



Analysis of the IAEA's Fifth Iran Nuclear Deal Report: Greater Transparency But Key Information Still Lacking

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On February 24, 2017, the International Atomic Energy Agency (IAEA) released its fifth [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), an agreement reached between the P5+1 and Iran in July 2015 aimed at limiting Iran's nuclear program. The JCPOA 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. The issue of full compliance is rightly the responsibility of the Joint Commission and governments, in particular those in the P5+1.

The IAEA report lists many areas where Iran has met the conditions of the JCPOA's provisions. However, known verification controversies are not included in the reporting. Moreover, the report states that the IAEA is still unable to determine the absence of undeclared nuclear material and activities in Iran. Although this report contains more detail in certain areas than previous reports, the IAEA reporting continues to be too sparse.

Key Findings

- 1) Since our [last report](#), the Joint Commission adopted our recommendation to make its decisions public. That decision to be more transparent is welcome and should have motivated the IAEA to report additional information about Iranian nuclear activities, programs, and materials. Yet, key information is still lacking. The IAEA should report comprehensively on the situation so that governments can determine if Iran is in compliance with the JCPOA.

¹ Institute Research Fellows and Associates Sarah Burkhard, Allison Lach, and Samta Savla provided the satellite images for this report.

- 2) Due to some of the information in the IAEA report and other information we have obtained, we remain concerned that Iran is not fully complying with the JCPOA, or is at least pushing the envelope of compliance in a detrimental direction.
- 3) Iran's total stock of heavy water is 135.2 metric tonnes,² comprising 124.2 metric tonnes inside Iran and 11 tonnes located outside Iran. A reasonable interpretation of the JCPOA, shared by many, is that Iran is limited to a total of 130 metric tonnes of heavy water whether the heavy water is in Iran or under its control outside Iran. The current situation whereby Iran can cache its heavy water in Iran, allowing it to exceed that cap, should be ended and recognized as not in compliance with the JCPOA. Iran is producing heavy water at an annualized rate of about 25 metric tonnes per year, or more than 2 metric tonnes per month. As a result, by early May, Iran's stock of heavy water inside Iran is expected to reach 130 metric tonnes.
- 4) The report does not discuss, and is cast in a way as to highly doubt, whether the inspectors have visited Iranian military sites. Such access is part of the IAEA's legitimate need to verify JCPOA bans on nuclear weaponization activities which could contribute to the development of a nuclear explosive device and develop confidence in the absence of undeclared nuclear material and activity as mandated under the IAEA comprehensive safeguards agreement and reinforced by the Additional Protocol. The IAEA at least needs to start to verify the weaponization bans in the JCPOA, which it is required to do under United Nations Security Council resolution 2231. This verification necessarily will require the IAEA to visit Iranian military sites.
- 5) Since the last report, the IAEA attended one meeting of the Procurement Working Group which oversees procurements by Iran of nuclear and nuclear-related commodities. This meeting may have addressed the export to Iran of a relatively large shipment of natural uranium (125.4 metric tonnes uranium mass). The approval of this uranium shipment occurred during the Obama administration, but it would likely have been blocked by the Trump administration.
- 6) The IAEA states 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." Yet this value does not represent the total amount of uranium enriched up to 3.67 percent. If all the LEU had been included, Iran's stock would have exceeded the 300 kg cap; the amount above that reported by the IAEA has been exempted from consideration by the Joint Commission.
- 7) Although not reported in the IAEA report, we have learned that Iran is not enriching much uranium in the Fuel Enrichment Plant (FEP). In theory, the FEP could produce up

² We are now using the unit metric tonnes, when earlier we simply called this tonnes. We have done so to follow the IAEA's use of this terminology.

to 100 kg of LEU hexafluoride per month; it is producing far less than this amount. Iran's future plans with regard to the FEP remain unknown. In addition, we do not know if Iran continues 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 fix.

- 8) The report includes little reporting on Iran's centrifuge research and development activities. It does state that Iran is now enriching uranium in a single IR-8 centrifuge and that after enrichment the enriched uranium is remixed with the depleted uranium, yielding natural uranium. The use of a single IR-8 centrifuge to enrich (and remix) uranium is consistent with Iran's enrichment plan. However, missing is any discussion of whether Iran abiding by restrictions on centrifuge R&D under the JCPOA. One example is allegations that Iran exploited allowed "quality assurance" criteria at Kalaye Electric and possibly elsewhere to conduct additional mechanical testing of centrifuges beyond that allowed under the JCPOA.
- 9) Overall, the IAEA effort in Iran needs to be strengthened, in particular by gaining access to Iranian military sites and providing more comprehensive reporting, and that strengthening should be fully supported by the Board of Governors and the P5+1.

Institute Statement

The IAEA reporting has improved although this report continues to lack critical technical details about the implementation of the agreement. This continued lack of information in the IAEA reports is a serious shortcoming in the implementation of the JCPOA and raises legitimate questions about the adequacy of Iran's compliance.

Since our [last report](#), the Joint Commission adopted our recommendation to make its decisions public. That decision to be more transparent is welcome and should have motivated the IAEA to report additional information about Iranian nuclear activities.

Nonetheless, we continue to call for the IAEA to include much more information than it is currently providing. This information is needed to allow for independent assessment of Iran's adherence to the JCPOA by experts within and outside governments, in particular those in the P5+1.

The type of information that should be in the quarterly reports includes: Iran's total inventory of enriched uranium stocks and their chemical forms and how much is included in the 300 kg cap and how much exempted from this cap; Iran's quarterly enrichment production output at Natanz; status of stable isotope production efforts at Fordow and elsewhere; natural uranium production and imports; heavy water quarterly production and total inventory domestically and in Oman or other off-shore locations; status and progress in centrifuge R&D and reporting on the number of manufactured centrifuge rotor assemblies; status of construction and operation of advanced centrifuge assembly facilities at Natanz; locations, characterizations, and monitoring of hot cells; work carried out to date on the Arak reactor; and other nuclear

activities. The report should also discuss controversies with Iran over interpretation or implementation of JCPOA conditions and the comprehensive safeguards agreement and associated Additional Protocol, as well as progress or problems in reaching a broader conclusion.

Heavy Water Activities³

The IAEA reports that on February 14, 2017, Iran's stock of heavy water inside Iran was 124.2 metric tons. Iran also controls and owns 11 metric tons of heavy water in Oman, bringing its stock of heavy water to 135.2 tonnes. Although the amount of heavy water in Iran remains below the allowed cap of 130 metric tonnes, its total stock exceeds that cap. A reasonable interpretation of the JCPOA is that the value that matters is the amount under Iran's ownership or control, namely 135.2 metric tons. A strong case can be made that Iran is violating its heavy water cap and action should be taken to bring Iran back into compliance. At least, in the future, the JCPOA should be implemented as applying the cap to all the heavy water Iran owns and controls. The need for a stricter interpretation of this cap is further justified by Iran having twice willfully violated even the loose interpretation of not having more than 130 metric tons of heavy water in Iran. Its second violation, which occurred last November, happened despite warnings from the IAEA that the cap had been reached.⁴

Given that heavy water is non-radioactive and can be easily diluted to normal water by simply dumping it into the nearby river, there is little justification for allowing Iran to cache heavy water in Oman or in other off-shore locations.

Thus, a reasonable position is that the JCPOA bans heavy water shipments overseas unless a sale has occurred and the export involves sending the heavy water to that buyer. The current situation to allow Iran to store its heavy water overseas even in the absence of a buyer is not a legitimate interpretation of the JCPOA.

For Iranian heavy water already located outside Iran, additional scrutiny should be applied. Any shipments from Oman (or other overseas storage locations) should be subject to approval by the Procurement Working Group. Potential overseas buyers should be wary; we continue to hear reports that the quality of the heavy water is not that high.

³ 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>

⁴ On October 25, 2016, the IAEA verified that Iran's stock of heavy water had reached the cap of 130.0 metric tonnes. On November 2, the Director General expressed concerns to the head of the Atomic Energy Organization of Iran (AEOI). On November 8, the IAEA verified that the cap had been breached, reaching 130.1 metric tonnes. On November 9, the IAEA received a letter from Iran stating its plan to send out five metric tonnes of heavy water. Despite knowing that the cap was reached, Iran continued to produce more heavy water. Although the excess amounts are relatively small, this is the second time that Iran exceeded the cap. In this case, the fact that Iran was aware is documented in the IAEA's reporting.

As in the previous report, Iran continues to produce heavy water at a rate greater than expected by the IAEA reporting. It is producing at a rate of about 25 metric tonnes of heavy water per year.⁵ Thus, under current arrangements, Iran is likely to continue seeking to exceed the allowed cap, unless the agreement is more strictly enforced. At its current average monthly production rate of over 2 metric tonnes per month, by early May, Iran's stock of heavy water inside Iran is expected to reach 130 metric tonnes.

Based on discussions with and statements by U.S. officials, we reported in our last report in November 2016 that the IAEA was not monitoring in person the heavy water in Oman, which until that date involved 70 metric tonnes of heavy water. This situation has apparently changed for the better. The most recent IAEA report states that the IAEA "verified the quantity of 11 metric tonnes of the nuclear grade heavy water at its destination outside Iran."

Fundamental Verification for Ensuring a Peaceful Nuclear Program

The IAEA 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."

Weaponization Activity Bans and Military Sites

The IAEA report does not include any efforts to verify the weaponization activity bans in Annex 1 of the JCPOA, namely a set of activities which could contribute to the development of a nuclear explosive device. Currently, those bans appear to be unverified. Under United Nations Security Council resolution 2231, the IAEA is charged with verifying the nuclear elements of the JCPOA.⁶ It appears not to be doing so with the weaponization activity bans.

⁵ As of May 9, 2016, Iran had 116.7 metric tonnes of heavy water, on August 30, 2016, it had 126.5 metric tonnes, and on November 8, 2016 it had total of 130.1 metric tonnes, which represents an increase of 13.4 tonnes from May to November 2016, assuming none was shipped out between May and November 8 but not reported by the IAEA. Subsequently, Iran shipped 11 metric tonnes of its heavy water to Oman on November 21, 2016, and on February 14, 2017 Iran had 124.2 metric tonnes. Ignoring production between November 8 and November 21, Iran produced about $124.2 - [130.1 - 11] = 5.1$ metric tonnes from about mid-November until February 14, 2017. In total, from May 9, 2016 until February 14, 2017, Iran has produced a total of 18.5 metric tonnes of heavy water. During this nine month period, Iran produced about 2.06 metric tonnes per month, for an annualized value of 24.7 metric tonnes of heavy water. The IAEA continues to report, by contrast, that the Arak heavy water production plant has a nominal design capacity of 16 tonnes of nuclear-grade heavy water per year. The actual rate of production thus exceeds the nominal annual production value given by the IAEA. The IAEA does not discuss this discrepancy in annual output. Other information states that Iran is exceeding this nominal value because since 2010, in defiance of United Nations Security Council sanctions, Iran managed to obtain illicitly sufficient equipment and materials overseas equipment to build a second production line, each of which has a capacity of about 12 metric tonnes of heavy water per year, or a total capacity of 24 metric tonnes per year. [see *Heavy Water Loophole in the Iran Deal*]

⁶ 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

We learned that the IAEA wanted to visit Sharif University, a site linked to past undeclared nuclear activities. Evidently, it did not do so; it was obtained answers to its questions from Iran. One has to ask if this outcome is satisfactory.

The IAEA again did not report on any progress at resolving the uncertainty about the environmental sampling at the Parchin site. The sampling detected uranium particles but the inspectors were unsure of how to interpret them. Under normal practice, the IAEA would be expected to re-visit Parchin and take additional samples. We understand that the IAEA has not re-visited Parchin, so this issue remains unresolved.

As part of its effort to reach a broader conclusion and verify nuclear weaponization-related limits in the JCPOA, 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. Given Iran's long history of refusing IAEA access to military sites, the IAEA may be hesitant to ask Iran for access. The Trump administration and other governments should encourage the IAEA to do so.

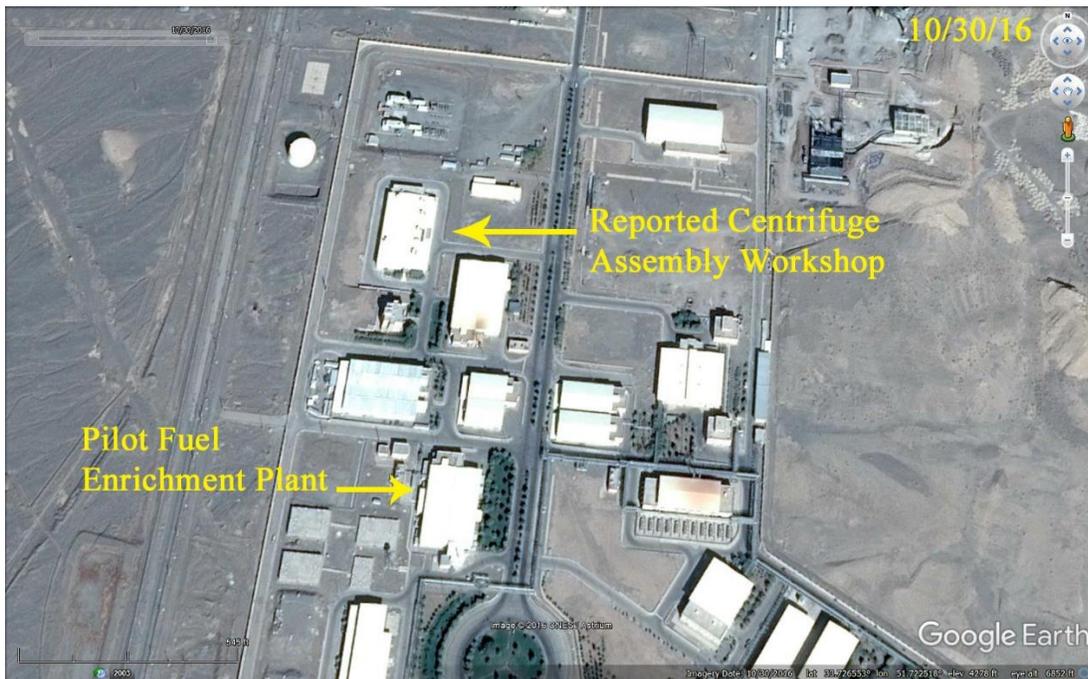
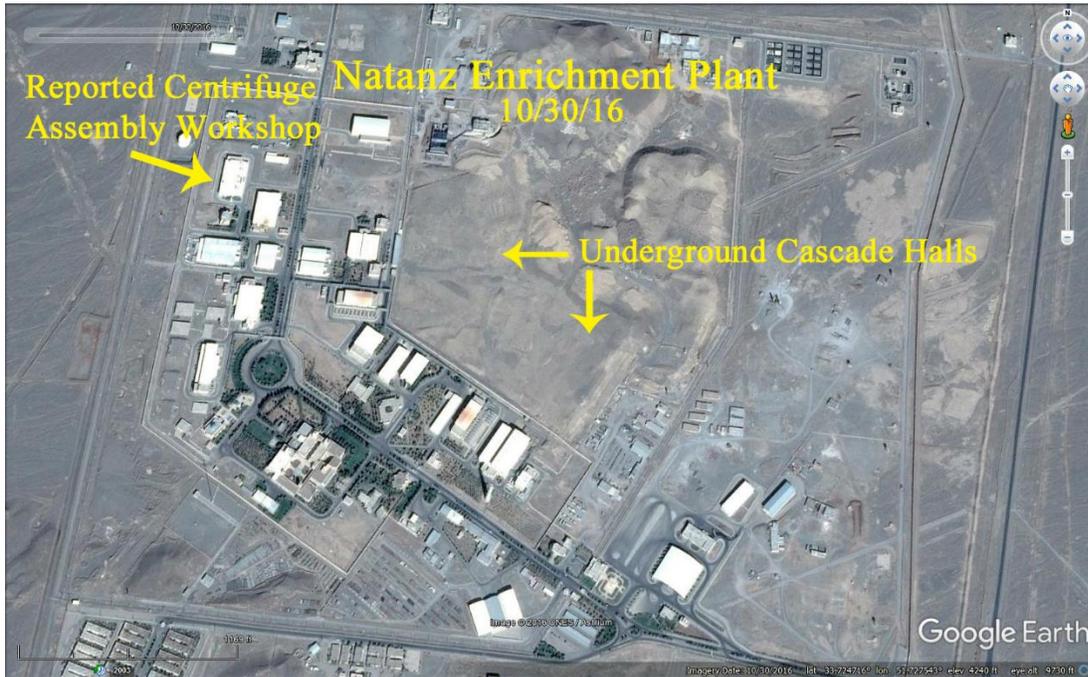
Declarations and Complementary Access

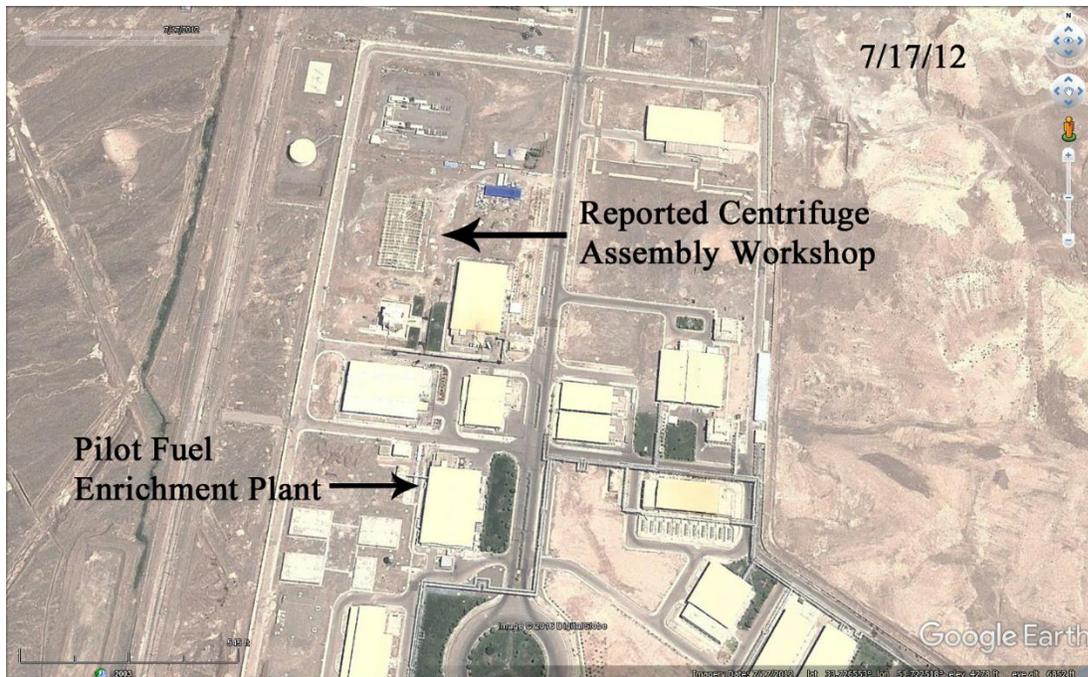
The IAEA report states that the IAEA has "continued to evaluate Iran's declarations under the Additional Protocol and to conduct complementary accesses under the Additional Protocol to sites and other locations in Iran." However, the IAEA report again does not contain any information about its activities, or access to individuals or sites 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 senior official close to the IAEA stated to the Institute that the IAEA has many unanswered questions related to the broader conclusion that it has not followed up on.

In terms of accesses to building outside of facilities where nuclear material is used, we have learned that, since last summer, the IAEA visited on short notice at least two sites at the Natanz site related to centrifuge rotor assembly. One was a new workshop near the Pilot Fuel Enrichment Plant being built by TESA and dedicated to assembling advanced centrifuge rotors and other key subcomponents. The inspectors found at the time of the visit that the workshop was not yet operational; much of the equipment was still in boxes. The existence of the facility is consistent with the JCPOA, but worth monitoring because of the sensitive work that can be done in this workshop, if finished. The figures below show Google Earth images from October 2016 of the workshop containing the new centrifuge rotor assembly facility and an image from July 2012 showing it under construction.

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."

Figures 1-3: The Natanz enrichment site showing a reported new centrifuge rotor assembly workshop near the pilot enrichment plant. Early construction activities of this workshop can be seen in a 2012 image. The underground cascade halls of the Fuel Enrichment Plant are also nearby. Images courtesy Google Earth.





Procurement Working Group

The IAEA notes in its latest report that it attended one meeting of the Procurement Working Group (PWG) which oversees procurements by Iran of nuclear and nuclear-related commodities. This meeting may have addressed the export to Iran of a relatively large shipment of natural uranium, which under the JCPOA would be subject to PWG approval. In this case, the uranium served as a payment by Russia to Iran for purchasing Iranian heavy water that had been stored in Oman for many months awaiting a buyer. The IAEA stated in this report that on February 8, 2017, the IAEA “verified the receipt in Iran of 125.4 metric tonnes of natural uranium in the form of UOC, which was then transferred” to the Uranium Conversion Facility at Esfahan.⁷ This uranium export to Iran was approved during the Obama administration but it would likely have been blocked by the Trump administration.

Enrichment and Enrichment Related R&D Activities

Partially reversing its underreporting on Iran’s LEU stocks since Implementation Day of the JCPOA in January 2016, the IAEA has included in this report more information on the status, amounts, and breakdown of enriched uranium by chemical form. Some of the stocks have been exempted from counting against the JCPOA’s 300 kg cap on the amount of LEU that can reside in Iran by the Joint Commission of the JCPOA in a [series of decisions](#) which the Commission

⁷ Earlier, Ali Akbar Salehi, the head of the Atomic Energy Organization of Iran, was quoted by the semi-official Fars News Agency stating that Iran would receive a final batch of 149 metric tonnes of natural uranium, in addition to 210 tons already delivered since early 2016. The value of 149 metric tonnes is undoubtedly the same as the shipment received on February 8, 2017, and the different masses (149 vs. 125.4 metric tonnes) may just reflect different ways of representing the mass.

decided to make public in December 2016 and January 2017. We supplement this information with other information we have learned.

LEU Production

Although not reported in the IAEA report, we have learned that Iran is producing very little enriched uranium in the Fuel Enrichment Plant (FEP). In theory, the FEP could produce up to 100 kg of LEU hexafluoride per month; it is producing far less than this amount. Its plans remain unknown. In addition, we do not know if Iran continues 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.

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." This value does not represent the total amount of uranium enriched up to 3.67 percent. If all the LEU were included, Iran's stock would have exceeded the 300 kg cap.

According to the IAEA report, the status and quantities of enriched uranium in Iran that it includes under the cap are:

- 101.7 kg of uranium enriched up to 3.67% U-235, including:
 - 53.6 kg of uranium in the form of UF₆;
 - 35.9 kg of uranium in the form of UO₂;
 - 9.7 kg of uranium in fuel assemblies and rods; and
 - 1.3 kg of uranium in liquid and solid scrap.
- 99.9 kg of enriched uranium in hold up at the Enriched UO₂ Powder Plant (EUPP) (see also below)

Omitted is enriched uranium that is part of low level waste and that was exempted from the cap in an early Joint Commission decision. This material is crudely estimated to contain 50-100 kg of low enriched uranium.

According to the IAEA's count, which excludes the enriched uranium exempted from the cap as low level waste, the subtotal is 201.6 metric tonnes, slightly below the allowed cap of 202.8 kg (equivalent of 300 kg UF₆).

We reported earlier that two independent sources had stated that Iran's total inventory had exceeded the cap. Iran may have revised downward its estimate of the amount of LEU held up in the EUPP, possibly explaining these earlier statements.

If the LEU in low level waste exempted earlier were included, the total amount of LEU in Iran would have exceeded 300 kg by a significant amount.

This analysis allows a closer scrutiny of at least one type of convoluted, and potentially deceptive, language the IAEA is being forced to use. The IAEA states: “As of 18 February 2017, the quantity of Iran’s uranium enriched up to 3.67% U-235 was 101.7 g, based on the JCPOA and decisions of the Joint Commission.” As the above demonstrates, there was more than double this amount of LEU in Iran; it was just exempted from consideration.

Uranium in EUPP Process Lines. As we discussed above, we [reported](#) in September 2016 that some forms of LEU were exempted by the Joint Commission and allowed to not count against the JCPOA’s 300 kg cap on low enriched uranium, which was confirmed by the release of Joint Commission [decisions](#) on the matter. The most recent [decision](#) in January 2017 describes a process for mixing depleted uranium and enriched uranium inside the EUPP with the goal of downblending the LEU to natural or depleted uranium or at least rendering the remaining held-up LEU difficult to recover. It also bans Iran from building or operating a facility to recover this any remaining LEU.

The IAEA report indicates that after asking Iran to revise its August 2016 estimate of the quantity of enriched uranium in the process lines of the EUPP at Esfahan, Iran returned on February 19, 2017 its updated estimate. The quantity is estimated by Iran to be 99.9 kg of enriched uranium which is “consistent with the [IAEA’s] assessment of the hold up.” On January 31, 2017, following the Joint Commission decision, “Iran started feeding depleted uranium through the process lines at the EUPP” under IAEA monitoring and “the estimated amount of enriched uranium in the EUPP equipment and the output material do not count against Iran’s enriched uranium stockpile.”

More information is still needed to adequately assess the basis for such an important determination on exempting this material. Moreover, the fact that Iran is banned from operating or building a recovery line raises further doubt whether the process to render the material “unrecoverable” is truly sound. A more accurate statement would likely be that the recovery of any remaining LEU would be more difficult, not impossible as the use of the term nonrecoverable would imply. One has to note that the frequent use of the term nonrecoverable when discussing exemptions to the 300 kg cap is another example where language has been used to exaggerate the significance of an action and distort the true situation.

The total amount of LEU in Iran and its forms matter because the LEU may be recoverable by Iran in a breakout to produce highly enriched uranium, thereby lowering breakout times. Separating LEU from its chemical constituents in such products is typically straightforward. A country intent on breaking out and making highly enriched uranium as a national priority may make an entirely different assessment about the LEU’s worth and devote considerable effort to recovering the LEU, such as during a push to acquire nuclear weapons in a crisis. Any discussion of such an important issue as exempting LEU from the 300 kilogram cap or from export should

have been public and subject to more rigorous review than it currently is receiving in secret deliberations within the membership of the Joint Commission.

Near 20 Percent LEU. The IAEA again does not report on the size or status of Iran’s stock of near 20 percent LEU. Iran is prohibited under the JCPOA from retaining any near 20 percent LEU unless it is in fuel elements, subsequently modified, based on a Joint Commission decision after the JCPOA was negotiated, that they must be in irradiated fuel elements. This report indicates that on February 4, 2017, Iran received from an unidentified state “the first increment of 5 kg U₃O₈ enriched up to 20% U-235 contained in partially fabricated TRR [Tehran Research Reactor] fuel plates.” This shipment would imply that Iran has placed or will soon insert all its existing near 20 percent LEU fuel into the TRR. Nonetheless, the IAEA report lacks information on the amount of near 20 percent LEU that remains in Iran and the exact irradiation level of the fuel. The required minimum level of irradiation is low and is not particularly preventive in terms of recovery and breakout by a state.

There is again no information in the report about the near 20 percent LEU lab contaminants revealed in our September 2016 [paper](#) as exempted by the Joint Commission. The Joint Commission decided in January 2016 to exempt this material from counting against the 300 kg cap on Iran’s uranium stockpile. We learned and reported in our previous analysis that the amount of near 20 percent LEU in lab contaminants is less than a half of kilogram.

Enrichment Related R&D

Iran is permitted to conduct limited research and development on small numbers of advanced centrifuges under the JCPOA. The IAEA reports that no uranium has been accumulated through these enrichment R&D activities and “Iran’s enrichment R&D with and without uranium has been conducted within the limits defined in the JCPOA.” The enrichment R&D [plan](#) is published on our website. Under this plan, the number of years is measured from January 16, 2016, or Implementation Day.

Kalaye Electric. We learned that Iran has allegedly exploited allowed “quality assurance” criteria at Kalaye Electric with regards to advanced centrifuge research and development to conduct additional mechanical testing of centrifuges beyond those allowed under the JCPOA. This issue is not discussed in the IAEA reports.

IR-8 Centrifuge. The IAEA reports that on January 21, 2017, Iran began feeding for the first time natural UF₆ into a single IR-8 centrifuge, its most advanced albeit undeveloped centrifuge. This process did not involve the accumulation of uranium, and its operation with uranium hexafluoride gas is per Iran’s enrichment plan. Iran has declared that the IR-8 has a theoretical enrichment output of 16 separative work units per year.

Fordow Fuel Enrichment Plant (FFEP) and Stable Isotope Production

The IAEA states that during the reporting period Iran has not conducted any uranium enrichment or related research and development activities at the Fordow Fuel Enrichment Plant (FFEP), and there has not been any nuclear material at the FFEP. On January 15, 2017, the IAEA confirmed that Iran had continued dismantling portions of the Fordow plant. It placed cascade electrical cabling, individual cascade control cabinets and vacuum pumps, and excess centrifuges and infrastructure from both wings of the FFEP into storage at the Natanz FEP under IAEA monitoring.

The IAEA reports that 1042 IR-1 centrifuges remain installed in six cascades for R&D relating to stable isotope production. However, the IAEA report makes no mention of reports that Iran used advanced centrifuges to study stable isotope separation at the Kalaye Electric facility in Tehran. We learned and wrote in our previous analysis that Iran had used an advanced IR-6 centrifuge for stable isotope work at the Kalaye Electric workshop in Tehran. The JCPOA allows stable isotope production (via enrichment or depletion) in the context of using IR-1 centrifuges. It makes no mention of using advanced centrifuges for this purpose. Moreover, the long term enrichment and R&D enrichment program does not discuss any stable isotope production using advanced centrifuges. This work with an advanced centrifuge is reported to have occurred prior to Implementation Day but after the deal was finalized in July 2015. It is unknown whether the use of an IR-6 or IR-6s centrifuge in stable isotope work is on-going. It is also unknown how this work was reconciled with the JCPOA requirements which most readings would understand as allowing the use of only IR-1 centrifuges for stable isotope production. This use of the IR-6 thus appears at odds with the stated JCPOA requirements. However, we do not know if the Joint Commission has deliberated this issue. Whatever the situation, the JCPOA clearly implies that stable isotope separation with advanced centrifuges is not allowed. The Joint Commission should affirm this view.