

I. Iran's nuclear programme and international concerns

TARIQ RAUF

Iran is party to the Treaty on the Non-Proliferation of Nuclear Weapons (Non-Proliferation Treaty, NPT), which it signed when the Treaty was opened for signature on 1 July 1968 and deposited its instrument of ratification on 2 February 1970. As a party to the NPT, Iran legally committed itself to nuclear non-proliferation and agreed to submit all its nuclear materials and facilities to international verification under a safeguards agreement concluded with the International Atomic Energy Agency (IAEA) that entered into force on 15 May 1974.¹ Under its NPT safeguards agreement, Iran has declared 18 nuclear facilities and 9 locations outside facilities where nuclear material is customarily used (LOFs).²

Since evidence of undeclared Iranian nuclear facilities was first made public in 2002, controversy has raged regarding the country's nuclear ambitions, the scale of its enrichment capabilities, and possible military activities in the nuclear field, which would not be in compliance with Iran's commitments under the NPT and its safeguards agreement. Between September 2003–September 2012, the IAEA Board of Governors and the United Nations Security Council adopted resolutions that, among other things, found Iran's past nuclear activities to be in non-compliance with its safeguards agreement.³ The IAEA and the UN Security Council have repeatedly called upon Iran to remedy its non-compliance, suspend all its enrichment-related, reprocessing and heavy-water related activities, and cooperate with the IAEA—including through the implementation of an Additional Protocol to its safeguards agreement—on all outstanding safeguards matters including those that are required to clarify allegations

¹ International Atomic Energy Agency, 'The text of the agreement between Iran and the Agency for the application of safeguards in connection with the Treaty on the Non-proliferation of Nuclear Weapons', INFCIRC/214, 13 Dec. 1974.

² By city, these facilities include Arak: Iran Nuclear Research Reactor (IR-40 Reactor); Bushehr: Bushehr Nuclear Power Plant (BNPP); Darkhovin: 360 MW Nuclear Power Plant; Esfahan: Miniature Neutron Source Reactor (MNSR), Light Water Sub-Critical Reactor (LWSCR), Heavy Water Zero Power Reactor (HWZPR), Uranium Conversion Facility (UCF), Fuel Manufacturing Plant (FMP), Fuel Plate Fabrication Plant (FPFP) and Enriched UO₂ Powder Plant (EUPP); Fordow: Fordow Fuel Enrichment Plant (FFEP); Karaj: Karaj Waste Storage; Natanz: Fuel Enrichment Plant (FEP) and Pilot Fuel Enrichment Plant (PFEP); Shiraz: 10 MW Fars Research Reactor (FRR); and Tehran: Tehran Research Reactor (TRR), Molybdenum, Iodine and Xenon Radioisotope Production (MIX) Facility and Jabr Ibn Hayan Multipurpose Laboratories (JHL). All 9 LOFs are situated within hospitals. International Atomic Energy Agency, Board of Governors, 'Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran', Report by the Director General, GOV/2014/58, 7 Nov. 2014.

³ International Atomic Energy Agency, Board of Governors, 'Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran', Report by the Director General, GOV/2013/56, 14 Nov. 2013, notes 2 and 3.

of ‘possible military dimensions’ (PMD) to Iran’s nuclear programme.⁴ Following a period of stalemate since 2011, a breakthrough was achieved in November 2013 when Iran and the IAEA agreed on a Framework of Cooperation designed to resolve all past and present issues. In addition Iran and the E3/EU+3 concluded a ‘Joint Plan of Action’ in November 2013 in an effort to reach a mutually agreed long-term comprehensive solution that would ensure Iran’s nuclear programme would be dedicated exclusively to peaceful purposes.

The IAEA and Iran

Implementation of NPT safeguards

The IAEA issued quarterly reports during 2014 concerning the implementation of the NPT safeguards agreement and relevant provisions of UN Security Council resolutions in Iran.⁵ These reports also covered progress under the ‘Joint Statement on a Framework for Cooperation’, signed between Iran and the IAEA on 11 November 2013.⁶ An Annex to the framework contained a list of practical measures to be implemented by Iran (in relation to verification activities to be undertaken by the IAEA) to resolve all present and past issues in a series of steps.

In each report to the IAEA Board of Governors in 2014 and, in parallel, to the UN Security Council, the IAEA reaffirmed its conclusion that although it had continued to verify the non-diversion of declared nuclear material at the nuclear facilities and LOFs declared by Iran under its safeguards agreement, the IAEA was not in a position to provide credible assurance on the absence of undeclared nuclear material and activities in Iran, and therefore to conclude that all nuclear material in Iran was used solely for peaceful activities.

The reports also stated that Iran had not suspended all of its uranium enrichment activities in the declared facilities at Natanz and Fordow, contrary to the relevant resolutions of the Board of Governors and the Security Council. However, since 20 January 2014 Iran had ceased the production of uranium hexafluoride (UF₆) enriched above 5 per cent uranium-235 (U-235) and it had further processed all of its stock of UF₆ enriched up to

⁴ On developments in earlier years see Kile, S. N., ‘Iran and nuclear proliferation concerns’, *SIPRI Yearbook 2014*, p. 357; and other relevant editions of the SIPRI Yearbook. For a summary and other details of the NPT see annex A, section I, in this volume.

⁵ International Atomic Energy Agency, Board of Governors, ‘Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran’, Reports by the Director General: GOV/2014/10, 20 Feb. 2014; GOV/2014/28, 23 May 2014; GOV/2014/43, 5 Sep. 2014; and GOV/2014/58 (note 2). The documents cited here are available on the International Atomic Energy Agency website, <<http://www.iaea.org/>>.

⁶ International Atomic Energy Agency, Joint Statement on a Framework for Cooperation, GOV/INF/2013/14, 11 Nov. 2013.

20 per cent U-235 through down blending or conversion into uranium oxide (UO₂).⁷ The IAEA reported that all declared enrichment-related activities, nuclear material and installed centrifuge cascades remained under IAEA safeguards. Iran explained to the IAEA that the purpose of producing low-enriched uranium (LEU) 5 per cent U-235 was to make fuel for its nuclear facilities, and 20 per cent U-235 for manufacture of fuel for research reactors.

The IAEA reported that both the Fuel Enrichment Plant (FEP) and Pilot Fuel Enrichment Plant (PFEP) at Natanz had operated as declared by Iran. The FEP comprised 15 420 IR-1 centrifuges installed in 90 cascades, of which 54 cascades with 9156 centrifuges were being fed with natural UF₆, while the PFEP housed 328 IR-1 centrifuges installed in two cascades, both of which were being fed with natural UF₆ for the production of 5 per cent U-235. The two Natanz facilities were reported to have ceased production of UF₆ enriched to 20 per cent U-235 as of 20 January 2014, and had withdrawn all the produced UF₆ enriched to 20 per cent U-235 from the process. Similarly, the Fordow Fuel Enrichment Plant (FFEP), with 2710 IR-1 installed centrifuges, had also operated as declared.

The IAEA confirmed no reprocessing activities were being carried out at the Tehran Research Reactor (TRR), the Molybdenum, Iodine and Xenon Radioisotope Production (MIX) Facility, and other facilities to which the IAEA had access.⁸

The IAEA reported that contrary to the relevant resolutions of the Board of Governors and the Security Council, Iran had not suspended work on all heavy-water related projects. However, since 20 January 2014 Iran had not installed any major components at the 40 MW(e) heavy-water moderated IR-40 research reactor that was under construction near Arak. The reactor had been designed to contain 150 fuel assemblies containing natural uranium in the form of UO₂. It also reported that Iran had not produced nuclear fuel assemblies for the IR-40 reactor at its Fuel Manufacturing Plant (FMP).

The IAEA verified that, as of 17 October 2014, Iran had produced an experimental nuclear fuel assembly at the FPF at Esfahan and 30 Tehran Research Reactor (TRR)-type nuclear fuel assemblies. A total of 28 of these nuclear fuel assemblies, as well as the experimental nuclear fuel assembly,

⁷ Uranium, like other elements, occurs in several slightly differing forms known as isotopes that differ from each other in the number of uncharged particles (neutrons) in the nucleus. Natural uranium (NU) as found in the Earth's crust is a mixture largely of 2 isotopes: uranium-238 (U-238), accounting for 99.3% and uranium-235 (U-235) about 0.7%. The isotope U-235 is important in the nuclear fuel cycle both for civilian and military uses. NU can be enriched to about 5% U-235 to make nuclear fuel to produce electricity, and to above 90% U-235 to make nuclear weapons. World Nuclear Association, 'What is uranium? How does it work?', Mar. 2014, <<http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Introduction/What-is-Uranium--How-Does-it-Work-/>>.

⁸ The MIX Facility is a hot-cell complex for the separation of radiopharmaceutical isotopes from targets, including uranium, irradiated at TRR.

had been transferred to the TRR. In October the IAEA confirmed that 13 nuclear fuel assemblies containing 20 per cent U-235 had been produced in Iran and had been installed in the core of the TRR.

The possible military dimensions (PMD) of Iran's nuclear programme continued to raise questions in 2014. The Annex to the November 2011 report of Director General Yukiya Amano provided a detailed description of the information available to the IAEA at that time indicating that Iran had carried out activities relevant to the development of a nuclear explosive device and stated the evidence had been 'assessed by the [IAEA] to be, overall, credible'.⁹ In 2014, the IAEA continued to urge Iran to cooperate fully with the agency on all outstanding issues. Pursuant to Security Council resolution 1929, the IAEA requested Iran to provide access without delay to all sites, equipment, persons and documents previously requested by the IAEA.¹⁰ The report noted that Iran had dismissed the IAEA's concerns regarding PMD largely on the grounds that Iran considered them to be based on unfounded allegations (see below).

Notwithstanding Iran's position with respect to PMD issues, the IAEA reported that, in April and May 2014, Iran had provided information and explanations on the development and applications of Exploding Bridge Wire (EBW) detonators. Iran also showed documents to the IAEA to substantiate its stated need for the development of EBW detonators and their application. In August 2014 Iran and the IAEA continued their discussions in order to clarify issues of concern over the initiation of high explosives and neutron transport calculations. However, the IAEA subsequently reported that Iran's explanations so far did not enable the IAEA to clarify these two issues and that consultations would have to continue on them.

The IAEA continued to request Iran to provide it with information on and access to the Parchin site in Iran which, according to information provided to the IAEA by unidentified states, had a large 'explosives containment chamber' designed for hydrodynamic experiments that may be associated with a programme to develop nuclear weapons.

The IAEA, in a change in its methodology for dealing with PMD, informed Iran that it would conduct a 'system assessment' of the outstanding issues. This would involve the consideration and development of a comprehensive understanding of each issue in turn followed by the integration all of the issues into a 'system' and an assessment of that system as a whole.¹¹

⁹ International Atomic Energy Agency, Board of Governors, 'Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran', Report by the Director General, GOV/2011/65, 8 Nov. 2011, p. 8.

¹⁰ UN Security Council Resolution 1929, 9 June 2010.

¹¹ International Atomic Energy Agency, GOV/2011/65, (note 9), paras 4951.

The four IAEA reports issued in 2014 also noted that during the year, contrary to the relevant resolutions of the Board of Governors and the Security Council, Iran had not implemented the Additional Protocol to its comprehensive safeguards agreement and the modified Code 3.1 of the Subsidiary Arrangements General Part concerning the early provision of design information. The IAEA added that it would not be in a position to provide credible assurance on the absence of undeclared nuclear material and activities in Iran unless and until Iran provided the necessary cooperation with the IAEA, including through implementation of its Additional Protocol.¹²

Overall IAEA safeguards conclusions for 2014

In its last report of the year on safeguards implementation in Iran pursuant to its NPT safeguards agreement and relevant provisions of Security Council resolutions, the IAEA reported that since Iran began enriching uranium at its declared facilities, those facilities had produced 13 397.3 kilograms of UF₆ enriched up to 5 per cent U-235, of which 8390.3 kg remained in the form of UF₆ enriched up to 5 per cent U-235 and the rest had been further processed. Prior to 20 January 2014, Iran had also produced 447.8 kg of UF₆ enriched up to 20 per cent U-235, all of which had been further processed through downblending or conversion into uranium oxide.¹³

At the FEP at Natanz there had been no change and, as of 15 October 2014, there remained 15 420 installed IR-1 centrifuges in 90 fully installed cascades. Of these, 54 cascades with 9156 centrifuges were being fed with natural UF₆.¹⁴ In the production area of the PFEP at Natanz, 328 IR-1 centrifuges installed in two cascades were being fed with natural UF₆. In the research and development (R&D) area at PFEP during the year Iran had intermittently fed natural UF₆ in test centrifuges. At the FFEP, the number of installed centrifuges remained unchanged at 2710 IR-1s. The IAEA concluded that FEP, PFEP and FFEP had all operated as declared by Iran.

The IAEA carried out relevant verification activities at the TRR and at the MIX Facility in October, and it continued to monitor the use of hot cells at both facilities. The IAEA maintained its conclusion that no

¹² International Atomic Energy Agency, GOV/2014/10, GOV/2014/28, GOV/2014/43, and GOV/2014/58 (note 5). International Atomic Energy Agency, Board of Governors, 'Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran', Resolution, GOV/2006/14, 4 Feb. 2006. Iran signed its Additional Protocol on 18 Dec. 2003. Although it had not been brought into force, Iran provisionally implemented its Additional Protocol between Dec. 2003 and Feb. 2006. It ceased implementation following the adoption of a resolution by the Board of Governors on 4 Feb. 2006 that reported Iran to the United Nations Security Council for not implementing the confidence-building measures as determined by the board.

¹³ International Atomic Energy Agency, GOV/2014/58 (note 2).

¹⁴ In mid-Oct., there were 28 IR-1, 172 IR-2m, 177 IR-4, 1 IR-5, 9 IR-6, and 1 IR-8 prototype centrifuges at PFEP in the R&D area.

reprocessing activities were being carried out at the TRR, the MIX Facility and the other facilities to which the IAEA had access.

The IAEA and Iran had concluded a safeguards approach for IR-40 in August. Based on the relevant verification activities it had carried out at the IR-40 research reactor in October, the IAEA reported that it had observed that none of the reactor's major components had been installed.

As noted earlier, the IAEA verified that as of October Iran had produced an experimental fuel assembly at FFPF at Esfahan and 30 TRR-type nuclear fuel assemblies, and that the experimental assembly and 28 of the TRR-type assemblies had been transferred to TRR. It also confirmed that 13 nuclear fuel assemblies containing 20 per cent U-235 had been produced in Iran and had been installed in the TRR core.

On issues related to PMD, the IAEA noted that it had held technical meetings in Iran in early October and early November to further discuss the issues relating to the initiation of high explosives and to neutron transport calculations. The IAEA also reported that, since September, at a particular location at the Parchin site (where a large 'explosives containment chamber' was located), it observed through satellite imagery that the construction activities that appeared to show the removal/replacement or refurbishment of the site's two main buildings' external wall structures appeared to have ceased. The report noted that the construction activities carried out there were likely to have further undermined the IAEA's ability to conduct effective verification and underlined the importance of access for the IAEA to the particular location in question.

The 'Framework for Cooperation' between Iran and the IAEA

The 'Framework for Cooperation'—essentially a plan of work on the implementation of an agreed list of specific safeguards and verification measures—marked a new step of engagement between the IAEA and Iran following the change of government in Tehran in August 2013.

Following the election of Hassan Rouhani as president of Iran in August 2013, Iran's narrative and engagement on its nuclear programme changed to one aimed at seeking a long-term, comprehensive agreement. On 11 November 2013, the IAEA and Iran signed a 'Joint Statement on a Framework for Cooperation', under which the two sides committed to resolve the IAEA's continuing concerns over Iran's nuclear programme through a step-by-step cooperative process that would address all of the outstanding issues.¹⁵ The IAEA agreed to continue to take into account Iran's security concerns, including through the use of managed access and the protection of confidential information.

¹⁵ International Atomic Energy Agency, GOV/INF/2013/14 (note 6).

An Annex to the framework specified six initial ‘practical measures’ that Iran agreed to undertake within a three-month period (December 2013–February 2014) as the first step in the process.¹⁶ In February 2014, the IAEA reported that technical meetings in Vienna and Tehran had been held on 11 December 2013 and 8–9 February 2014, respectively, to review progress on the implementation of the agreed measures under the framework. The IAEA confirmed that Iran had successfully implemented the measures within the three-month timeframe and agreed upon seven further measures to be carried out during the next step by 15 May 2014 (see table 12.1).¹⁷

In its May report the IAEA confirmed that Iran had implemented the seven practical measures to which it had previously agreed in February (see table 12.2).¹⁸ In implementing its measures, Iran had provided the IAEA with information and explanations, including showing documents to substantiate its stated need and application for the development of EBW detonators for civilian uses. According to the IAEA’s report, this marked the first instance when Iran engaged in a technical exchange with the IAEA on this or on any other of the outstanding matters related to PMD to Iran’s nuclear programme since 2008.¹⁹

During technical meetings held in Tehran on 26 April 2014 and on 12 May 2014 the IAEA provided suggestions for further practical measures to be implemented by Iran in relation to the framework. At a technical meeting in Tehran on 20 May 2014, the IAEA and Iran subsequently agreed on five additional practical measures to be implemented by Iran during the third step by 25 August 2014.

In its September report, the IAEA confirmed that Iran had implemented three of the five practical measures under the third step of the Framework for Cooperation (although two had been implemented a week after the agreed deadline of 25 August 2014) and that discussions had begun on the two other practical measures (see table 12.3).²⁰

The IAEA noted that Iran’s engagement had been helpful in enabling it to gain a clearer picture of these elements of Iran’s nuclear programme. It was agreed that a further technical meeting would be convened to discuss the two outstanding actions regarding the initiation of high explosives and

¹⁶ International Atomic Energy Agency, GOV/INF/2013/14 (note 6).

¹⁷ International Atomic Energy Agency, GOV/2014/10 (note 5).

¹⁸ International Atomic Energy Agency, GOV/2014/28 (note 5).

¹⁹ As indicated above, Iran further limited its engagement with the IAEA on PMD following the release of the Annex on PMD to the Nov. 2011 report by Director General Amano. International Atomic Energy Agency, GOV/2011/65 (note 9). The previous technical exchange engagement took place in 2008 and has been restricted since then as a response to Security Council resolutions against Iran. International Atomic Energy Agency, GOV/2014/28 (note 5), p. 12.

²⁰ International Atomic Energy Agency, GOV/2014/43 (note 5).

Table 12.1. Agreed practical measures and status under the Framework for Cooperation to be completed by 11 February 2014

Agreed actions	Status
Provide mutually agreed relevant information and managed access to the Gchine mine in Bandar Abbas	Completed: Iran provided this information (including on the production and shipping of UOC) and managed access to the requested site locations on 29 Jan. 2014 ^d
Provide mutually agreed relevant information and managed access to the Heavy Water Production Plant (HWPP) at Arak	Completed: Iran provided this information and the managed access on 8 Dec. 2013. It was that approximately 100 tonnes of reactor-grade heavy water had been produced at the reactor since production began in 2006
Provide information on all new research reactors and the identification of 16 sites designated for the construction of nuclear power plants	Completed: On 8 Feb. 2014 Iran informed the IAEA of its plans to build a '10 MW light-water pool type research reactor with 20% enriched uranium oxide fuel', for which the site selection was still in its preliminary stages. Iran reported that the planned purpose of the research reactor was for 'educational nuclear research, material testing, medical radioisotopes production and other beam line application'
Provide information with regard to the identification of 16 sites designated for the construction of nuclear power plants	Completed: On 8 Feb. 2014, Iran informed the IAEA that work had begun to identify 'Candidate Areas' for new nuclear power plants and provided a list of the 16 'Preferred Candidate Areas' as potential locations that had so far been identified according to criteria based on 'safety, environmental, social and economical, and technical factors'
Provide clarification of the announcement made by Iran regarding additional enrichment facilities	Completed: On 18 Jan. 2014, Iran clarified its earlier announcement on its decision to construct 10 additional uranium enrichment facilities and announced that preliminary site selections for 5 such facilities had begun, but remained to be finalized and further that no new enrichment facilities would be identified during the 'first step time-bound (six months)'
Provide further clarification of the announcement made by Iran with respect to laser enrichment technology	Completed: On 18 Jan. 2014 Iran provided further clarification of its Feb. 2010 statement with respect to laser enrichment technology in which Iran indicated that this statement had been based on its past laser enrichment R&D activities which had been discontinued in 2003. Iran reported that no 'especially designed or prepared systems, equipment and components for use in laser-based enrichment plants in Iran' had since been developed

IAEA = International Atomic Energy Agency; R&D = research and development; UOC = uranium ore concentrate.

^d Iran has very limited reported uranium resources, with the main deposits located at the Gchine open pit mine. Production at the mine commenced in 2006. World Nuclear Association, 'Nuclear power in Iran', <<http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Iran/>>.

Table 12.2. Agreed practical measures and status under the Framework for Cooperation to be completed by 15 May 2014

Agreed actions	Status
Provide mutually agreed relevant information and managed access to the Saghand mine in Yazd	Completed: Iran provided this information on 6 May 2014
Provide mutually agreed relevant information and managed access to the Ardakan uranium ore concentration plant	Completed: Iran provided this information on 7 May 2014
Submit an updated design information questionnaire for the IR-40 Reactor at Arak	Completed: On 12 Feb. 2014 Iran provided an updated design information questionnaire for the IR-40 Reactor and, in response to a request by the IAEA, provided further clarification of certain information in the questionnaire on 29 Mar.
Take steps to agree with the IAEA on the conclusion of a safeguards approach for the IR-40 Reactor	Completed: On 5 May 2014 Iran agreed to safeguards measures for the IR-40 Reactor
Provide mutually agreed relevant information and arranging for a technical visit to Lashkar Ab'ad Laser Centre	Completed: On 12 Mar. 2014 Iran provided this information and arranged the IAEA's technical visit to the site
Provide information on source material, which has not reached the composition and purity suitable for fuel fabrication or for being isotopically enriched, including imports of such material and on Iran's extraction of uranium from phosphates	Completed: On 29 Apr. 2014 Iran provided information on source material as requested
Provide information and explanations for the IAEA to assess Iran's stated need or application for the development of EBW detonators	Completed: Iran supplied the requested information and explanations at a meeting on 26 Apr. 2014, letters dated 30 Apr. 2014, and a further meeting on 20 May 2014

EBW = Exploding-bridgewire detonator; IAEA = International Atomic Energy Agency.

neutron transport calculations. On 28 August 2014, Iran proposed that a road map be developed before any new measures were to be identified. Subsequently, on 4 September 2014, the IAEA reiterated its earlier invitation made on 25 August 2014 for Iran to propose new technical measures under the framework.

In its last report of the year on the Framework for Cooperation issued in November, the IAEA noted that it had held two technical meetings in Tehran, on 7 October and 2 November, to discuss the two outstanding practical measures agreed in May 2014 in the third step of the Framework for Cooperation.²¹ It noted that Iran had not provided any explanations that enabled the IAEA to clarify the two outstanding practical measures

²¹ International Atomic Energy Agency, GOV/2014/58 (note 2).

Table 12.3. Agreed practical measures and status under the Framework for Cooperation to be completed by 25 August 2014

Agreed actions	Status
Exchange information with IAEA with respect to the allegations related to the initiation of high explosives, including the conduct of large scale high explosives experimentation in Iran	Not yet completed
Provide mutually agreed relevant information and explanations related to studies made and/or papers published in Iran in relation to neutron transport and associated modelling and calculations and their alleged application to compressed materials	Not yet completed
Provide mutually agreed information and arrange a technical visit to a centrifuge research and development centre	Completed: On 30 Aug. 2014. Iran provided the agreed information and arranged the technical visit
Provide mutually agreed information and managed access to centrifuge assembly workshops, centrifuge rotor production workshops and storage facilities	Completed: Iran provided the agreed information and managed access on 18–20 Aug. 2014
Conclude the safeguards approach for the IR-40 Reactor	Completed: Iran concluded the safeguards approach on 31 Aug 2014 (6 days after the 25 Aug. 2014 deadline)

IAEA = International Atomic Energy Agency.

relating to the initiation of high explosives and to neutron transport calculations, although Iran had provided some explanation of related open source scientific publications.

It was agreed that another technical meeting would be held on these issues after 24 November. As Iran had not proposed any new practical measures in the next step of the framework, the IAEA reiterated its invitation to Iran to propose additional practical measures to address outstanding matters relating to PMD.

Iran's responses to the IAEA reports

During 2014, as in previous years, Iran sent 'explanatory notes' to the IAEA commenting on the respective IAEA reports on safeguards implementation in Iran.²² The notes stated, among other things, that 'based on the provisions of the IAEA Statute and the Safeguards Agreement, the BOG [Board of Governors] resolutions against Iran are illegal and unjustified' and that in this context the 'adoption of politically motivated, illegal and unjust UNSC [UN Security Council] resolutions against Iran is neither legitimate nor acceptable. Therefore, any request by the Agency [IAEA] stemming

²² International Atomic Energy Agency, Communication dated 5 Mar. 2014 received from the Permanent Mission of the Islamic Republic of Iran to the Agency regarding the report of the Director General on the implementation of safeguards in Iran, INF/CIRC/861, 11 Mar. 2014.

from those resolutions is not justifiable'.²³ This complaint by Iran referred to the IAEA's investigations of PMD and related matters. Such responses to IAEA reports had been sent by Iran for many years and continued when the current Iranian government took office.

On 4 June 2014, Iran stated, among other things, that IAEA's 'access to open source information does not authorize it to require a Member State to provide information or access beyond its safeguards agreement'.²⁴

On 20 November 2014, Iran, among other things, stated that on 'one of the practical measures under consideration, Iran ... provided detailed explanations on the documents shown by the [IAEA] to Iran and provided pieces of evidence that indicate such documents are fabricated. Those forged documents have no sign to prove that they are of Iranian origin and contrary to such claim; the documents are full of mistakes and contain fake names with specific pronunciations, which only point toward a certain Member of the IAEA as their forger'.²⁵ Iran stated that it considered the Director General was relying on forged and false information provided by Western intelligence services, without any authenticity or verification, to put pressure on Iran.²⁶ Thereafter, Iran effectively limited its engagement with the IAEA on PMD and limited its cooperation mainly to the implementation of its comprehensive safeguards agreement.

Iran and E3/EU+3 Joint Plan of Action

IAEA monitoring and verification

On 24 November 2013 in Geneva, following several months of negotiations facilitated by the European Union (EU), Iran and foreign ministers from the E3/EU+3 (China, France, Germany, Russia, the United Kingdom and

²³ International Atomic Energy Agency, INFCIRC/861 (note 22).

²⁴ International Atomic Energy Agency, Communication dated 4 June 2014 received from the Permanent Mission of the Islamic Republic of Iran to the Agency regarding the report of the Director General on the implementation of safeguards in Iran, INFCIRC/866, 13 June 2014.

²⁵ International Atomic Energy Agency, Communication dated 20 Nov. 2014 received from the Permanent Mission of the Islamic Republic of Iran to the Agency regarding the report of the Director General on the implementation of safeguards in Iran, INFCIRC/871, 1 Dec. 2014.

²⁶ There have been previous instances of fake documentation and information being provided to the IAEA in high-profile verification cases. E.g. the IAEA was given fake documents about the import of uranium by Iraq from Niger. See e.g. ElBaradei, M., Director General of the IAEA, 'The status of nuclear inspections in Iraq: an update', 7 Mar. 2003, <<https://www.iaea.org/newscenter/statements/status-nuclear-inspections-iraq-update>>; and International Atomic Energy Agency, 'Work programme of IAEA in Iraq pursuant to Security Council Resolution 1284 (1999)', 19 Mar. 2003, <https://www.iaea.org/newscenter/focus/iraq/wp_res1284>. There have also been allegations in the media that information and documentation on PMD in Iran may include fake and forged documentation. See e.g. Porter, G., 'Ex-IAEA chief warns on using unverified intel to pressure Iran', LobeLog foreign policy, 19 Dec. 2014, <<http://www.lobelog.com/ex-iaea-chief-warns-on-using-unverified-intel-to-pressure-iran/>>; and Tirone, J., 'CIAs nuclear-bomb sting said to spur review in Iran arms case', Bloomberg Business, 20 Feb. 2015, <<http://www.bloomberg.com/news/articles/2015-02-20/cia-s-nuclear-bomb-sting-said-to-spur-review-in-iran-arms-case>>.

the United States) successfully concluded a Joint Plan of Action (JPA) with Iran as an interim agreement in pursuit of the goal of 'a mutually agreed long-term comprehensive solution that would ensure Iran's nuclear programme will be exclusively peaceful'.²⁷

The JPA was scheduled to take effect on 20 January 2014 and included a series of voluntary measures to be implemented over a six-month duration, renewable by mutual agreement. Under the agreement Iran committed to suspend all uranium enrichment above 5 per cent, freeze its enrichment capacity (no new enrichment facilities to be developed beyond those already existing at the Fordow and Natanz sites) and significantly reduce its stockpile of enriched uranium (convert or dilute all 20 per cent U-235 and covert all newly enriched UF₆ up to 5 per cent U-235 to uranium oxide). Iran additionally undertook to suspend further development of the IR-40 Reactor at Arak (including the manufacture and testing of fuel and transfer of heavy water to the reactor) and to halt reprocessing activities, including the construction of a facility capable of reprocessing. Lastly, Iran also agreed on arrangements with the IAEA for increased access by agency inspectors to the Natanz and Fordow facilities.

On 24 January the IAEA Board of Governors endorsed the request by Iran and the E3/EU+3 for the IAEA to undertake monitoring and verification of nuclear-related measures in relation to the Joint Plan of Action, subject to the availability of funds.²⁸

In March an IAEA report on Iran's implementation of voluntary measures under the JPA since 20 January confirmed that Iran had ceased both the enrichment of uranium above 5 per cent U-235 and the operation of cascades in an interconnected configuration at any of its declared facilities. Further, Iran had diluted nearly one-third of UF₆ enriched up to 20 per cent U-235 down to an enrichment level not exceeding 5 per cent U-235 at the PFEP, and had undertaken to downblend half of the remaining UF₆ within three months with the balance to be converted to uranium oxide within six months. It was reported that Iran had halted 'further advances' to its activities at the fuel enrichment plants at Natanz and Fordow and the IR-40 reactor at Arak, and had not carried out any reprocessing activities at the MIX Facility. Further, Iran had provided information and managed access to the Gchine mine; provided IAEA

²⁷ International Atomic Energy Agency, Communication dated 27 Nov. 2013 received from the EU High Representative concerning the text of the Joint Action Plan, INFCIRC/855, 27 Nov. 2013; and International Atomic Energy Agency, Communication dated 28 Nov. 2013 received from the Permanent Mission of the Islamic Republic of Iran to the Agency concerning the text of the Joint Action Plan, INFCIRC/856, 29 Nov. 2013.

²⁸ International Atomic Energy Agency, 'IAEA Convenes board meeting on Iran', Press Release 2014/1, 15 Jan. 2014, <<https://www.iaea.org/newscenter/pressreleases/iaea-convenes-board-meeting-iran>>.

inspectors with daily access to FEP, PFEP and FFEP; and provided managed access to centrifuge assembly, production and storage facilities.²⁹

In its next report on the JPA issued in April, the IAEA, among other things, confirmed that Iran had completed the dilution of half of the UF₆ that had been enriched up to 20 per cent U-235 down to an enrichment level below 5 per cent U-235, and reconfirmed the previous steps taken by Iran under the plan.³⁰

In June the IAEA confirmed that Iran had completed the downblending of half of its stock of UF₆ enriched up to 20 per cent U-235 to an enrichment level of no more than 5 per cent U-235. Moreover, Iran had begun the conversion of some UF₆ enriched up to 20 per cent U-235 into uranium oxide at the FFPF at Esfahan, provided information in relation to enhanced IAEA monitoring of nuclear facilities, uranium mines and mills, and on source material, and had reconfirmed the continuation of the voluntary measures.³¹ No new information was reported by the IAEA in its reports of July and August.

The IAEA's September report added that Iran had stated that it would dilute approximately 4118 kg of UF₆ enriched to 2 per cent U-235 down to the level of natural uranium.³² In its October report, the IAEA confirmed that this process had been completed.³³

On 24 November—the date of the expiry of the extension of the JPA—the IAEA, among other things, reconfirmed that Iran had (a) ceased enrichment of uranium above 5 per cent U-235 at all of its declared facilities; (b) not operated centrifuge cascades in an interconnected configuration at any of its declared facilities; (c) downblended 108.4 kg of its stock of UF₆ enriched up to 20 per cent U-235 to an enrichment level of no more than 5 per cent U-235; and (d) fed 100 kg of UF₆ enriched up to 20 per cent U-235 into uranium oxide.³⁴

The IAEA's final report of 2014 on the JPA, issued in December, reconfirmed that of Iran's total inventory of 209.1 kg of UF₆ enriched up to 20 per cent as of 20 January, 208.40 kg had been downblended and 0.6 kg of UF₆ enriched to 20 per cent U-235 of reference material for mass spectroscopy was under IAEA seal. The IAEA had taken 0.1 kg of the material

²⁹ International Atomic Energy Agency, Board of Governors, 'Status of Iran's nuclear programme in relation to the Joint Action Plan', Report by the Director General, GOV/INF/2014/6, 20 Mar. 2014.

³⁰ International Atomic Energy Agency, Board of Governors, 'Status of Iran's nuclear programme in relation to the Joint Action Plan', Report by the Director General, GOV/INF/2014/10, 17 Apr. 2014.

³¹ International Atomic Energy Agency, Board of Governors, 'Status of Iran's nuclear programme in relation to the Joint Action Plan', Report by the Director General, GOV/INF/2014/14, 20 June 2014.

³² International Atomic Energy Agency, Board of Governors, 'Status of Iran's nuclear programme in relation to the Joint Action Plan', Report by the Director General, GOV/INF/2014/21, 19 Sep. 2014.

³³ International Atomic Energy Agency, Board of Governors, 'Status of Iran's nuclear programme in relation to the Joint Action Plan', Report by the Director General, GOV/INF/2014/23, 20 Oct. 2014.

³⁴ International Atomic Energy Agency, Board of Governors, 'Status of Iran's nuclear programme in relation to the Joint Action Plan', Report by the Director General, GOV/INF/2014/26, 24 Nov. 2014.

for its sampling purposes. It further stated that Iran had not made any advances at the FEP, FFEP and IR-40 facilities and had not carried out any reprocessing at the MIX Facility. In addition, Iran had provided information and managed access to the uranium mines at Gchine and Saghand, provided daily access to IAEA inspectors to uranium enrichment facilities at Natanz and Fordow and provided regular managed access to centrifuge assembly and rotor production workshops and storages. Lastly, the IAEA restated that Iran had diluted UF₆ enriched up to two per cent U-235 to the level of natural uranium.³⁵

Extension of the Joint Plan of Action

On 28 November Iran and the E3/EU+3 informed the IAEA of the further extension of the JPA until 30 June 2015 and requested the IAEA continue to undertake monitoring and verification activities under the JPA, including monitoring of nuclear fuel fabrication for the TRR and defined centrifuge related activities.

On 11 December the IAEA Board of Governors endorsed the continuation of monitoring and verification activities by the IAEA under the JPA extension, subject to the availability of funds. The IAEA noted that these activities involved a significant increase in the frequency of its in-field verification activities, including access to locations, additional sample analyses and analytical work, as well as procurement and installation of more safeguards equipment. The IAEA estimated the cost of monitoring and verification activities until June 2015 would require approximately €5.5 million (\$6.8 million).³⁶

³⁵ International Atomic Energy Agency, Board of Governors, 'Status of Iran's nuclear programme in relation to the Joint Action Plan', Report by the Director General, GOV/INF/2014/29, 19 Dec. 2014.

³⁶ International Atomic Energy Agency, Board of Governors, 'Status of Iran's nuclear programme in relation to the Joint Action Plan', Report by the Director General, GOV/2014/62, 3 Dec. 2014.