



**IAEA**

Atoms for Peace and Development

**Derestricted 9 June 2021**

*(This document has been derestricted at the meeting of the Board on 9 June 2021)*

# Board of Governors

**GOV/2021/28**

Date: 31 May 2021

Original: English

## **For official use only**

Item 6 of the provisional agenda  
(GOV/2021/24)

# Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council resolution 2231 (2015)

*Report by the Director General*

## **A. Introduction**

1. This report of the Director General to the Board of Governors and, in parallel, to the United Nations Security Council (Security Council), is on the Islamic Republic of Iran's (Iran's) implementation of its nuclear-related commitments under the Joint Comprehensive Plan of Action (JCPOA) and on matters related to verification and monitoring in Iran in light of Security Council resolution 2231 (2015). It also provides information on financial matters, and the Agency's consultations and exchanges of information with the Joint Commission, established by the JCPOA.

## **B. Background**

2. On 14 July 2015, China, France, Germany, the Russian Federation, the United Kingdom, the United States of America,<sup>1</sup> with the High Representative of the European Union for Foreign Affairs and Security Policy (E3/EU+3) and Iran agreed on the JCPOA. On 20 July 2015, the Security Council adopted resolution 2231 (2015), in which, inter alia, it requested the Director General to "undertake the necessary verification and monitoring of Iran's nuclear-related commitments for the full duration of those commitments under the JCPOA" (GOV/2015/53 and Corr.1, para. 8). In August 2015, the Board

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<sup>1</sup> On 8 May 2018, the then President of the United States of America, Donald Trump, announced that the "United States will withdraw from the Iran nuclear deal", 'Remarks by President Trump on the Joint Comprehensive Plan of Action', at: <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-joint-comprehensive-plan-action/>.

of Governors authorized the Director General to implement the necessary verification and monitoring of Iran's nuclear-related commitments as set out in the JCPOA, and report accordingly, for the full duration of those commitments in light of Security Council resolution 2231 (2015), subject to the availability of funds and consistent with the Agency's standard safeguards practices. The Board of Governors also authorized the Agency to consult and exchange information with the Joint Commission, as set out in GOV/2015/53 and Corr.1.

3. In December 2016 and January 2017, the Director General shared with Member States nine documents,<sup>2</sup> developed and endorsed by all participants of the Joint Commission, providing clarifications for the implementation of Iran's nuclear-related measures as set out in the JCPOA for its duration.<sup>3</sup>

4. On 8 May 2019, Iran issued a statement including, inter alia, that "...in implementation of its rights set forth in Paragraph 26 and 36 of the JCPOA, the Supreme National Security Council [of] the Islamic Republic of Iran has issued an order to stop some of Iran's measures under the JCPOA from today".<sup>4</sup>

5. On 5 January 2020, Iran announced that its nuclear programme would no longer be "subject to any restrictions in the operational sphere" and stated that it would continue to cooperate with the Agency "as in the past".<sup>5</sup>

6. On 29 January 2021, Iran informed the Agency that, according to a new law passed by Iran's Parliament,<sup>6</sup> Iran would take certain measures related to the JCPOA, including stopping Agency inspections beyond the Safeguards Agreement.

7. On 11 February 2021, the Director General informed Iran that stopping or limiting the Agency's verification and monitoring activities would have a serious impact on the Agency's ability to report on the implementation of Iran's commitments and undermine the critical confidence in the peaceful nature of Iran's nuclear programme. He added that without the measures currently provided by the Additional Protocol and the JCPOA being implemented, the Agency may be unable to continue to provide factual reports on Iran's nuclear programme or to recover the knowledge necessary to resume such a verification role in future. The Director General stated his willingness to discuss the possibility of a viable framework which would allow the Agency to continue its current verification role and to provide factual and impartial reports, which are essential to all parties, and that such a framework would have to be compatible with the obligations of the Government of Iran under the laws of Iran.<sup>7</sup>

8. On 15 February 2021, Iran informed the Agency that Iran "will stop the implementation of voluntary transparency measures as envisaged in the JCPOA, as of February 23, 2021", as follows:

- "Provisions of the Additional Protocol to the CSA;
- Modified code 3.1 of the subsidiary arrangements to Iran's Safeguards Agreement;
- Use of modern technologies and long term presence of IAEA;
- Transparency measures related to uranium ore concentrate (UOC);
- Transparency measures related to enrichment;

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<sup>2</sup> Reproduced in INFCIRC/907 and INFCIRC/907/Add.1.

<sup>3</sup> GOV/2017/10, para. 3.

<sup>4</sup> Announced by H.E. Dr Hassan Rouhani, President of Iran, at: <http://president.ir/en/109588>.

<sup>5</sup> <http://irangov.ir/detail/332945>.

<sup>6</sup> INFCIRC/953.

<sup>7</sup> GOV/2021/10, para. 7.

- Access pursuant to provisions of the JCPOA;
- Monitoring and Verification of the implementation of the voluntary measures;
- Transparency measures related to centrifuge component manufacturing.”<sup>8</sup>

9. On 16 February 2021, the Director General, inter alia, reminded Iran that implementation of modified Code 3.1 is a legal obligation for Iran under the Subsidiary Arrangements to its Safeguards Agreement which cannot be modified unilaterally and that there is no mechanism in that Agreement for the suspension of implementation of provisions agreed to in the Subsidiary Arrangements.<sup>9</sup>

10. On 21 February 2021, in a Joint Statement by the Vice-President of Iran and Head of the Atomic Energy Organization of Iran, H.E. Ali Akbar Salehi and the Director General, the Agency and Iran reached a temporary bilateral technical understanding,<sup>10</sup> compatible with Iranian law, whereby the Agency would continue with its necessary verification and monitoring activities for up to three months, as set out in a technical annex. Iran and the Agency further agreed, inter alia, to keep the technical understanding under regular review to ensure it continued to achieve its purposes and that Iran would continue to implement fully and without limitation its Safeguards Agreement with the Agency as before.

11. On 24 May 2021, the Director General and Vice-President Salehi agreed that: (i) the information collected by the Agency monitoring equipment covered by the technical understanding would continue to be stored for a further period of one month up to 24 June 2021; and (ii) the equipment would continue to operate and be able to collect and store further data for this period, as provided for in the Joint Statement, dated 21 February 2021.<sup>11</sup> This agreement is to enable the Agency to recover and re-establish the necessary continuity of knowledge.

12. The estimated cost to the Agency for the implementation of Iran’s Additional Protocol and for verifying and monitoring Iran’s nuclear-related commitments as set out in the JCPOA is €9.2 million per annum. For 2021, extrabudgetary funding is necessary for €4.0 million of the €9.2 million.<sup>12</sup> As of 28 May 2021, €4.9 million of extrabudgetary funding had been pledged to meet the cost of JCPOA-related activities for 2021 and beyond.<sup>13,14</sup>

## C. JCPOA Verification and Monitoring Activities

13. Between 16 January 2016 (JCPOA Implementation Day) and 23 February 2021, the Agency verified and monitored Iran’s implementation of its nuclear-related commitments in accordance with the modalities set out in the JCPOA,<sup>15</sup> consistent with the Agency’s standard safeguards practices, and

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<sup>8</sup> GOV/INF/2021/13.

<sup>9</sup> GOV/2021/10, para. 10.

<sup>10</sup> GOV/2021/10, Annex I.

<sup>11</sup> GOV/INF/2021/31, para. 4.

<sup>12</sup> The cost of the provisional application of Iran’s Additional Protocol (€3.0 million) and €2.2 million for the inspector costs related to the verification and monitoring of Iran’s nuclear-related commitments as set out in the JCPOA are being met from the regular budget (GC(63)/2).

<sup>13</sup> This funding meets the cost of JCPOA-related activities until late March 2022.

<sup>14</sup> The cost implications for the Agency of Iran not implementing the Additional Protocol and its nuclear-related commitments under the JCPOA since 23 February 2021 will be assessed in due course.

<sup>15</sup> Including the clarifications referred to in para. 3 of this report.

in an impartial and objective manner.<sup>16,17</sup> Since 23 February 2021, however, the Agency's verification and monitoring activities in relation to the JCPOA have been affected as a result of Iran's decision to stop the implementation of its nuclear-related commitments under the JCPOA, including the Additional Protocol (see paragraph 8 above and Annex I). The Agency reports the following for the period since the issuance of the Director General's quarterly report of 23 February 2021<sup>18</sup> and 12 subsequent updates (see Annex II).

### **C.1. Activities Related to Heavy Water and Reprocessing**

14. Iran has not pursued the construction of the Arak heavy water research reactor (IR-40 Reactor) based on its original design.<sup>19,20,21</sup> Iran has not produced or tested natural uranium pellets, fuel pins or fuel assemblies specifically designed for the support of the IR-40 Reactor as originally designed, and all existing natural uranium pellets and fuel assemblies have remained in storage under continuous monitoring (paras 3 and 10).<sup>22</sup>

15. Since 23 February 2021, Iran has neither informed the Agency about the inventory of heavy water in Iran and the production of heavy water at the Heavy Water Production Plant (HWPP),<sup>23</sup> nor allowed the Agency to monitor the quantities of Iran's heavy water stocks and the amount of heavy water produced at the HWPP (para. 15). While the Agency's monitoring equipment installed at the HWPP has continued to operate, the Agency has not had access to the data and recordings collected by its equipment.<sup>24</sup>

16. Iran has not carried out activities related to reprocessing at the Tehran Research Reactor (TRR) and the Molybdenum, Iodine and Xenon Radioisotope Production (MIX) Facility or at any of the other facilities it has declared to the Agency (paras 18 and 21).<sup>25</sup>

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<sup>16</sup> GOV/2016/8, para. 6.

<sup>17</sup> Note by the Secretariat, 2016/Note 5.

<sup>18</sup> GOV/2020/51.

<sup>19</sup> The calandria was removed from the reactor and rendered inoperable during preparation for Implementation Day and has been retained in Iran (GOV/INF/2016/1, Arak heavy water research reactor, paras 3(ii) and 3(iii)).

<sup>20</sup> As indicated previously (GOV/2017/24, footnote 10), Iran has changed the name of the facility to the Khondab Heavy Water Research Reactor.

<sup>21</sup> On 16 February 2021, the Agency verified that Iran had completed the installation of the refuelling machine (see GOV/2021/10, footnote 17). Iran had indicated previously that this machine was constructed based on the original design and was planned to be adapted to the new design of the reactor (see GOV/2021/41, footnote 17).

<sup>22</sup> Unless otherwise indicated, the paragraph references in parentheses throughout Sections C and D of this report correspond to the paragraphs of 'Annex I – Nuclear-related measures' of the JCPOA.

<sup>23</sup> In June 2017, Iran informed the Agency that the "maximum annual capacity of the Heavy Water Production Plant (HWPP) is 20 Tons". GOV/201/35, footnote 12.

<sup>24</sup> Based on its analysis of commercially available satellite imagery, the Agency assesses that the HWPP has continued to operate during the reporting period.

<sup>25</sup> In an updated DIQ for the MIX Facility, dated 9 May 2021, Iran informed the Agency of its plan to extract caesium from irradiated targets.

## C.2. Activities Related to Enrichment and Fuel

17. Iran has continued the enrichment of UF<sub>6</sub> at the Fuel Enrichment Plant (FEP) and the Pilot Fuel Enrichment Plant (PFEP) at Natanz,<sup>26</sup> and at the Fordow Fuel Enrichment Plant (FFEP) at Fordow.<sup>27</sup> As previously reported, Iran has been enriching UF<sub>6</sub> up to 5% U-235 since 8 July 2019<sup>28</sup> (para. 28), has been enriching UF<sub>6</sub> up to 20% U-235 since 4 January 2021,<sup>29</sup> and has been enriching UF<sub>6</sub> up to 60% U-235 since 17 April 2021.<sup>30</sup> Iran has continued to conduct certain enrichment activities that are not in line with its long-term enrichment and R&D enrichment plan, as provided to the Agency on 16 January 2016 (para. 52).<sup>31</sup>

18. Since 23 February 2021, while centrifuges and associated infrastructure in storage remained under continuous monitoring by Agency surveillance equipment, the Agency has not had access to the data and recordings collected by its equipment (paras 29, 47, 48 and 70).

19. Since 23 February 2021, while the Agency has had regular access to relevant buildings at Fordow and Natanz, including all of FFEP, FEP and PFEP, it has not been able to perform daily access upon request (paras 51 and 71).

### C.2.1. FEP

20. As previously reported, Iran intends to install 19 cascades at FEP – six of IR-2m centrifuges, six of IR-4 centrifuges, six of IR-1 centrifuges and one of IR-6 centrifuges<sup>32</sup> – in addition to the 30 cascades of IR-1 centrifuges, provided for under the JCPOA (para. 27).

21. On 24 May 2021, the Agency verified that 30 cascades of IR-1 centrifuges,<sup>33</sup> six cascades of IR-2m centrifuges and two cascades of IR-4 centrifuges, were installed to enrich natural UF<sub>6</sub> up to 5% U-235 at FEP. The Agency also verified that installation of the remaining four cascades of IR-4 centrifuges, one cascade of IR-6 centrifuges and six cascades of IR-1 centrifuges had yet to begin. On 24 May 2021, the Agency verified that 15 IR-1 cascades, three IR-2m cascades and two IR-4 cascades were being fed with natural UF<sub>6</sub>.

22. Since 23 February 2021, while Agency equipment installed at FEP has continued to monitor any withdrawals by Iran of IR-1 centrifuges from those held in storage (see paragraph 34 below) for the replacement of damaged or failed IR-1 centrifuges installed at FEP, the Agency has not had access to the data and recordings collected by its equipment (para. 29.1).

### C.2.2. PFEP

23. Since the previous quarterly report, Iran, as indicated in an updated design information questionnaire (DIQ) for PFEP, has continued to transfer its enrichment R&D activities to a segregated

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<sup>26</sup> GOV/INF/2019/12, para. 4.

<sup>27</sup> Under the JCPOA, “[f]or 15 years the Natanz enrichment site will be the sole location for all of Iran’s uranium enrichment related activities including safeguarded R&D” (para. 72).

<sup>28</sup> GOV/INF/2019/9, para. 3.

<sup>29</sup> GOV/INF/2021/2, para. 5.

<sup>30</sup> GOV/INF/2021/26, para. 3. According to Iran, fluctuations of the enrichment levels of UF<sub>6</sub> were experienced. This was confirmed by the Agency’s analysis of the environmental samples taken on 22 April 2021, which showed an enrichment level of up to 63% U-235 (see GOV/INF/2021/29, para. 7).

<sup>31</sup> GOV/INF/2019/10, GOV/INF/2019/12, GOV/INF/2019/16, GOV/INF/2020/10 and Section C.3 of this report.

<sup>32</sup> GOV/INF/2020/10, para. 2; GOV/INF/2021/15, para. 2, and GOV/INF/2020/17, para. 2; GOV/INF/2021/19, para. 3, and GOV/INF/2021/27, para. 2; GOV/INF/2021/24, para. 2.

<sup>33</sup> The 5060 IR-1 centrifuges installed in 30 cascades remained in the configurations in the operating units at the time the JCPOA was agreed, as provided for in the JCPOA (para. 27).

area of Building A1000 at FEP, to create a new area of PFEP (paras 27 and 40–42).<sup>34</sup> As previously reported,<sup>35</sup> the Agency verified that Iran has completed installation of sub-headers for 18 cascades for R&D activities in this new, segregated area of PFEP. On 16 May 2021, the Agency verified that there had been limited progress in the installation of the infrastructure for these 18 cascades.

24. The following is reported regarding the R&D activities involving R&D lines 1–6 in the original area of PFEP (paras 32–42):

- **R&D lines 1, 4 and 6:** As previously reported,<sup>36</sup> on 17 April 2021, the Agency verified that Iran had begun the production of UF<sub>6</sub> enriched up to 60% U-235 by feeding UF<sub>6</sub> enriched up to 5% U-235 simultaneously into two cascades of IR-4 centrifuges and IR-6 centrifuges in R&D lines 4 and 6, respectively. The Agency verified that Iran changed this mode of production on 21 April 2021 and changed it again on 10 May 2021.<sup>37,38</sup> On 25 May 2021, the Agency verified that Iran was accumulating uranium enriched up to 60% U-235 from R&D line 6 through feeding UF<sub>6</sub> enriched up to 5% U-235 into a cascade of 164 IR-6 centrifuges to produce UF<sub>6</sub> enriched up to 60% U-235, feeding the tails produced from this cascade into a cascade of 130 IR-4 centrifuges in R&D line 4 to produce UF<sub>6</sub> enriched up to 20% U-235 and feeding the tails produced from this cascade into a cascade of 30 IR-5 and 29 IR-6s centrifuges in R&D line 1 to produce UF<sub>6</sub> enriched up to 5% U-235.<sup>39</sup>
- **R&D lines 2 and 3:** On 25 May 2021, the Agency verified that Iran was continuing to accumulate uranium enriched up to 2% U-235 from R&D lines 2 and 3 through feeding natural UF<sub>6</sub> into cascades of up to: ten IR-4 centrifuges; five IR-5 centrifuges; five IR-6 centrifuges, ten IR-6 centrifuges and another cascade of 18 IR-6 centrifuges; nine IR-6s centrifuges; and ten IR-s centrifuges. The following single centrifuges were being tested with natural UF<sub>6</sub> but not accumulating enriched uranium: one IR-1 centrifuge; two IR-2m centrifuges; two IR-4 centrifuges; two IR-5 centrifuges; two IR-6 centrifuges; one IR-6s centrifuge; one IR-7 centrifuge; one IR-8 centrifuge; one IR-8B centrifuge; and one IR-9 centrifuge.
- **R&D line 5:** On 25 May 2021, the Agency verified that Iran was using an intermediate cascade of 18 IR-1 centrifuges and an intermediate cascade of 32 IR-2m centrifuges in R&D line 5 to produce uranium enriched to below 2% U-235.<sup>40</sup>

### C.2.3. FFEP

25. As previously reported, Iran began to enrich UF<sub>6</sub> (para. 45) in one wing (Unit 2) of the facility in November 2019<sup>41</sup> and, since January 2020, has been using a total of six cascades, containing 1044 IR-1 centrifuges, to enrich UF<sub>6</sub> (para. 46). In January 2021, Iran reconfigured these six cascades as three sets of two interconnected cascades and began feeding UF<sub>6</sub> enriched up to 5% U-235 into the process to start the production of UF<sub>6</sub> enriched up to 20% U-235.<sup>42</sup> Iran then informed the Agency that it planned to use

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<sup>34</sup> GOV/INF/2020/15, para. 2.

<sup>35</sup> GOV/2021/10, para. 22.

<sup>36</sup> GOV/INF/2021/26, para. 3.

<sup>37</sup> GOV/INF/2021/28, para. 3 and GOV/INF/2021/29, para. 3.

<sup>38</sup> Using the mode of production described in GOV/INF/2021/22, para. 4.

<sup>39</sup> Using the mode of production described in GOV/INF/2021/29, para. 3.

<sup>40</sup> R&D line 5 at PFEP is the location where previously a cascade of IR-2m centrifuges had been installed, before it was transferred to FEP (see GOV/2020/51, para. 13).

<sup>41</sup> GOV/2019/55, para. 15.

<sup>42</sup> GOV/INF/2021/2, para.5.

eight cascades to enrich uranium in Unit 2 at FFEP as follows:<sup>43</sup> two cascades of IR-6 centrifuges would be fed with natural UF<sub>6</sub> to produce UF<sub>6</sub> enriched up to 5% U-235 to directly feed the three sets of two interconnected cascades of IR-1 centrifuges to produce UF<sub>6</sub> enriched up to 20% U-235.

26. On 26 May 2021, the Agency verified that Iran was using 1031 IR-1 centrifuges in three sets of two interconnected cascades to enrich uranium up to 20% U-235<sup>44</sup> and that one IR-1 centrifuge was installed in a single position.<sup>45</sup> As previously reported,<sup>46</sup> the Agency verified that installation of sub-headers for the cascades of IR-6 centrifuges had been completed. On 26 May 2021, the Agency verified that ten IR-6 centrifuges were installed in one of the two planned cascades of IR-6 centrifuges.

#### C.2.4. FPPF

27. As previously reported, in December 2020, Iran informed the Agency that it would start R&D activities on the production of uranium metal using natural uranium at the Fuel Plate Fabrication Plant (FPPF) at Esfahan, before moving to produce uranium metal enriched to up to 20% U-235 for fuel for the TRR (paras 24 and 26).<sup>47</sup> Iran also informed the Agency that uranium metal would be produced at the second stage of a three-stage process; that installation of the equipment at FPPF needed for the first stage of the process was expected to be completed in 4-5 months; and that as the other two stages of the process were still in the design phase no timeline was yet available. On 2 February 2021, the Agency verified that Iran had started the production of uranium metal in a laboratory experiment at FPPF using natural UF<sub>4</sub> transferred from the Uranium Conversion Facility (UCF) at Esfahan.<sup>48</sup>

28. On 18 May 2021, the Agency verified that, in laboratory experiments conducted at FPPF, 2.42 kg of natural uranium metal had been produced from 3.1 kg of natural uranium in the form of UF<sub>4</sub> transferred from UCF (paras 24 and 26). From the 2.42 kg of natural uranium metal, 0.85 kg were used to produce 0.54 kg of uranium in the form of uranium silicide, from which two uranium silicide fuel plates were manufactured. The Agency also verified that installation of the equipment for the first stage of the process i.e. production of UF<sub>4</sub> from UF<sub>6</sub>, was ongoing.

29. As previously reported,<sup>49</sup> on 7 April 2021, the Agency verified at FPPF that Iran had dissolved six unirradiated, scrap fuel plates for the TRR containing 0.43 kg of uranium enriched up to 20% U-235, from which a uranyl nitrate solution was extracted and converted into ammonium uranyl carbonate (AUC) (paras 58 and 60).<sup>50</sup>

30. On 15 May 2021, the Agency verified that Iran had dissolved an additional unirradiated, scrap fuel plate for the TRR containing 0.08 kg of uranium enriched up to 20% U-235, from which a uranyl nitrate solution was extracted. This uranyl nitrate solution, along with the AUC referred to in the previous paragraph, were converted into U<sub>3</sub>O<sub>8</sub> powder. According to Iran, this U<sub>3</sub>O<sub>8</sub> powder was to be used to produce enriched uranium targets for irradiation at the TRR for the production of molybdenum at the MIX Facility.

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<sup>43</sup> GOV/INF/2021/9.

<sup>44</sup> GOV/2021/10, para. 26.

<sup>45</sup> On 29 January 2018, Iran provided the Agency with updated design information for FFEP, which included a temporary setup for a single IR-1 centrifuge position for “separation of stable isotopes” in Unit 2 (see GOV/2018/7, footnote 19).

<sup>46</sup> GOV/2021/10, para. 26.

<sup>47</sup> GOV/INF/2021/3, para. 5.

<sup>48</sup> GOV/INF/2021/11, para. 4.

<sup>49</sup> GOV/INF/2021/21.

<sup>50</sup> See also the decision of the Joint Commission of 6 January 2016 (INFCIRC/907).

31. On 18 April 2021, the Agency verified 28 targets containing uranium enriched up to 20% U-235, of which 26 had been shipped to the MIX Facility. On 18 May 2021, the Agency verified an additional 22 targets containing uranium enriched up to 20% U-235. The Agency also verified that the total of 50 targets contained 330 g of uranium enriched up to 20% U-235.<sup>51</sup>

### **C.2.5. TRR**

32. On 15 May 2021 the Agency verified that all the irradiated TRR fuel elements in Iran had a measured dose rate of less than 1 rem/hour (at one metre in air), except one single irradiated fuel plate.<sup>52</sup>

## **C.3. Centrifuge Manufacturing, Mechanical Testing and Component Inventory**

33. Since 23 February 2021, while Agency surveillance equipment has maintained continuous monitoring of Iran's mechanical testing of centrifuges as specified in the JCPOA, the Agency has not had access to the data and recordings collected by its surveillance equipment (paras 32 and 40). In January 2021, Iran began using a new location (at a workshop at Natanz), beyond those specified in the JCPOA, for mechanical testing of centrifuges.

34. Since 23 February 2021, Iran has no longer provided declarations to the Agency of its production and inventory of centrifuge rotor tubes and bellows, nor has it permitted the Agency to verify the items in the inventory (para. 80.1). Moreover, while Agency surveillance equipment has maintained continuous monitoring to ensure that the declared equipment has been used for the production of rotor tubes and bellows to manufacture centrifuges for the activities specified in the JCPOA, the Agency has not had access to the data and recordings collected by its surveillance equipment (para. 79). Previously, the equipment declared by Iran had also been used for activities beyond those specified in the JCPOA, such as the installation of the cascades described above (para. 80.2). Since 23 February 2021, the Agency has been unable to verify whether Iran has produced any IR-1 centrifuges to replace those that have been damaged or failed (para. 62).

35. Since 23 February 2021, while Agency surveillance equipment has continued to monitor declared rotor tubes, bellows and rotor assemblies, including those rotor tubes and bellows manufactured since Implementation Day (para. 70), the Agency has not had access to the data and recordings collected by its surveillance equipment. In the absence of access to these data and recordings, the Agency is not able to reconcile Iran's declarations prior to 23 February 2021 with the current inventory. Nor can the Agency confirm the extent to which Iran is continuing to manufacture centrifuge rotor tubes using carbon fibre that had not been subject to previous continuous Agency containment and surveillance measures.<sup>53,54</sup>

## **C.4. Enriched Uranium Stockpile**

36. As previously reported, since 1 July 2019, the Agency has verified that Iran's total enriched uranium stockpile has exceeded 300 kg of UF<sub>6</sub> enriched up to 3.67% U-235 (or the equivalent in

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<sup>51</sup> The 50 targets were produced using the U<sub>3</sub>O<sub>8</sub> enriched up to 20% U-235 recovered from the plates dissolved as referred to in paras 29 and 30 of this report.

<sup>52</sup> One fuel plate containing 75 g of uranium enriched up to 20% U-235, had a dose rate below that limit. Decision of the Joint Commission of 24 December 2015 (INFCIRC/907).

<sup>53</sup> GOV/INF/2019/12, para. 6.

<sup>54</sup> Decision of the Joint Commission of 14 January 2016 (INFCIRC/907).

different chemical forms) (para. 56).<sup>55</sup> The quantity of 300 kg of UF<sub>6</sub> corresponds to 202.8 kg of uranium.<sup>56</sup>

37. Since the previous report the following changes to the inventory of uranium enriched up to 2% U-235, enriched up to 5% U-235, enriched up to 20% U-235 and enriched up to 60% U-235, as declared by Iran and verified by the Agency, were as follows:

- **FEP:** Iran has estimated that from 16 February 2021 to 21 May 2021, approximately 335.7 kg of UF<sub>6</sub> enriched up to 5% U-235 were produced, 311.0 kg of which have been verified by the Agency.<sup>57</sup>
- **FFEP:** Iran has estimated that from 16 February 2021 to 21 May 2021, 382.4 kg of UF<sub>6</sub> enriched up to 5% U-235 were fed into cascades at FFEP, and that approximately 61.0 kg of UF<sub>6</sub> enriched up to 20% U-235 were produced, 48.1 kg of which have been verified by the Agency.
- **PFEP:** The Agency verified that from 16 February 2021 to 3 May 2021: 68.4 kg of UF<sub>6</sub> enriched up to 2% U-235 were produced in R&D lines 1, 2, 3 and 5, and 15.6 kg of UF<sub>6</sub> enriched up to 5% U-235 were produced in R&D lines 4 and 6.

The Agency also verified that from 17 April to 3 May 2021, 100.2 kg of UF<sub>6</sub> enriched up to 5% U-235 were fed into cascades installed in R&D lines 4 and 6 and that: 92.2 kg of UF<sub>6</sub> enriched up to 2% U-235, 3.5 kg of UF<sub>6</sub> enriched up to 20% U-235 and 2.0 kg of UF<sub>6</sub> enriched up to 60% U-235 were produced. In addition, Iran has estimated that, from 3 May 2021 to 21 May 2021,<sup>58</sup> approximately: 57.7 kg of UF<sub>6</sub> enriched up to 5% U-235 were fed into the cascade installed in R&D line 6 and 9.0 kg of UF<sub>6</sub> enriched up to 5% U-235, 2.4 kg of UF<sub>6</sub> enriched up to 20% U-235 and 1.6 kg of UF<sub>6</sub> enriched up to 60% U-235 were produced.

According to Iran's declarations, R&D lines 2, 3 and 5 did not produce enriched uranium between 3 May and 21 May 2021.

38. For this reporting period, the Agency has not been able to verify Iran's total enriched uranium stockpile, comprising enriched uranium produced at FEP, PFEP and FFEP.<sup>59</sup> Based on the information in the previous paragraph, the Agency has estimated that, as of 22 May 2021, Iran's total enriched uranium stockpile was 3241.0 kg (+273.2 kg since the previous quarterly report). The estimated stockpile comprised 3206.3 kg of uranium in the form of UF<sub>6</sub>; 13.3 kg of uranium in the form of uranium oxides and their intermediate products; 10.5 kg of uranium in fuel assemblies and rods; and 10.9 kg of uranium in liquid and solid scrap.

39. The estimated total enriched uranium stockpile in the form of UF<sub>6</sub> of 3206.3 kg comprises: 1367.9 kg of uranium enriched up to 2% U-235; 1773.2 kg of uranium enriched up to 5% U-235; 62.8 kg of uranium enriched up to 20% U-235; and 2.4 kg of uranium enriched up to 60% U-235.

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<sup>55</sup> GOV/INF/2019/8, paras 2 and 3.

<sup>56</sup> Considering the standard atomic weight of uranium and fluorine.

<sup>57</sup> Since 23 February 2021, as the Agency has only been able to verify Iran's production of enriched UF<sub>6</sub> once the enriched uranium product has been removed from the process, the quantity of nuclear material that remains in the process can only be estimated.

<sup>58</sup> An estimated amount of 44.7 kg UF<sub>6</sub> (tails from R&D line 1) is still in process and has not been measured. Its average enrichment could be slightly above the level of natural uranium. This amount is not included in the inventory of low enriched uranium at PFEP declared by Iran from 3 May to 21 May 2021.

<sup>59</sup> Under Iran's Safeguards Agreement, the Agency is able to verify the physical inventory of nuclear material at each declared facility at the annual physical inventory verification (PIV).

## **D. Transparency Measures**

40. Since 23 February 2021, the Agency has not had access to the data from its on-line enrichment monitors and electronic seals, or had access to the measurement recordings registered by its installed measurement devices (para. 67.1). Iran has issued long-term visas to Agency inspectors designated for Iran as requested by the Agency, provided proper working space for the Agency at nuclear sites and facilitated the use of working space at locations near nuclear sites in Iran (para. 67.2).

41. Since 23 February 2021, the Agency has not been provided with any information or access to data from containment and surveillance measures relating to the transfer to UCF of uranium ore concentrate (UOC) produced in Iran or obtained from any other source (para. 68). While the production of UOC has remained under continuous monitoring by Agency surveillance equipment, the Agency has not had access to the data and recordings collected by its surveillance equipment. Iran has not provided the Agency with any information on the production of UOC or on whether it has obtained UOC from any other source (para. 69).

## **E. Other Relevant Information**

42. Since 23 February 2021, Iran has no longer provisionally applied the Additional Protocol to its Safeguards Agreement in accordance with Article 17(b) of the Additional Protocol (para. 64). Iran has not provided updated declarations and the Agency was not able to conduct any complementary access under the Additional Protocol to any sites and locations in Iran during this reporting period. In addition, Iran has not implemented modified Code 3.1 of the Subsidiary Arrangements to Iran's Safeguards Agreement during this reporting period (para. 65). Iran has informed the Agency that it does not have a plan to construct a new nuclear facility in the near future. Iran also informed the Agency of its readiness to work with the Agency to find a mutually acceptable solution to address the issue of modified Code 3.1. The other matters previously addressed in this section relating to Iran's implementation of its Safeguards Agreement and Additional Protocol<sup>60</sup> are addressed in GOV/2021/29.

43. On 1 April 2021, Iran provided the Agency with an updated DIQ for UCF in which Iran informed the Agency that it was starting to install equipment for the production of uranium metal. On 23 May 2021, the Agency verified that installation of the equipment had been completed and that it was ready to operate with either natural or depleted uranium, although nuclear material had yet to be introduced into the production area.

44. During this reporting period, the Agency was unable to verify Iran's other JCPOA nuclear-related commitments, including those set out in Sections D, E, S and T of Annex I of the JCPOA.

45. During this reporting period, the Agency attended one meeting of the Procurement Working Group of the Joint Commission (JCPOA, Annex IV – Joint Commission, para. 6.4.6).

## **F. Summary**

46. Between 16 January 2016 (JCPOA Implementation Day) and 23 February 2021, the Agency verified and monitored the implementation by Iran of its nuclear-related commitments under the JCPOA. Since 23 February 2021, however, the Agency's verification and monitoring activities have been

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<sup>60</sup> GOV/2020/51, paras 33-35.

affected as a result of Iran's decision to stop the implementation of its nuclear-related commitments under the JCPOA, including the Additional Protocol.

47. The agreement of 24 May 2021 is to enable the Agency to recover and re-establish the necessary continuity of knowledge.

48. The Director General will continue to report as appropriate.



ANNEX I

**Impact on Agency verification and monitoring resulting from Iran stopping implementation of its nuclear-related commitments as envisaged in the JCPOA<sup>61</sup>**

The Agency is unable to:

Monitor or verify Iranian production and inventory of heavy water;	para 14 and para 15
Verify that use of shielded cells, referred to in the decision of the Joint Commission of 14 January 2016 (INFCIRC/907), are being operated as approved by the Joint Commission;	para 21
Monitor and verify that all centrifuges and associated infrastructure in storage remain in storage or have been used to replace failed or damaged centrifuges	para 70
Perform daily access upon request to the enrichment facilities at Natanz and Fordow	para 71 and para 51
Verify in-process material at enrichment facilities to enable an accurate stockpile of enriched uranium to be calculated	para 56
Verify whether or not Iran has conducted mechanical testing of centrifuges as specified in the JCPOA	para 32 and para 40
Monitor or verify Iranian production and inventory of centrifuge rotor tubes, bellows or assembled rotors	para 80.1
Verify whether produced rotor tubes and bellows are consistent with the centrifuge designs described in the JCPOA	para 80.2
Verify whether produced rotor tubes and bellows have been used to manufacture centrifuges for the activities specified in the JCPOA	para 80.2
Verify whether rotor tubes and bellows have been manufactured using carbon fibre which meets the specifications agreed under the JCPOA	para 80.2
Monitor or verify Iranian production of UOC	para 69
Monitor or verify Iranian procurement of UOC from any other source	para 69
Monitor or verify whether UOC produced in Iran or obtained from any other source has been transferred to UCF	para 68
Verify Iran's other JCPOA nuclear-related commitments, including those set out in Sections D, E, S and T of Annex I of the JCPOA	
Receive any updated declarations from Iran or conduct any complementary access to any sites and locations in Iran during this reporting period	Additional Protocol

<sup>61</sup> Implementation of modified Code 3.1 is a legal obligation as explained in paras 9 and 42 of this report and is not reflected in the table.

ANNEX II

**Twelve Updates since the Director General's previous Quarterly Report**

GOV/INF	Date	Content
2021/17	8 March 2021	Iran begins feeding a third cascade of IR-2m at FEP
2021/19	15 March 2021	Iran informs the Agency that it intends to install an additional cascade of IR-4 centrifuges at FEP; Iran begins feeding the first cascade of IR-4 at FEP
2021/20	31 March 2021	Iran begins feeding a fourth cascade of IR-2m centrifuges at FEP
2021/21	9 April 2021	Iran dissolves six unirradiated scrap TRR fuel plates and converts them to AUC
2021/22	13 April 2021	Iran informs the Agency that it intends to start producing 60% enriched UF <sub>6</sub> at PFEP
2021/23	14 April 2021	Iran has almost completed preparations to start feeding 5% UF <sub>6</sub> into Line 6 at PFEP
2021/24	14 April 2021	Iran informs the Agency that it intends to install an additional six cascade of IR-1 centrifuges at FEP
2021/26	17 April 2021	Iran begins feeding 5% UF <sub>6</sub> into Lines 4 and 6 at PFEP; declared product enrichment 55.3%
2021/27	21 April 2021	Iran informs the Agency that it intends to install an additional four cascades of IR-4 centrifuges at FEP
2021/28	22 April 2021	Iran changes operating mode for 20% and 60% UF <sub>6</sub> production at PFEP; declared product enrichments 20.3% and 59.6%
2021/29	11 May 2021	Iran changes operating mode for 5%, 20% and 60% UF <sub>6</sub> production at PFEP. Agency analysis shows enrichment level of up to 63%.
2021/31	24 May 2021	Continued operation of the Agency's equipment to collect and store data for a further period of one month up to 24 June 2021