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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 Director General

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) on activities related to fuel manufacturing for the Tehran Research Reactor (TRR) using indigenously-produced uranium enriched up to 20% U-235. It provides an update on developments since the Director General's previous reports.¹

A. Activities related to production of uranium metal for TRR fuel

2. As previously reported,² on 16 December 2020, Iran informed the Agency that it would start research and development (R&D) activities on the production of uranium metal using natural uranium at the Fuel Plate Fabrication Plant (FPFP) at Esfahan, before moving to produce uranium metal enriched up to 20% U-235 for fuel for the TRR.³ Iran also informed the Agency that uranium metal would be produced at the second stage of a three-stage process and that installation of the equipment at FPFP needed for the first stage of the process was expected to be completed in 4-5 months.⁴ The three-stage process involved the conversion of: UF₆ to UF₄; UF₄ to uranium metal; and uranium metal to uranium silicide (U₃Si₂).

¹ GOV/2021/28 and GOV/INF/2021/32.

² GOV/INF/2021/3, para. 5.

³ JCPOA, 'Annex I – Nuclear-related measures', paras 24 and 26.

⁴ GOV/INF/2021/3, para. 7.

3. As also previously reported,⁵ on 2 February 2021, the Agency verified that Iran had started the production of natural uranium metal in a laboratory experiment at FPFPP using natural UF₄ transferred from the Uranium Conversion Facility (UCF) at Esfahan and, on 8 February 2021, the Agency verified that 3.6 g of uranium metal had been produced from the aforementioned natural UF₄ in a laboratory experiment conducted at FPFPP on 6 February 2021.
4. In a letter dated 23 June 2021, Iran informed the Agency that it intended to transfer UF₆ enriched up to 20% U-235 produced at the Pilot Fuel Enrichment Plant (PFEP) at Natanz to FPFPP for the purpose of producing fuel assemblies⁶ for the TRR.
5. In a letter dated 28 June 2021, Iran informed the Agency about a four-step process, different from the one described in paragraph 2 above, by which it intended to produce new TRR fuel, which included the use of uranium metal enriched up to 20% U-235. The four-step production process is as follows:
 - (i) conversion of UF₆ enriched up to 20% U-235 to uranyl fluoride (UO₂F₂) and then conversion of UO₂F₂ to ammonium uranyl carbonate (AUC) at FPFPP;
 - (ii) conversion of AUC to uranium dioxide powder (UO₂) enriched up to 20% U-235 at the R&D laboratory of UCF;
 - (iii) use of the UO₂ enriched up to 20% U-235 to produce UF₄ which is then used to produce uranium metal enriched up to 20% U-235 at the R&D laboratory at FPFPP; and
 - (iv) production of uranium silicide, and one TRR fuel plate, at FPFPP.
6. On 1 July 2021, the Agency verified that, as described in the first step of the four-step process, 1.1 kg of uranium in the form of AUC enriched up to 20% U-235, which had been produced from UO₂F₂, had been transferred from FPFPP to UCF for the production of UO₂.
7. On 5 July 2021, the Agency verified that, as described in the second step of the four-step process, Iran had produced 0.84 kg of uranium in the form of UO₂ enriched up to 20% U-235 at the R&D laboratory at UCF.
8. On 6 July 2021, the Agency verified that an additional 0.46 kg of uranium in the form of AUC enriched up to 20% U-235 had been transferred from FPFPP to UCF for the production of UO₂.
9. On 6 July 2021, Iran informed the Agency that the UO₂ enriched up to 20% U-235 would be shipped to the R&D laboratory at FPFPP, where it would be converted to UF₄ and then to uranium metal.

B. Other activities related to production of TRR fuel

10. On 6 July 2021, the Agency verified that Iran had produced 3.8 kg of uranium in the form of U₃O₈ enriched up to 20% U-235, using UO₂F₂ produced in the first step of the four-step process, for the manufacture of TRR aluminium-uranium fuel assemblies.⁷

⁵ GOV/INF/2021/11, para. 4.

⁶ A standard fuel assembly comprises 19 fuel plates and a control fuel assembly comprises 14 fuel plates.

⁷ JCPOA, 'Annex I – Nuclear-related measures', Section J.