INSTITUTE FOR SCIENCE AND INTERNATIONAL SECURITY
ISIS

Reconciling the 300 kg Cap with Iran's Monthly Production of Low Enriched Uranium

Institute for Science and International Security

July 22, 2015

We are releasing a series of reports containing our analysis of specific key issues in the Joint Comprehensive Plan of Action. We are neutral on whether the deal should be implemented. We are using our role as a technical nonproliferation organization to highlight strengths as well as potential problems and remediation steps.

For 15 years, the Joint Comprehensive Plan of Action (JCPOA) imposes a 300 kilogram (kg) cap on Iran's stock of less than 3.67 percent low enriched uranium (LEU). However, at the same time, Iran is allowed to continue producing LEU. More precisely, for 10 years, Iran can enrich with 5,060 IR-1 centrifuges at the Natanz Fuel Enrichment Plant (FEP) and with an increasing number of more powerful centrifuges after year 10.

Based on previous performance data, using about 5,000 IR-1 centrifuges, Iran is expected to produce about 100 kg of 3.67 percent LEU in uranium hexafluoride form ($LEUF_6$) every month. The fact that every month Iran will be producing about one-third of its allowed stockpile means that it will regularly have to take actions to reduce its stock of LEU in order to comply with the cap.

If Iran will be producing about 100 kg of LEU hexafluoride a month, how will it maintain such a tight cap? Under the JCPOA, it will have to either dilute it to natural uranium or send it abroad. Iran could claim an exception to the cap under the agreement and seek approval to use the excess LEU to make reactor fuel. However, the conditions for this exception are so restrictive as to essentially not allow it, except in the case of Arak reactor fuel (see paragraph 59, Annex 1, and ISIS JCPOA analysis *When is the 300 Kilogram Cap on Low Enriched Uranium not a Cap?*). This exception is not likely for years, since the Arak reactor is not expected to operate for at least five, if not ten years, and when it does, it will require very little LEU. Thus, if Iran continues to produce LEU, it will have two choices spelled out in the JCPOA: re-mixing the LEU with the depleted uranium tails to generate natural uranium or sending the LEU overseas.

Under the JCPOA, Iran has committed to the following:

> *All enriched uranium hexafluoride in excess of 300 kg of up to 3.67% enriched UF6 (or the equivalent in different chemical forms) will be down blended to natural uranium level or be sold on the international market and delivered to the international buyer in return for natural uranium delivered to Iran. Iran will enter into a commercial contract with an entity outside Iran for the purchase and transfer of its enriched uranium stockpile in excess of 300 kg UF6 in return for natural uranium delivered to Iran. The E3/EU+3 will*

facilitate, where applicable, the conclusion and implementation of this contract. Iran may choose to seek to sell excess enriched uranium to the IAEA fuel bank in Kazakhstan when the fuel bank becomes operational.

Iran will thus need to take steps almost monthly that reduce its LEU stockpile. The more reliable of the two methods will be down blending to natural uranium. Remixing the LEU hexafluoride with depleted uranium hexafluoride is easy to do and Iran has already done this type of remixing with its near 20 percent LEU under the Joint Plan of Action. It could also regularly sell the LEU abroad. However, finding buyers for such a small stream of LEU, relative to the much larger amounts typically sold in the international commercial market, may be challenging.

Alternatively, Iran could stop making LEU for several years. A halt is the most practical step, and in all fairness, the only one consistent with its practical needs. This is a fact not emphasized in the JCPOA, except in the Preface.

With Iran potentially bumping up against the cap monthly, what about violations? Iran has the tools to immediately avoid any violation, either by down blending or halting LEU production. So, any excess over the cap is Iran's decision to violate the cap and should not be viewed as an inadvertent mistake. Based on Iran's long history of violations of its safeguards violations and non-cooperation with the International Atomic Energy Agency (IAEA), any overage over the cap should be treated as Iran testing the limits of the agreement.

The response to violations should be firm. That would confirm that enforcement is serious and violations - even minor ones - will not be tolerated. The first time the cap is exceeded, the response will need to be rapid and significant. One E3+3 official put it bluntly: the official could not fathom a scenario where Iran accumulates 400-500 kg of LEU, and there is not a snapback of sanctions.

In general, for overages above the cap, there should be a calibrated response that can escalate, if Iran has not returned to compliance, ultimately reaching snapback. As soon as the limit is exceeded, such as Iran is several days late in shipping out the LEU or blending down to natural uranium, a response by the E3+3 will be required. The E3+3 should prepare a range of options in an escalatory ladder, where the rungs, not in any order, could be reporting a violation to the Joint Commission, re-imposing some sanctions, delaying the provision of some or all civil nuclear energy cooperation, or blocking some or all exports to Iran under the procurement channel mechanism. The top rung would be the snapback of sanctions.

Whether Iran abides by this cap and how violations of the cap are enforced will be an important indication of the performance of this agreement. But what should not be forgotten is that Iran does not need to produce LEU for several years. To avoid unneeded tension and misunderstandings over the cap, the United States or other members of the E3+3 should initiate discussions with Iran aimed at convincing it to sharply limit or halt LEU production on a voluntary basis. The agreement by no means prohibits this discussion, and Iran can always say no.