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

Report by the Acting Director General

A. Introduction

1. This report of the Acting 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,¹ 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 of Governors authorized the Director General to implement the necessary verification and monitoring

¹ On 8 May 2018, the 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 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,² 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.³

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 the Islamic Republic of Iran has issued an order to stop some of Iran's measures under the JCPOA from today".^{4,5}

5. 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 2019, extrabudgetary funding is necessary for €4.0 million of the €9.2 million.⁶ As of 7 November 2019, €7.1 million of extrabudgetary funding had been pledged to meet the cost of JCPOA-related activities for 2019 and beyond.

C. JCPOA Verification and Monitoring Activities

6. Since 16 January 2016 (JCPOA Implementation Day), the Agency has verified and monitored Iran's implementation of its nuclear-related commitments in accordance with the modalities set out in the JCPOA,⁷ consistent with the Agency's standard safeguards practices, and in an impartial and objective manner.^{8,9} The Agency reports the following for the period since the issuance of the Acting Director General's quarterly report of August 2019¹⁰ and updates included in reports of September and November 2019.¹¹

² Reproduced in INFCIRC/907 and INFCIRC/907/Add.1.

³ GOV/2017/10, para. 3.

⁴ Announced by H.E. Dr Hassan Rouhani, President and Head of the Supreme National Security Council of Iran, at: <http://president.ir/en/109588>.

⁵ GOV/INF/2019/8, GOV/INF/2019/9, GOV/INF/2019/10, GOV/INF/2019/12 and GOV/INF/2019/16.

⁶ 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(60)/2).

⁷ Including the clarifications referred to in para. 3 of this report.

⁸ GOV/2016/8, para. 6.

⁹ Note by the Secretariat, 2016/Note 5.

¹⁰ GOV/2019/32.

¹¹ GOV/INF/2019/10, GOV/INF/2019/12 and GOV/2019/16.

C.1. Activities Related to Heavy Water and Reprocessing

7. Iran has not pursued the construction of the Arak heavy water research reactor (IR-40 Reactor) based on its original design.^{12,13} 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 Agency monitoring (paras 3 and 10).¹⁴

8. Iran has continued to inform the Agency about the inventory of heavy water in Iran and the production of heavy water at the Heavy Water Production Plant (HWPP)¹⁵ and 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). On 28 October 2019, the Agency verified that the HWPP was in operation and that Iran's stock of heavy water was 128.9 metric tonnes.¹⁶ Throughout the reporting period, Iran had no more than 130 metric tonnes of heavy water (para. 14).

9. 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).¹⁷

C.2. Activities Related to Enrichment and Fuel

10. At the Fuel Enrichment Plant (FEP) at Natanz, there have been no more than 5060 IR-1 centrifuges installed in 30 cascades, which remain in the configurations in the operating units at the time the JCPOA was agreed (para. 27). Iran has withdrawn 48 IR-1 centrifuges from those held in storage¹⁸ for the replacement of damaged or failed IR-1 centrifuges installed at FEP (para. 29.1).

11. Iran has continued the enrichment of UF₆ at FEP and, since the Acting Director General's previous quarterly report, has started the enrichment of UF₆ at the Pilot Fuel Enrichment Plant (PFEP) at Natanz¹⁹ and the Fordow Fuel Enrichment Plant (FFEP) at Fordow (see paragraph 15 of this report).²⁰ As

¹² 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)).

¹³ As indicated previously (GOV/2017/24, footnote 10), Iran has changed the name of the facility to the Khondab Heavy Water Research Reactor.

¹⁴ 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.

¹⁵ HWPP is a facility for the production of heavy water which, according to the design information provided by Iran to the Agency on 25 January 2016, has a nominal capacity of 16 tonnes of nuclear-grade heavy water per year and an actual capacity of "about 20 tonnes" of nuclear-grade heavy water per year. Iran informed the Agency, in a letter dated 18 June 2017, that the "maximum annual capacity of the Heavy Water Production Plant (HWPP) is 20 Tons".

¹⁶ On 28 October 2019, the Agency confirmed that in this reporting period, 0.4 metric tonnes of heavy water had been shipped out of Iran and Iran had used 0.6 metric tonnes of heavy water for research and development (R&D) activities related to the production of deuterated compounds for medical applications. As of the same date, Iran was preparing to purify 2.2 metric tonnes of contaminated heavy water which had resulted from the production of deuterated compounds. All of the activities described in this footnote were conducted under continuous monitoring by the Agency.

¹⁷ Including hot cells at TRR and the MIX facility and shielded cells, referred to in the decision of the Joint Commission of 14 January 2016 (INFCIRC/907).

¹⁸ Para. 16 of this report.

¹⁹ GOV/2019/12.

²⁰ 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).

previously reported,²¹ on 8 July 2019, the Agency verified that Iran had begun enriching UF₆ above 3.67% U-235 (para. 28). Since that date, Iran has been enriching uranium up to 4.5% U-235.

12. As previously reported,²² on 1 July 2019, the Agency verified that Iran's total enriched uranium stockpile had exceeded 300 kg of UF₆ enriched up to 3.67% U-235 (or the equivalent in different chemical forms) (para. 56). The quantity of 300 kg of UF₆ corresponds to 202.8 kg of uranium.²³

13. As of 3 November 2019, the Agency verified that, based on the JCPOA and decisions of the Joint Commission,²⁴ Iran's total enriched uranium stockpile was 372.3 kg (+130.7 kg since the Acting Director General's previous quarterly report).²⁵ The stockpile comprised 212.6 kg of uranium enriched up to 3.67% U-235, produced prior to 8 July 2019, and 159.7 kg of uranium enriched up to 4.5% U-235, produced since 8 July 2019.²⁶

14. At FFEP, no more than 1044 IR-1 centrifuges have been maintained in one wing (Unit 2) of the facility (para. 46). On 6 November 2019, the Agency verified that 1020 IR-1 centrifuges were installed in six cascades. On the same date, the Agency also verified that ten IR-1 centrifuges were installed in a layout of 16 IR-1 centrifuge positions²⁷ and one IR-1 centrifuge was installed in a single position,²⁸ for the purpose of conducting "initial research and R&D activities related to stable isotope production".^{29,30}

15. As previously reported,³¹ on 6 November 2019, the Agency verified that Iran had transferred a cylinder of natural UF₆ from FEP to FFEP. On the same date, the Agency also verified that this cylinder had been connected at FFEP in preparation for feeding UF₆ into the two cascades of IR-1 centrifuges, which had remained spinning since 16 January 2016 (JCPOA Implementation Day), for passivation (para. 46.2). Also on the same date, the Agency verified that two cascades of IR-1 centrifuges, with all their associated infrastructure, remained in an idle state (para. 46.2), and the two cascades that are to be modified for the production of stable isotopes remained unchanged (para. 46.1). On 9 November 2019, the Agency verified that Iran had started feeding UF₆ into the two cascades of IR-1 centrifuges that had remained spinning since Implementation Day, for enrichment. Since 6 November 2019, there has been nuclear material at FFEP and, since 9 November 2019, Iran has been conducting uranium enrichment at the plant (para. 45).

16. All centrifuges and associated infrastructure in storage have remained under continuous Agency monitoring (paras 29, 47, 48 and 70). During this reporting period, however, some of the centrifuges and associated infrastructure have been withdrawn from storage for installation at PFEP, while remaining under continuous Agency monitoring throughout (para. 70). The Agency has continued to

²¹ GOV/INF/2019/9.

²² GOV/INF/2019/8.

²³ Considering the standard atomic weight of uranium and fluorine.

²⁴ Decisions of the Joint Commission of 6 January 2016 and 18 December 2016 (INFCIRC/907), and 10 January 2017 (INFCIRC/907/Add.1).

²⁵ Comprising 349.9 kg of uranium in the form of UF₆; 10.4 kg of uranium in the form of uranium oxides and their intermediate products; 4.6 kg of uranium in fuel assemblies and rods; and 7.4 kg of uranium in liquid and solid scrap.

²⁶ The uranium enriched up to 4.5% U-235 is entirely in the form of UF₆ and includes 30.5 kg of uranium enriched up to 2% U-235 produced using the cascades in R&D lines 2 and 3 at PFEP.

²⁷ GOV/2017/48, footnote 20.

²⁸ 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.

²⁹ GOV/2016/46, para. 12.

³⁰ On 6 November 2019, 13 IR-1 centrifuges were not installed and were stored within the facility under Agency monitoring.

³¹ GOV/INF/2019/16.

have regular access to relevant buildings at Natanz, including all of FEP and PFEP, and performed daily access upon Agency request (para. 71). The Agency has also continued to have regular access to FFEP, including daily access upon Agency request (para. 51).

17. Since the Acting Director General's previous quarterly report, Iran has conducted 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).³²

18. On 26 October 2019, the Agency verified that all irradiated TRR fuel elements in Iran have a measured dose rate of no less than 1 rem/hour (at one metre in air).

19. Iran has not operated any of its declared facilities for the purpose of re-converting fuel plates or scrap into UF₆, nor has it informed the Agency that it has built any new facilities for such a purpose (para. 58).

C.3. Centrifuge Research & Development, Manufacturing and Inventory

20. As previously reported, Iran informed the Agency on 8 September 2019 that it would modify the header connections in such a way that the product and the tails would be collected separately from the cascades in five R&D lines (Nos 2, 3, 4, 5 and 6)³³ at PFEP (paras 32 and 42).³⁴

21. In a letter dated 23 October 2019, Iran informed the Agency that it "intends to install 6 new types of centrifuge machines, namely IR-7, IR-8s, IR-8B, IR-9, IR-s and IR-6smo in single machine positions" at PFEP. The Agency requested Iran, in a letter dated 24 October 2019, to update the template³⁵ that Iran had submitted to the Agency on 15 January 2016 to include a description of the IR-8s, IR-8b, IR-9, IR-s and IR-6smo centrifuge types. In a letter dated 4 November 2019, Iran further updated the design information questionnaire (DIQ) for PFEP, in which it included the list of all centrifuge types at PFEP.³⁶

22. On 5 November 2019, the Agency verified that the following centrifuges and cascades were installed and being tested with UF₆ in R&D lines 2 and 3 (paras 32–42): up to 22 IR-2m centrifuges, including a cascade of 20 centrifuges; up to 22 IR-4 centrifuges, including a cascade of 20 centrifuges; up to 11 IR-5 centrifuges, including a cascade of 10 centrifuges; up to 34 IR-6 centrifuges, including a cascade of 10 and another of 20 centrifuges; up to 33 IR-6s centrifuges, including a cascade of 20 centrifuges and 12 centrifuges installed in a new "modular" configuration (IR-6smo); three single IR-8 centrifuges; one single IR-3 centrifuge; one single IR-6m centrifuge; one single IR-6sm centrifuge; two single IR-7 centrifuges; one single IR-8s centrifuge; one single IR-8B centrifuge; one single IR-s centrifuge; and one single IR-9 centrifuge. Iran has informed the Agency that all of the cascades in R&D lines 2 and 3 at PFEP, once installed, would be used to accumulate enriched uranium.

23. On 21 October 2019, the Agency verified that Iran had completed the reinstallation of a cascade of 164 IR-4 centrifuges and a cascade of 164 IR-2m centrifuges, along with the necessary piping, in R&D lines 4 and 5 (paras 33 and 34).³⁷ On 30 October 2019, the Agency verified that both of these cascades were accumulating enriched uranium (para. 32). On 13 October 2019, Iran informed the

³² See GOV/INF/2019/10, GOV/INF/2019/12, GOV/INF/2019/16 and Section C.3 of this report.

³³ As previously reported, in R&D line 1 Iran rendered inoperable a cascade of IR-1 centrifuges by, inter alia, removing the rotors, injecting epoxy resin into the pipework and removing the electrical systems from all of the centrifuges (see GOV/INF/2016/1, 'Centrifuge Research and Development (15.4)', para. ix).

³⁴ GOV/INF/2019/10, para. 4.

³⁵ See Decision of the Joint Commission of 14 January 2016 (INFCIRC/907).

³⁶ IR-1, IR-2m, IR-3, IR-4, IR-5, IR-6, IR-6m, IR-6s, IR-6sm, IR-7, IR-8, IR-8s, IR-8B, IR-s and IR-9.

³⁷ GOV/INF/2019/10, para. 4.

Agency that it would first install a cascade of 30 IR-6 centrifuges in R&D line 6 prior to expanding the cascade to 164 IR-6 centrifuges (paras 37 and 41).³⁸ On 30 October 2019, the Agency verified that the reinstallation of the piping at R&D line 6 to accommodate a cascade of 164 IR-6 centrifuges had been completed, and that the installation of the cascade of 30 IR-6 centrifuges had also been completed. On 5 November 2019, the Agency verified that the cascade of 30 IR-6 centrifuges was accumulating enriched uranium.

24. On 20 October 2019, the Agency verified that, for 12 days, Iran had conducted mechanical testing of three IR-4 centrifuges simultaneously at the Tehran Research Centre. On 9 November 2019, the Agency verified that Iran had prepared a new location, beyond those specified in the JCPOA, for mechanical testing of centrifuges (para. 40).

25. Iran has provided declarations to the Agency of its production and inventory of centrifuge rotor tubes and bellows and permitted the Agency to verify the items in the inventory (para. 80.1). The Agency has conducted continuous monitoring, including through the use of containment and surveillance measures, and verified that the declared equipment has been used for the production of rotor tubes and bellows to manufacture centrifuges not only for the activities specified in the JCPOA but also for activities beyond those specified in the JCPOA, such as the installation of the new cascades described in the previous paragraphs (para. 80.2). Iran has not produced any IR-1 centrifuges to replace those that have been damaged or failed (para. 62).

26. All declared rotor tubes, bellows and rotor assemblies have been under continuous monitoring by the Agency, including those rotor tubes and bellows manufactured since Implementation Day (para. 70). On 21 October 2019, the Agency verified that Iran was continuing to manufacture centrifuge rotor tubes using carbon fibre that was not subject to continuous Agency containment and surveillance measures.^{39,40} The rotor and bellow manufacturing process remains under continuous monitoring by the Agency.

D. Transparency Measures

27. Iran has continued to permit the Agency to use on-line enrichment monitors and electronic seals which communicate their status within nuclear sites to Agency inspectors, and to facilitate the automated collection of Agency measurement recordings registered by 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).

28. Iran has continued to permit the Agency to monitor – through measures agreed with Iran, including containment and surveillance measures – that all uranium ore concentrate (UOC) produced in Iran or obtained from any other source is transferred to the Uranium Conversion Facility (UCF) at Esfahan (para. 68). Iran also provided the Agency with all information necessary to enable the Agency to verify the production of UOC and the inventory of UOC produced in Iran or obtained from any other source (para. 69).

³⁸ GOV/INF/2019/12, para. 3.

³⁹ GOV/INF/2019/12, para. 6.

⁴⁰ Decision of the Joint Commission of 14 January 2016 (INFCIRC/907).

E. Other Relevant Information

29. Iran continues to provisionally apply the Additional Protocol to its Safeguards Agreement in accordance with Article 17(b) of the Additional Protocol, pending its entry into force. The Agency has continued to evaluate Iran's declarations under the Additional Protocol, and has conducted complementary accesses under the Additional Protocol to all the sites and locations in Iran which it needed to visit. Timely and proactive cooperation by Iran in providing such access facilitates implementation of the Additional Protocol and enhances confidence. As reported by the Acting Director General to the Board of Governors on 7 November 2019, the Agency has detected natural uranium particles of anthropogenic origin at a location in Iran not declared to the Agency. It is essential for Iran to continue interactions with the Agency to resolve the matter as soon as possible. Ongoing interactions between the Agency and Iran relating to Iran's implementation of its Safeguards Agreement and Additional Protocol require full and timely cooperation by Iran.

30. The Agency's verification and monitoring of Iran's other JCPOA nuclear-related commitments continues, including those set out in Sections D, E, S and T of Annex I of the JCPOA.

31. 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

32. The Agency continues to verify the non-diversion of declared nuclear material at the nuclear facilities and locations outside facilities where nuclear material is customarily used (LOFs) declared by Iran under its Safeguards Agreement. Evaluations regarding the absence of undeclared nuclear material and activities for Iran remained ongoing.

33. Since Implementation Day, the Agency has been verifying and monitoring the implementation by Iran of its nuclear-related commitments under the JCPOA.

34. The Acting Director General will continue to report as appropriate.