



Analysis of the IAEA's Sixth Iran Nuclear Deal Report: A Return to More Limited Data

By David Albright and Andrea Stricker

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On June 2, 2017, the International Atomic Energy Agency (IAEA) released its sixth [report](#) on Iran's compliance with United Nations Security Council (UNSC) resolution 2231 (2015). UNSCR 2231 codified into international law the Joint Comprehensive Plan of Action (JCPOA), which was implemented on January 16, 2016, a date known as Implementation Day. The latest IAEA report again states: "Since Implementation Day, the Agency has been verifying and monitoring the implementation by Iran of its nuclear-related commitments" under the Iran deal. Nowhere in the report does the IAEA state that Iran is fully compliant with the JCPOA, and it should not make that judgement in any case. The issue of judging full compliance is rightly the responsibility of the Joint Commission and governments, in particular those in the P5+1. This IAEA report again omits known controversies over Iranian compliance with specific provisions of the JCPOA. It is deficient in reporting on the verification and monitoring of the JCPOA. The IAEA has an obligation to report fully to member states on Iranian compliance or non-compliance with the JCPOA.

The IAEA report lists many areas where Iran has met the conditions of the JCPOA's provisions. This includes apparently taking steps to come into stricter compliance with the heavy water cap and the cap on low enriched uranium (LEU) imposed by the JCPOA. The Trump administration likely deserves some of the credit for this change, including slowing Iran's persistent violations, its exploitation of loopholes in the deal, and its pushing of the envelope of nuclear limitations. However, known verification controversies continue to not be included in the reporting and may be continuing. While these issues have apparently not reached the level of a material breach, a term used in U.S. legislation such as the Iran Nuclear Agreement Review Act of 2015, they are relevant to member states' understanding of Iran's JCPOA adherence, and to providing an opportunity for independent assessment.

The IAEA's inability to inspect military sites in Iran is not discussed in this report and the IAEA is not believed to have accessed Iranian military sites since Implementation Day. It certainly is not doing so on a regular basis. The lack of such access undermines any statement that the IAEA is able to verify the JCPOA. Such access is necessary to verify limits on Iran's centrifuge

production, judge adherence to nuclear weaponization development bans in the JCPOA, and more broadly gain answers about past and on-going nuclear weapons work.

Moreover, this report is particularly minimalist in nature. Overall, we urge fuller reporting by the IAEA on Iran's compliance with the JCPOA, including previously included technical data, at-issue verification concerns, and details about the IAEA's efforts to verify weaponization bans and reach a broader conclusion about the peacefulness of Iran's nuclear program. As the two year review of the JCPOA approaches, the United States and its allies in the Joint Commission need to press the IAEA to report more fully on the status of Iran's compliance with the nuclear deal, particularly on challenges facing the IAEA in its efforts, including gaining access to military sites.

We also point out that the media should more carefully cover the IAEA's report. In particular, it should not make the mistake of falsely interpreting the IAEA report as stating Iran is complying with the JCPOA, given the lack of any such statement in the report and its many omissions.

Key Findings

- 1)** Since the previous IAEA report, Iran appears to be complying more strictly with JCPOA limitations over which it was facing controversy, such as the heavy water cap. It has also taken steps to reduce its total stockpile of LEU. This suggests that a tougher approach toward compliance by the new U.S. administration may be working.
- 2)** The IAEA's apparent decision to withhold information is damaging to member state review and independent scrutiny of Iran's JCPOA adherence.
- 3)** Iran's stock of heavy water inside Iran was 128.2 metric tonnes near the end of the reporting period but its total stock, including heavy water inside and outside Iran, appears to have remained above the cap of 130 tonnes during the reporting period. Iran may still be storing 11 metric tonnes of its heavy water in Oman. This practice should be ended and Iran should be held to a strict standard of no more than 130 metric tonnes of heavy water under its control, whether inside of outside Iran. Any heavy water in excess of 130 metric tonnes, including that in Oman, should be blended down.
- 4)** In a potentially positive development, Iran shut down its Heavy Water Production Plant (HWPP) for maintenance, despite earlier, false claims that such a shutdown would cause irreversible damage and thus would not be done. Iran does not need more heavy water and should shut this plant permanently.
- 5)** The IAEA claims in a minor comment on the issue that it is verifying and monitoring the nuclear weaponization bans in Section T, Annex I, of the JCPOA. However, the IAEA includes no information about visits to sites or monitoring of specialized equipment that would provide insight into its Section T verification effort. It is doubtful that the IAEA is

adequately verifying the Section T ban, which would include periodic visits to Iranian military sites.

- 6) The IAEA reports that it again attended a meeting of the Procurement Working Group (PWG), which oversees procurements by Iran of nuclear and nuclear-related commodities. The reasons or specifics of the visit are not provided. One positive related development not discussed in the IAEA report is that Kazakhstan, under pressure from JCPOA member states, [withdrew](#) its proposal to sell Iran 950 metric tonnes of natural uranium. This proposal, which would have required the approval of the PWG, would not have been approved by the new U.S. administration and Britain, among others. Iran has no need for additional natural uranium and its stockpiling of natural uranium violates the spirit of capping Iran's nuclear program, which is fundamental to the JCPOA.
- 7) Iran has produced a small quantity of LEU in the Natanz Fuel Enrichment Plant (FEP) during this reporting period, but it may also have exploited a loophole in the JCPOA and enriched a considerable amount of natural uranium using its existing stocks of depleted uranium.
- 8) The IAEA continues to use Joint Commission (or fuzzy) math to define the amount of LEU in Iran subject to the 300 kilogram (kg) cap. The actual amount is greater than that given by the IAEA, although we cannot tell by how much.
- 9) The IAEA provides no information on compliance controversies about: Iran's operation of more IR-6 centrifuges than allowed; production of significantly more rotor tubes and bellows than used in operating advanced centrifuges; its exploitation of quality assurance limits to further test advanced centrifuges; questions on its production of rotor tubes and bellows outside of declared manufacturing equipment; or excessive numbers of centrifuge parts manufactured in general.

Heavy Water and Reprocessing Related Activities¹

The IAEA reports that on May 16, 2017, Iran's stock of heavy water inside Iran was 128.2 metric tonnes but does not report on how much heavy water Iran has in storage in Oman. Iran previously had 11 metric tonnes of heavy water in Oman and this heavy water may still be there. In that case, Iran would have more heavy water than the cap of 130 metric tonnes. Iran's control of more than 130 metric tonnes of heavy water, whether inside or outside the country, should be interpreted as a violation of the JCPOA. As such, Iran should blend down any heavy water under its control that exceeds the 130 metric tonnes cap.

¹ For more information on Iran's heavy water and related issues, see *Heavy Water Loophole in the Iran Deal*, by David Albright and Andrea Stricker, Institute for Science and International Security Report, December 21, 2016. <http://isis-online.org/isis-reports/detail/heavy-water-loophole-in-the-iran-deal>

The IAEA reports that Iran informed the agency that it intended to shut down the HWPP for maintenance on April 27. On May 16, the IAEA verified that the HWPP was shut down. Iran twice willfully violated the looser interpretation that it should not have more than 130 metric tonnes of heavy water in Iran, not counting the overage of the heavy water cap located in Oman. Iran has no reason to keep this plant operational and should shut it down indefinitely.

The IAEA reports that Iran is not conducting reprocessing related activities at the Tehran Research Reactor, the Molybdenum, Iodine and Xenon Radioisotope Production (MIX) Facility, or at any of the other hot cell facilities exempted by the Joint Commission and declared by Iran to the IAEA. The IAEA did not name these other facilities or provide information about the number and types of visits to these sites.

The IAEA continues to report that the Arak heavy water research reactor remains inoperable and Iran is not pursuing a redesign. Iran notified the IAEA that the name of the facility has been changed to Khondab Heavy Water Research Reactor.

Fundamental Verification for Ensuring a Peaceful Nuclear Program

The IAEA again reports that it has “continued 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 remained ongoing.” The IAEA includes no details about its verification efforts in this important area. Given the importance of determining the absence of undeclared nuclear material and activities and Iran’s past cheating on just this point, the lack of IAEA reporting is particularly problematic.

Weaponization Activity Bans and Military Sites

The IAEA report this time does include a minor reference to efforts to verify the weaponization activity bans in Section T, Annex 1, of the JCPOA, namely a set of activities which could contribute to the development of a nuclear explosive device. It states, “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.” Under United Nations Security Council resolution 2231, the IAEA is charged with verifying the nuclear elements of the JCPOA.²

Section T, Annex 1, states: “Iran will not engage in the following activities which could contribute to the development of a nuclear explosive device:

- 82.1. Designing, developing, acquiring, or using computer models to simulate nuclear explosive devices.

² According to UNSC resolution 2231, it “Requests the Director General of the IAEA to undertake the necessary verification and monitoring of Iran’s nuclear-related commitments for the full duration of those commitments under the JCPOA.” In addition, the resolution states: “The International Atomic Energy Agency (IAEA) will be requested to monitor and verify the voluntary nuclear-related measures as detailed in this JCPOA.”

82.2. Designing, developing, fabricating, acquiring, or using multi-point explosive detonation systems suitable for a nuclear explosive device, unless approved by the Joint Commission for non-nuclear purposes and subject to monitoring.

82.3. Designing, developing, fabricating, acquiring, or using explosive diagnostic systems (streak cameras, framing cameras and flash x-ray cameras) suitable for the development of a nuclear explosive device, unless approved by the Joint Commission for non-nuclear purposes and subject to monitoring.

82.4. Designing, developing, fabricating, acquiring, or using explosively driven neutron sources or specialized materials for explosively driven neutron sources.”

Verifying these conditions would likely require IAEA visits to military sites and broader Iranian declarations. Subsection 82.3, for example, covers explosive diagnostic systems that Iran’s military industries are believed to possess. Have these systems been identified, approved by the Joint Commission for non-nuclear use, and subjected to IAEA monitoring? We believe not. In this case, Section T is unimplemented in real terms but needs to be implemented and monitored, including the visiting of military sites to ensure Iranian compliance.

It goes without saying that the IAEA needs to visit military sites as part of its effort to reach a broader conclusion. We have urged the IAEA to [insist](#) on visiting and inspecting Iran’s military sites, in order to ensure that those sites are devoid of any banned activities.

Declarations and Complementary Access

The IAEA report again states that the IAEA has “continued to evaluate Iran’s declarations under the Additional Protocol and to conduct complementary accesses under the Additional Protocol to sites and other locations in Iran.” However, the IAEA report again does not contain any information about its activities, or access to individuals, sites, or documentation in its efforts to reach a broader conclusion about the peaceful nature of Iran’s nuclear program and establish confidence about the absence of undeclared nuclear material and activities in Iran. Iran is provisionally applying the Additional Protocol pending consideration of ratification at Year 8 of the JCPOA and submitted its declarations under the Additional Protocol to the IAEA in the summer of 2016. However, one former senior official close to the IAEA continues to state to the Institute that the IAEA has many unanswered questions related to the broader conclusion that it has not followed up on.

Procurement Working Group

The IAEA notes in its latest report that it again attended one meeting of the PWG which oversees procurements by Iran of nuclear and nuclear-related commodities. No details about the visit are provided.

Enrichment and Enrichment Related R&D Activities

The IAEA has again included in this report information on the status, amounts, and breakdown of enriched uranium by chemical form. However, it does not provide the amount of LEU exempted from the 300 kg cap on LEU or limits on near 20 percent LEU. By acting as if this material does not exist, its report is misleading. Some stocks of LEU have been exempted by the Joint Commission of the JCPOA in a [series of decisions](#) which the Commission decided, under pressure, to make public in December 2016 and January 2017.

LEU Production

Iran appears to be producing very little enriched uranium in the FEP. In theory, the FEP could produce up to 100 kg of LEU hexafluoride per month; it is producing far less than this amount, or only an estimated 13.1 kg of UF₆ since the previous report in February 2017. This amount translates into a monthly production of only about 4 kg, or about four percent of maximal production.

Iran may continue to enrich depleted uranium to natural uranium in the FEP, which would be an exploitation of a loophole in the JCPOA that the Joint Commission should ban. If it were enriching depleted uranium, another statement in the report about the high failure rate of IR-1 centrifuges would make more sense.

Iran reported that during this quarterly reporting period it had withdrawn 48 IR-1 centrifuges from storage for the replacement of damaged or failed IR-1 centrifuges installed at the FEP. Normally, according to IAEA information, about 20-30 percent of the IR-1 centrifuges fail each year. At full-LEU production, that failure rate would require the replacement of about of about 1000-1500 IR-1 centrifuges per year of the 5060 IR-1 centrifuges operating at the FEP. If LEU production is only at a rate of about four kilograms per month or four percent of maximum production, then about 40-60 IR-1 centrifuges per year would be expected to fail at the above rate. The actual annualized failure rate during this reporting period is approximately 193 IR-1 centrifuges (48 times 4), or about 3-5 times greater than expected from considering current LEU production only. This larger failure rate, albeit less than maximal, could imply that most of the enrichment occurring at the FEP involves producing natural uranium from depleted uranium. As a result, the IAEA should report how much natural uranium Iran has produced per month from depleted uranium during this reporting period.

Total LEU with respect to 300 Kg Cap

The IAEA reports that during the reporting period, Iran's total enriched uranium stockpile "has not exceeded 300 kg of UF₆ enriched up to 3.67% U-235 (or the equivalent in different chemical forms). The quantity of 300 kg of UF₆ corresponds to 202.8 kg of uranium."

The IAEA does not report on the total amount of LEU in Iran, whether enriched less than 5 percent or near 20 percent enriched. The IAEA reports as though some of this LEU does not

exist, based on Joint Commission decisions to exempt it from the limits. For example, LEU in low level waste is exempted, and some of the LEU in or from the Enriched UO₂ Powder Plant (EUPP) may not be counted as well. One has to doubt that the IAEA applies such lax accounting practices in its normal safeguards operations. If it did, it would be legitimate to raise questions about its competence in accounting for LEU in a country.

With a recognition that the total LEU stock is in fact larger, the IAEA reports the status and quantities of enriched uranium in Iran that it includes under the cap are:³

- 79.8 kg of uranium enriched up to 3.67% U-235 (reduced from previous report's figure of 101.7 kg), including:
 - 66.7 kg of uranium in the form of UF₆ (previous report was 53.6 kg, reflecting a slight increase of 13.1 kg likely representing new LEU production in the FEP (see above));
 - 0.9 kg of uranium in the form of UO₂ (previous report was 35.9 kg, reflecting a large decrease);
 - 9.7 kg of uranium in fuel assemblies and rods (same as previous report);
 - 1.3 kg of uranium in liquid and solid scrap (same as previous report); and
 - 1.2 kg of enriched uranium in hold up at the EUPP.

At the end of the previous reporting period, [we calculated](#) based on the IAEA's figures that the total LEU stock subject to the cap (not including already exempted LEU) was composed of 101.7 kg of LEU in easily measurable forms and another 99.9 kg of LEU that was estimated to be held up at the EUPP and expected to be blended down to natural uranium or exempted from the cap. The total of both values was 201.6 kg of LEU, all of which was subject to the cap.

The reason for the decline in the LEU stock to 79.8 kg at the end of this reporting period can be explained by removing all but 1.2 kg of the 99.9 kg LEU in hold up at the EUPP and 35.7 kg of LEU earlier recovered from the EUPP and recently downblended to natural uranium (201.6-99.9+1.2-35.7 = 66.7 kg). To this total must be added 13.1 kg of freshly produced LEU, for a total of 79.8 kg of LEU subject to the cap. It is unknown how much of the LEU from the EUPP cleanout was exempted and not included in this total.

Enrichment R&D

The IAEA provides no information on enrichment R&D compliance controversies we have [reported on, including](#): Iran's operation of more IR-6 centrifuges than allowed; production of significantly more rotor tubes and bellows than used in operating advanced centrifuges; its exploitation of quality assurance limits for advanced centrifuges; questions about production of rotor tubes and bellows outside of declared manufacturing sites; or excessive centrifuge parts manufactured in general. It should include information about all of these issues as part of its reporting to member states.

³ Recognizing the absurdity of the accounting practices, or "fuzzy math" under the JCPOA, the IAEA gives its value of 79.8 kg, "based on the JCPOA and decisions of the Joint Commission."