

IV. Implementation of the Joint Comprehensive Plan of Action in Iran

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During 2016 Iran continued to implement its comprehensive Safeguards Agreement in connection with the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the related Additional Protocol with the International Atomic Energy Agency (IAEA).¹ Iran also continued to implement the provisions of the Joint Comprehensive Plan of Action (JCPOA) covering limitations on its nuclear programme that was signed in Vienna on 14 July 2015 between Iran and the E3/EU+3 (France, Germany and the United Kingdom (the E3), and China, Russia and the USA (+3), facilitated by the European Union (EU)).² The United Nations Security Council unanimously adopted Resolution 2231 on 20 July 2015 in which it endorsed the JCPOA and terminated all provisions of its resolutions on the Iranian nuclear issue—1696 (2006), 1737 (2006), 1747 (2007), 1803 (2008), 1835 (2008), 1929 (2010) and 2224 (2015).³ It was concurrently agreed that the IAEA would verify Iran's implementation of nuclear-related provisions under the JCPOA.

Under the JCPOA, Iran reaffirmed that it would implement the Additional Protocol to its NPT Safeguards Agreement with the IAEA, and under no circumstances would it ever seek, develop or acquire any nuclear weapons. Iran voluntarily undertook to reduce its operating IR-1 centrifuges from nearly 20 000 machines to 6100, of which 5060 would remain operational. Excess centrifuges and related infrastructure at the Fuel Enrichment Plant (FEP) and Pilot Fuel Enrichment Plant (PFEP) at Natanz would be stored under continuous IAEA monitoring. Iran agreed to limit enrichment of uranium to 3.67 per cent uranium-235 (U-235) and to ship out its inventory of enriched uranium (UF₆) except for 300 kilograms—a level that would be maintained for 15 years. The Fordow Fuel Enrichment Plant (FFEP) would be converted into a nuclear technology centre with 1044 IR-1 centrifuges that would be

¹ Treaty on the Non-Proliferation of Nuclear Weapons (Non-Proliferation Treaty, NPT), opened for signature 1 July 1968, entered into force 5 Mar. 1970, INF/CIRC/140, 22 Apr. 1970.

² IAEA, Communication dated 24 July 2015 received from China, France, Germany, the Russian Federation, the United Kingdom, the United States of America (the E3/EU+3) and the Islamic Republic of Iran concerning the text of the Joint Comprehensive Plan of Action (JCPOA), INF/CIRC/887, 31 July 2015. For the full text of the JCPOA see <http://eeas.europa.eu/statements-eeas/docs/iran_agreement/iran_joint-comprehensive-plan-of-action_en.pdf>. For a description of the elements of the JCPOA see Rauf, T., 'Resolving concerns about Iran's nuclear programme', *SIPRI Yearbook 2016*, pp. 673–88.

³ UN Security Council Resolution 2231, 20 July 2015 stipulated that in the event of significant non-performance of commitments by Iran, the termination of the provisions of previous Security Council resolutions can be rescinded.

transitioned for stable isotope production for a period of 15 years.⁴ Iran agreed to redesign and rebuild a modernized heavy-water reactor at Arak based on an internationally agreed design, use UF₆ enriched to 3.67 per cent U-235 for fuel, and to remove and render dysfunctional the core of the 40-megawatt (MW) Arak reactor (IR-40 Reactor) under construction. Iran would neither reprocess spent nuclear fuel nor build any other heavy-water reactors for 15 years; in addition, it would cap its stocks of nuclear-grade heavy water at 130 metric tonnes.

Iran further consented to fully implementing modified Code 3.1 of the subsidiary arrangements to its Safeguards Agreement on the early provision of design information of nuclear facilities.⁵ It agreed to permit the IAEA to monitor the implementation of the voluntary measures for their respective durations, as well as to implement transparency measures, including: (a) a long-term IAEA inspector presence in Iran; (b) IAEA monitoring of uranium ore concentrate produced by Iran from all uranium ore concentrate plants for 25 years; (c) the containment and surveillance of centrifuge rotors and bellows for 20 years; (d) the use of IAEA approved and certified modern technologies including online enrichment measurement and electronic seals; and (e) the employment of a reliable mechanism to ensure speedy resolution of IAEA access concerns for 15 years. Iran also agreed not to engage in activities, including at the research and development (R&D) level that could contribute to the development of a nuclear explosive device including uranium or plutonium metallurgy activities.⁶

Under the JCPOA, a Joint Commission was established to meet at the level of Political Directors of JCPOA participating states, chaired by the European External Action Service's (EEAS) Deputy Secretary General for Political Affairs.⁷ The Joint Commission serves as a dispute resolution mechanism, approves nuclear-related procurements by Iran, oversees the Arak IR-40 Reactor conversion, and addresses concerns about non-compliance. The Joint Commission held a meeting in Vienna on 19 July 2016 'to review the implementation of the JCPOA as far as nuclear and sanctions related issues

⁴ White House, Office of the Press Secretary, 'Key excerpts of the Joint Comprehensive Plan of Action (JCPOA)', Press release, 14 July 2015.

⁵ Under the terms of its Safeguards Agreement and the JCPOA, Iran is required to implement the provisions of the modified Code 3.1 of the Subsidiary Arrangements General Part concerning the early provision of design information (i.e. in order to facilitate safeguards implementation, Iran must inform the IAEA of any plans to construct a new nuclear facility or to modify an existing nuclear facility as soon as the relevant decision is taken by competent authorities of Iran). For the modified Code 3.1, which is applicable to all states with safeguards agreements in force with the IAEA see IAEA, 'Strengthening the effectiveness and improving the efficiency of the safeguards system', Report by the Director General, GC(XXXVII)/1073, 6 Sep. 1993.

⁶ White House (note 4).

⁷ European External Action Service, 'Press release on the outcome of the first Joint Commission on the Joint Comprehensive Plan of Action (JCPOA) on the Iranian nuclear programme', 19 Oct. 2015.

are concerned. All sides reaffirmed their commitment to continue full and effective implementation of the JCPOA.⁸

Security Council Resolution 2231 requested, among other things, that the Director General of the IAEA undertake the necessary verification and monitoring of Iran's nuclear-related commitments under the JCPOA, and reaffirmed that Iran shall cooperate fully with the IAEA to resolve all outstanding issues as identified in IAEA reports.⁹ Accordingly, in its meeting on 25 August 2015, the IAEA Board of Governors authorized the Director General to undertake verification and monitoring of Iran's nuclear-related commitments under the JCPOA as requested by the Security Council and to report for the full duration of those commitments in the light of Security Council Resolution 2231.¹⁰

On 25 May 2016 US Ambassador Stephen D. Mull, Lead Coordinator for Iran Nuclear Implementation, testified at the US Senate Committee on Banking, Housing, and Urban Affairs that 'the JCPOA has been implemented by all participants' and that 'Iran had completed dozens of specific actions to limit, freeze, or roll back its nuclear program and subject it to greater transparency by the IAEA'.¹¹

The IAEA and Iran

The IAEA issued five 'verification and monitoring' reports on Iran during 2016.¹² In its report of January 2016 it verified and confirmed that as of 16 January 2016 Iran had complied with a number of significant provisions under Annex I (nuclear-related measures) of the JCPOA, including the following.¹³

1. *Arak IR-40 Reactor*. Iran had (a) ceased construction of the existing IR-40 Reactor (paragraph 3); (b) removed the existing calandria from the IR-40 Reactor (paragraph 3); (c) rendered the calandria inoperable by filling the openings with concrete, such that the IAEA was able to verify that the calandria was unusable for future nuclear applications (paragraph 3); and

⁸ European External Action Service, 'Press release on the holding of the Joint Commission of the JCPOA', 19 July 2016.

⁹ IAEA, Board of Governors, 'Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015)', Report by the Director General, GOV/2015/53, 14 Aug. 2015.

¹⁰ IAEA, 'IAEA Board discusses safeguards implementation in Iran', 25 Aug. 2015.

¹¹ Mull, S. D., Lead Coordinator for Iran Nuclear Implementation, US Department of State, Testimony before the US Senate Committee on Banking, Housing, and Urban Affairs, 'Understanding the role of sanctions under the Iran deal: administration perspectives', 25 May 2016.

¹² IAEA, Board of Governors, 'Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015)', Reports by the Director General, GOV/INF/2016/1, 16 Jan. 2016; GOV/2016/8, 26 Feb. 2016; GOV/2016/23, 27 May 2016; GOV/2016/46, 8 Sep. 2016; and GOV/2016/55, 9 Nov. 2016.

¹³ IAEA, GOV/INF/2016/1 (note 12).

(d) not produced or tested natural uranium pellets, fuel pins or fuel assemblies specifically designed for the support of the IR-40 Reactor (paragraph 10).

2. *Heavy water production.* Iran had not allowed its stocks of nuclear-grade heavy water to exceed 130 metric tonnes (paragraph 14) and had allowed monitoring of those stocks (paragraph 15).

3. *Enrichment capacity.* Iran had (a) no more than 5060 IR-1 centrifuges installed in no more than 30 cascades at the FEP at Natanz (paragraph 27); (b) not enriched uranium above 3.67 per cent U-235 at any of its declared nuclear facilities (paragraph 28); and (c) removed and stored, under continuous monitoring by the IAEA, all excess centrifuges and infrastructure not associated with the 5060 IR-1 centrifuges at the FEP (paragraph 29).

4. *Activities at the FFEP.* Iran had (a) not conducted any uranium enrichment or related R&D at the FFEP (paragraph 45); (b) removed all nuclear material from the FFEP (paragraph 45); (c) maintained not more than 1044 IR-1 centrifuges at the FFEP; and (d) modified 2 of the cascades at the FFEP for the production of stable isotopes under continuous IAEA monitoring (paragraph 46.1).

5. *Other aspects of enrichment.* Iran had provided the IAEA with (a) its long-term enrichment and R&D enrichment plan (paragraph 52); and (b) a template for describing different centrifuge types (IR-1, IR-2m, IR-4, IR-5, IR-6, IR-6s, IR-7, IR-8) and associated definitions that had been agreed with JCPOA participants (paragraph 54).

6. *Uranium stocks and fuels.* Iran had (a) a stockpile of not more than 300 kg of UF₆ enriched up to 3.67 per cent U-235 (paragraph 57); and (b) fabricated into fuel plates for the Tehran Research Reactor and transferred out of Iran or diluted to an enrichment level of 3.67 per cent U-235 or less, all uranium oxide enriched to between 5 per cent and 20 per cent U-235 (paragraph 58).

7. *Centrifuge component manufacturing transparency.* Iran had provided to the IAEA an initial inventory, as well as production locations, of all existing centrifuge rotor tubes and bellows, and permitted the IAEA to verify the inventory through continuous monitoring of this equipment (paragraphs 80.1 and 80.2).

8. *Use of modern technologies.* Iran had permitted the IAEA to use online enrichment measurement devices and electronic seals which communicate their status within nuclear sites to IAEA inspectors (paragraph 67.1).

9. *Transparency related to enrichment.* Iran provided the IAEA with regular access to relevant buildings at Natanz, including all of the FEP and the PFEP, and daily access upon request (paragraph 71).¹⁴

¹⁴ For a description of the online enrichment measurement devices and electronic seals see Rauf, T. and Kelley, R., 'Nuclear verification in Iran', *Arms Control Today*, Aug. 2014.

The IAEA's report of 26 February 2016 gave the total expenditure incurred as of that date for monitoring and verification in Iran as €15.2 million, of which €1.0 million came from the regular budget, with the remainder funded through extrabudgetary contributions from 31 member states. According to the report, the estimated annual cost for both the implementation of Iran's Additional Protocol and for verifying and monitoring Iran's nuclear-related commitments, as set out in the JCPOA, was €9.2 million per annum—to be drawn in its entirety from extrabudgetary funds during 2016.¹⁵

The February 2016 report also confirmed that the IAEA had verified that Iran had continued to implement the relevant nuclear-related provisions of the JCPOA, although it noted that on 17 February Iran's stock of heavy water had temporarily reached 130.9 metric tonnes (i.e. over the 130 metric tonnes limit stipulated in the JCPOA). The IAEA confirmed that 20 metric tonnes of heavy water had subsequently been shipped out of Iran on 24 February 2016, bringing Iran's stock of heavy water back below 130 metric tonnes as required by the JCPOA.¹⁶ The IAEA reiterated its previous safeguards conclusion that it continued to verify the non-diversion of declared nuclear materials and that its activities under the Additional Protocol, commenced on 16 January 2016, ascertained that there were no indications of undeclared nuclear material or activities in Iran.¹⁷ However, the IAEA was unable to provide assurances regarding the absence of undeclared nuclear material and activities in Iran—and therefore to conclude that all nuclear material in Iran remained in peaceful activities—because 'Evaluations regarding the absence of undeclared nuclear material and activities for Iran remained ongoing', meaning that the IAEA was continuing with its evaluations under the Additional Protocol to Iran's Safeguards Agreement.¹⁸ The IAEA's May, September and November reports in 2016 maintained the IAEA's assessments and safeguards conclusion as previously reported in February, noting that evaluations regarding the absence of undeclared nuclear material and activities for Iran remained ongoing.¹⁹

In its last report on Iran of 2016 (dated 9 November), the IAEA noted that it had verified that Iran's stock of heavy water had reached 130.1 metric tonnes (and was therefore marginally in excess of the JCPOA limit) on 8 November 2016. The report further noted that the IAEA Director General had expressed 'concerns related to Iran's stock of heavy water' to Iran on 2 November. On 9 November Iran informed the IAEA of its plan to transfer

¹⁵ IAEA, GOV/2016/8 (note 12), paras 11–12.

¹⁶ IAEA, GOV/2016/8 (note 12), para. 16.

¹⁷ IAEA, GOV/2016/8 (note 12), para. 32.

¹⁸ IAEA, GOV/2016/55 (note 12), para. 23.

¹⁹ IAEA, GOV/2016/23 (note 12), para. 24; IAEA, GOV/2016/46 (note 12), para. 23; and IAEA, GOV/2016/55 (note 12), para. 23.

5 metric tonnes of its nuclear-grade heavy water out of the country.²⁰ The IAEA's November 2016 report reiterated its assessments and safeguards conclusion as noted in its previous reports for 2016.²¹ US Department of State spokesman Mark Toner stated in a regular press briefing that 'It's important to note that Iran made no effort to hide this, hide what it was doing from the IAEA', and was taking steps to export the excess heavy water.²²

Earlier in the year the USA made a licensed purchase of 32 metric tonnes of nuclear-grade heavy water totalling \$8.6 million from the Atomic Energy Organization of Iran to help Iran comply with the JCPOA limit of 130 metric tonnes.²³ US Energy Secretary Ernest Moniz stated that: 'The idea is: OK, we tested it, it's perfectly good heavy water. It meets spec. We'll buy a little of this. That will be a statement to the world: "You want to buy heavy water from Iran, you can buy heavy water from Iran. It's been done. Even the United States did it."' ²⁴ The Iranian heavy water was delivered to Oak Ridge National Laboratory in Tennessee, USA.²⁵ It was reported in November 2016 that Iran had shipped 11 metric tonnes of heavy water to Oman to draw down its stocks below 130 metric tonnes as mandated by the JCPOA.²⁶ Iran had also previously sold low-enriched uranium to Russia to help reach its limit of 300 kg of UF₆ enriched up to 3.67 per cent U-235.²⁷

²⁰ IAEA, GOV/2016/55 (note 12), para 6.

²¹ IAEA, GOV/2016/55 (note 12), para. 23.

²² Murphy, F., 'Iran once again exceeds a nuclear deal limit: IAEA report', Reuters, 9 Nov. 2016.

²³ Reuters, 'U.S. to buy heavy water from Iran's nuclear program', 22 Apr. 2016; and Solomon, J., 'U.S. to buy material used in Iran nuclear program', *Wall Street Journal*, 22 Apr. 2016.

²⁴ Solomon (note 23).

²⁵ US Department of State, Deputy Spokesperson, Daily press briefing, 27 Apr. 2016.

²⁶ 'Iran says it has transferred 11 tons of heavy water to Oman', Associated Press, 22 Nov. 2016; and Norman, L., 'Iran to ship heavy water out of country to ease nuclear conflict', *Wall Street Journal*, 19 Nov. 2016.

²⁷ Sanger, D. E. and Kramer, A. E., 'Iran hands over stockpile of enriched uranium to Russia', *New York Times*, 28 Dec. 2015.