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Déjà vu at Fordow? What are Iran's enrichment plans?

The May 25, 2012 International Atomic Energy Agency Safeguards Report calls on Iran to increase transparency at its Fordow gas centrifuge plant. Will Iran significantly increase its production of up to 20 percent low enriched uranium (LEU)? Will it make highly enriched uranium under safeguards? Iran should limit operations at Fordow to producing LEU enriched below five percent and to operating a few hundred centrifuges.

By David Albright, Andrea Stricker, and Christina Walrond

In the May 25, 2012 International Atomic Energy Agency (IAEA) Iran [safeguards report](#), inspectors continue to raise questions about the original and future purpose of the formerly secret Fordow Fuel Enrichment Plant (FFEP) near the city of Qom. Suspicions remain over the timing of its construction and whether its original purpose was intended to be the enrichment of uranium up to weapons-grade for use in nuclear weapons. Moreover, new questions center on whether Iran will dramatically increase its production of 19.75 percent low enriched uranium (LEU) at this deeply buried site or even produce highly enriched uranium (HEU), which is enriched uranium containing more than 20 percent uranium-235.

The IAEA has repeatedly questioned the completeness and veracity of Iran's statements regarding the Fordow centrifuge plant. Since the West uncovered the secret construction of this plant in 2009, Iran has provided only partial information about the facility. Iran provided the IAEA some information in 2011 regarding the initial timing of and circumstances relating to its decision to build the FFEP at an existing defense establishment. The IAEA re-stated in its May 25, 2012 Iran's safeguards report that it still needs additional information from Iran in connection with this facility, particularly in light of the difference between the original stated purpose of the facility and the purpose for which it is now being used. Adding to concerns are Iran's multiple changes to the site's Design Information Questionnaire (DIQ) on the FFEP, a key document in implementing IAEA safeguards.

Originally Intended for Weapon-Grade Uranium Production?

Iran's decision to build a relatively small, deeply buried enrichment facility without first informing the IAEA suggests that Fordow was intended to be used to make weapon-grade uranium (HEU enriched to over 90 percent) for nuclear weapons, or to provide Iran with that option. Compounding concerns about the site's original purpose, according to senior officials close to the IAEA, inspectors who made visits to the Fordow site soon after its revelation in the fall of 2009 noted that Iran had remodeled portions of the facility. Inspectors suspected that the plant was intended for producing weapon-grade uranium. The changes in the plant seen by inspectors combined with Iran's multiple DIQs on Fordow have added credence to the assessment that after realizing it was caught in 2009 building the facility in secret, Iran rushed to proclaim a civilian purpose for it with the IAEA.

If the original purpose was military the [Physics Research Center could have](#) had some hand in planning for the facility in the 1990s before its consolidation into other entities.¹ These plans would have been delayed by the 2003 suspension of Iran's centrifuge program that followed intense international pressure and the invasion of Iraq. With the end of the suspension in 2006, Iran may have resumed its plans to build the Fordow plant for military purposes.

The First DIQs

Iran's multiple DIQs have increased suspicions that Iran re-purposed the site from a military to a civilian one. Certainly, countries can change their minds about the purpose of a nuclear facility. However, Iran has altered the stated purpose of the Fordow facility so many times over such a short period of time that it raises significant questions regarding its original purpose.

According to IAEA safeguards reports, the first DIQ of October 10, 2009 stated that Fordow would produce uranium hexafluoride enriched up to five percent uranium-235 in 16 cascades containing about 3,000 centrifuges, and that the plant was a backup in case the Natanz enrichment site was bombed. Iran did not explain why the Fordow site was considerably smaller than the Natanz Fuel Enrichment Plant.

The second DIQ, dated September 2010, changed the purpose from 16 cascades of centrifuges to eight cascades that would produce LEU below five percent uranium-235 and be located in one of the two underground cascade halls. The second hall would have a research and development system for more advanced centrifuges.

The third DIQ in June 2011 changed the facility's purpose again, stating that one hall composed of eight cascades of IR-1 centrifuges would be dedicated to making uranium enriched up to 20 percent. To emphasize that point, it was called the "IR-1 Hall." Iran stated it had not yet decided on the purpose of the second hall, but it would likely hold advanced centrifuges, such as the IR-2m or IR-4 centrifuges. Iran informed the IAEA that production of up to 20 percent enriched uranium would take place within two sets of two interconnected cascades, and that each of these cascades would consist of 174 IR-1 centrifuges. According to the media, Iran reportedly had decided to "triple its (production) capacity," after which Iran would stop the "20 percent fuel production" at Natanz.²

The Fourth DIQ and the Amount of 19.75 percent LEU

In the latest and fourth DIQ, Iran stated Fordow will be used for only 19.75 and 3.5 percent enriched uranium production. However, it did not specify how many centrifuges would be dedicated to making 19.75 percent LEU.

In the May 25, 2012 safeguards report, the IAEA reported on its inability to get Iran to clarify the number of centrifuges that would make 19.75 percent LEU, despite several attempts. In a letter dated March 7, 2012, the IAEA requested that Iran provide the number and location of cascades at the FFEP to be dedicated to the production of 19.75 percent LEU. Iran replied, in an April 2, 2012 letter, that "once the installation of cascades additional to the four currently installed had been completed, the Agency would be notified of 'further development' in advance." In a May 21, 2012 letter, the IAEA "requested that Iran provide information regarding the purpose of the fifth and sixth cascades now installed at FFEP are to be used." Iran replied, in a

¹ David Albright, Paul Brannan, and Andrea Stricker, *The Physics Research Center and Iran's Parallel Military Nuclear Program* (Washington, D.C.: Institute for Science and International Security, February 23, 2012).

² "Iran to Triple Production of 20%-Enriched Uranium," Fars News Agency, June 8, 2011.

letter dated May 23, 2012, “that the installation of centrifuges in the other cascades in Unit 2 (Cascades 5–8) was yet to be completed and that ‘related utilities may need some months to get ready for commissioning.’” Iran was willing to commit only to notifying the IAEA about the enrichment level of these cascades prior to their operation, according to the May report.

Iran has signaled through the earlier deployment of 2,200 IR-1 outer casings in the two halls at Fordow that it intends to fully outfit both halls with this centrifuge type, despite having no credible civilian need for the LEU that these machines would produce. It makes more than enough 3.5 percent LEU at the Natanz Fuel Enrichment Plant. And Iran [already possesses](#) enough 19.75 percent LEU to run its Tehran Research Reactor, the only civilian justification for this enrichment, for five to 20 years depending on its power level.³ Iran’s unwillingness to state how many centrifuges will be dedicated to making 19.75 percent LEU intensifies suspicions that it seeks to increase its stock of 19.75 percent LEU far beyond any credible civilian purpose.

As this situation now stands, at any point, Iran could tell the IAEA that it will further increase production of 19.75 percent LEU at Fordow from two to four sets of tandem cascades. It could state that it will make 19.75 percent LEU in both cascade halls.

HEU Production?

The developments at the Fordow site also raise the question of whether Iran intends to make HEU. Iran could change its DIQ again and state that some of the cascades at the facility will exceed the 20 percent enriched uranium threshold for LEU, namely producing HEU. Iran would certainly claim civilian applications for any HEU it produces. It may claim, for example, that it requires HEU in targets for irradiation in the Tehran Research Reactor to produce medical isotopes, when it could suitably use LEU instead.

If Iran’s intention is to use its gas centrifuges at Fordow to increase its stock of 19.75 percent LEU in anticipation of an eventual breakout to make weapon-grade uranium, Iran has a high motivation to find a civilian justification to make highly-enriched uranium. The international community needs to be vigilant and send a clear signal that Iran should not make any HEU even for ostensibly civilian purposes. Iran successfully maneuvered to make 19.75 percent LEU when most believed that would not be possible, and it is wholly conceivable that it could try similar tactics to justify HEU production and further reduce the amount of time it needs to breakout.

Given its lack of need for more 19.75 percent LEU, Iran should agree to cap LEU production at five percent and freeze the number of enriching centrifuges at Fordow to the current level of four cascades of IR-1 centrifuges. In the end, unless Iran wants nuclear weapons, the Fordow enrichment site is unnecessary for its civilian nuclear program and greatly increases Iran’s risk of military strikes.

³ David Albright, Andrea Stricker, Paul Brannan, and Christina Walrond, *A Freeze Today, Not in the Future, to Iran’s 20 Percent Enrichment*, ISIS, April 10, 2012. http://isis-online.org/uploads/isis-reports/documents/Freeze_today_10Apr2012.pdf; and “Technical Note: Tehran Research Reactor Fueling Requirements,” ISIS. <http://www.isisnucleariran.org/static/444/>