



November 19, 2008

IAEA Report on Iran:

Enriched Uranium Output Steady; Centrifuge Numbers Expected to Increase Dramatically; Arak Reactor Verification Blocked

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The International Atomic Energy Agency (IAEA) released on November 19, 2008 its [latest report](#) on the implementation of NPT safeguards in Iran and the status of Iran's compliance with Security Council Resolutions 1737, 1747 and 1803. The report, which shows Iran's continued non-compliance with these resolutions, includes three important findings. **The first is that Iran continues to make progress on developing and operating its centrifuges and plans to significantly increase the number of operational centrifuges. The second is that Iran refused to allow the IAEA to make a scheduled visit to the Arak heavy water reactor that is under construction. The third is that Iran continues to resist efforts to address substantively its alleged nuclear weapons-related work, which the IAEA says remains of serious concern.**

Steady centrifuge operation in the first module

The IAEA report states that as of November 7, 2008 a total of 9,750 kilograms of uranium hexafluoride had been fed into the cascades at the Natanz Fuel Enrichment Plant (FEP), producing a total of 630 kilograms of low enriched uranium (LEU).

From August 30, 2008 until November 7, 2008, Iran fed a total of 2,150 kilograms of uranium hexafluoride into the cascades at the FEP, producing a total of 150 kilograms of LEU. On average, Iran produced 2.2 kilograms of LEU per day. During the previous reporting period, from May 7, 2008 through August 30, 2008, Iran fed a total of 3,630 kilograms of uranium hexafluoride into the cascades at the FEP. During this earlier period

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Iran produced on average about 2-2.5 kilograms of LEU per day. Therefore, Iran's daily rate of LEU production has remained about the same during the last two reporting periods.

Iran could increase its average daily output of LEU, although it is achieving close to its own expected output. The IAEA has no information about whether Iran intends to increase its LEU output or if it would face significant technical obstacles in doing so.

Large scale up in the total number of centrifuges

In addition to the first module of 18 cascades containing some 3,000 P-1 centrifuges, Iran continues to install a second module of 3,000 P1 centrifuges. As of November 7, 2008, five cascades were enriching and another 13 were being installed and tested. These same five cascades were enriching uranium at the start of this reporting period, meaning that Iran did not start enriching uranium in any of the other new cascades. According to a senior official close to the IAEA, however, the reason for Iran not doing so is unknown, and he expects that these other cascades could start enriching anytime. He added that he expects all 18 cascades to be enriching uranium by the end of this year. Iran would then have about 6,000 operational centrifuges.

In addition, Iran recently told the IAEA that it intends to start installation of another module of 3,000 P1 centrifuges at FEP at the beginning of 2009. Questions remain whether Iran has enough components to install another 3,000 centrifuges. According to the senior official, at the time of the Iran's suspension of its uranium enrichment program, the IAEA estimated based on its access to centrifuge components and production information that Iran had enough components or materials to build 10,000 centrifuges. It could have made significantly more than that number of components since the end of the suspension in 2006.

Iran is preparing other areas of the FEP for the installation of two more modules of centrifuges. Construction activity is in its early stages, and according to the senior official, the IAEA does not know if Iran will install more P1 centrifuges or a more advanced centrifuge in these modules.

Progress toward a break-out nuclear weapons capability

A key benchmark of enrichment progress is when Iran accumulates enough low enriched uranium to have a capability to produce quickly enough weapon-grade uranium for a nuclear weapon. In this case, Iran would use the LEU as feed into its cascades, dramatically shortening the time to produce weapon-grade uranium. Other ISIS-generated reports have discussed this issue in more detail.¹ Achieving this benchmark is bound to increase tensions between the United States and Iran, and Iran and Israel, over when it could build nuclear weapons.

ISIS estimates that under optimal conditions, Iran could use between 700 and 800 kilograms of LEU to produce in its P1 centrifuges 20-25 kilograms of weapon-grade uranium, enough for a crude fission weapon. Other estimates are more pessimistic about Iran's ability to enrich

¹ http://www.isis-online.org/publications/iran/ISIS_Report_Iran_15September2008.pdf,
http://www.armscontrol.org/act/2007_11/Albright

the LEU up to weapon-grade, estimating that 1,000-1,700 kilograms of LEU would be necessary to produce 25-30 kilograms of weapon-grade uranium, generally considered more than enough for one nuclear weapon. Whatever the actual amount of LEU, Iran is progressing toward this capability and can be expected to reach the lower limit within a few months. The upper limit can be reached within a year with two centrifuge modules operating at already achieved LEU outputs.

New advanced centrifuge designs in testing phase: Iran maintaining its feed rate into its test cascade of IR-2 centrifuges

At the Natanz Pilot Fuel Enrichment Plant, Iran has installed two or three types of next-generation centrifuges: the IR-2, the IR-3, and possibly a longer centrifuge. Previous ISIS reports describe these more advanced centrifuges in more detail.² These centrifuges are expected to have greater enrichment output and perform better in operation. According to a senior official close to the IAEA, the inspectors do not know when Iran would deploy the IR-2 or IR-3 centrifuges in large numbers. This official speculated that the fourth or fifth module could contain these advanced centrifuges.

During this reporting period, Iran introduced a total of about 31 kilograms of uranium hexafluoride into the 10-machine IR-2 cascade and the single P1, IR-2, and IR-3 centrifuges. This represents an increase from the last reporting period.

IAEA denied access to Arak heavy water reactor

Agency inspectors were unable to carry out a scheduled design information verification (DIV) visit on October 26, 2008 to the Arak Heavy Water Reactor. [Satellite imagery from October 2007](#) showed that construction was progressing at the reactor.

DIV visits are necessary to provide assurance that the reactor site will not be used for plutonium separation, as declared by Iran. According to the design information from Iran, the hot cell facility adjacent to the reactor will not be used for plutonium separation. In order to verify the declared purpose of the hot cell facility, the IAEA needs to be able to carry out periodic DIV visits.

Continued gridlock on alleged weaponization work

Iran and the IAEA made no progress in resolving a series of outstanding questions the IAEA has raised with regard to alleged research into nuclear weaponization issues, or other issues with a “military” dimension.

² http://www.isis-online.org/publications/iran/ISIS_Iran_P2_7Feb2008.pdf