sub> in the large cylinder originated in the DPRK, whereas the UF<sub>6</sub> contained in the two small cylinders did not. This would indicate that the DPRK had undeclared conversion capabilities prior to 2001.

## **F. Summary**

51. The Agency has not been able to verify the correctness and completeness of the DPRK's declarations under its Safeguards Agreement concerning nuclear material and facilities. On 1 April 1993, the DPRK was

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<sup>47</sup> GOV/2011/30, para. 33.

<sup>48</sup> GOV/2004/12, para. 14.

<sup>49</sup> GOV/2004/33, para. 20.

<sup>50</sup> GOV/2008/39, Annex, para. 6.

found to be in non-compliance with its Safeguards Agreement. Since 1994, the Agency has not been able to conduct all necessary safeguards activities provided for in the 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.

52. The DPRK has not implemented those measures that are binding upon it pursuant to Security Council resolutions 1718 (2006) and 1874 (2009), which, inter alia: demanded that the DPRK return to the NPT and IAEA safeguards; decided that the DPRK shall abandon all nuclear weapons and existing nuclear programmes in a complete, verifiable and irreversible manner, act strictly in accordance with the obligations applicable to parties under the NPT and the terms and conditions of its Safeguards Agreement and 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.

53. The nuclear programme of the DPRK is a matter of serious concern and reports about the construction of a new uranium enrichment facility and a light water reactor in the DPRK are deeply troubling.

54. The Director General continues to call upon the DPRK to fully comply with its obligations under relevant Security Council resolutions, to come into full compliance with the NPT, to cooperate promptly with the Agency in the full and effective implementation of its Safeguards Agreement, and to resolve any outstanding issues that may have arisen due to the long absence of Agency safeguards. The Agency will continue to maintain its readiness to play an essential role in verifying the DPRK's nuclear programme.



## Annex: Nuclear Facilities and LOFs Declared by the DPRK

Facility	INFCIRC/252 <sup>51</sup>	INFCIRC/403 <sup>52</sup>	Covered by the freeze under the Agreed Framework	Monitoring and verification in connection with the Initial Actions agreed by the Six Parties	Last Agency access to Facility/LOFs
IRT Research Reactor	Y	Y	N	N	19 December 2002
Critical Facility	Y (as part of IRT Research Reactor)	Y	N	N	20 December 2002
Sub-Critical Assembly	N	Y	N	N	26 December 2002
Yongbyon Nuclear Fuel Rod Fabrication Plant	N	Y	Y	Y	15 April 2009
Yongbyon Nuclear Fuel Rod Storage	N	Y	N	Y	15 April 2009
Yongbyon Experimental Nuclear Power Plant (5MW(e))	N	Y	Y	Y	15 April 2009
Radiochemical Laboratory	N	Y	Y	Y	15 April 2009
Yongbyon Nuclear Power Plant (50MW(e))	N	Y	Y	Y	25 February 2009
Taechon Nuclear Power Plant (200 MW(e))	N	Y	Y	Y	10 December 2008
Locations Outside Facilities	N	Y	N	N	16 August 2002

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<sup>51</sup> INFCIRC/66/Rev.2-type safeguards agreement.

<sup>52</sup> INFCIRC/153-type safeguards agreement.