

Iran's Uranium Enrichment Program: September 2020 Update

In July 2015 an agreement, known as the Joint Comprehensive Plan of Action (JCPOA), was reached between Iran and the E3/EU+3² to temporarily restrict Iran's nuclear program. These restrictions focused mainly on Iran's centrifuge enrichment program and its construction of a heavy water moderated, natural uranium fueled reactor which would produce significant amounts of plutonium. In May 2018 the United States withdrew from this agreement. Iran initially continued to abide by the terms of the JCPOA but in May 2019 said that it would no longer be bound by the agreement. In July 2019 it began to operate its centrifuge enrichment facilities beyond the limits of the JCPOA. At that time, it increased the enrichment of the uranium it was producing from 3.67% to 4.5% and began to accumulate enriched uranium in amounts beyond that permitted by the JCPOA. Between November 2019 and January 2020, Iran started producing additional enriched uranium using six cascades at the Fordow Fuel Enrichment Plant. Since January Iran has not taken any significant steps to further increase its rate of production of enriched uranium but has continued to steadily increase its enriched uranium stockpile.

One of the most worrisome aspects of centrifuge enrichment plants is that even if they are configured to produce only low enriched uranium, they can easily be used to produce the highly enriched uranium (HEU) required for nuclear weapons using a batch recycling process. In prior analysis, I described how Iran could carry out this process by sending the enriched uranium back through the cascade three more times.³ In the first step, the enrichment would be increased to 23.7%, the second step to 67.1% and the third step to 93.1%.⁴ Only minor modifications to the centrifuge plant are needed to carry out this process.

This prior analysis showed that *given a sufficiently large* stockpile of 4.5% enriched uranium, Iran could produce enough HEU for a nuclear weapon in just two to two and one half months. The analysis showed that Iran would need about 1,845 kilograms of 4.5% enriched uranium to be able to produce enough HEU for a nuclear weapon (20 kilograms of uranium enriched to 93.1%). However according to reporting by the International Atomic Energy Agency (IAEA) as of February 20, 2020, Iran only had a stockpile of 537.8 kilograms of 4.5% enriched uranium. At its then production rate of 4.5% enriched uranium, Iran would not reach the total of 1,845 kilograms of 4.5% enriched uranium for about eleven months from February 2020, that is January 2021.

¹ This paper is the product of the author's personal research and the analysis and views contained in it are solely his responsibility. Though the author is also a part-time adjunct staff member at the RAND Corporation, this paper is not related to any RAND project and therefore RAND should not be mentioned in relation to this paper. I can be reached at GregJones@proliferationmatters.com

² These are China, Russia, the United States, France, Germany and the United Kingdom.

³ Gregory S. Jones, "Iran's Uranium Enrichment Program Making Strides but Still At Least Six Months From Being Able to Produce Enough HEU for a Nuclear Weapon." April 2, 2020.
<https://nebula.wsimg.com/0110bd8db6cebe189303e8aa10b23ece?AccessKeyId=40C80D0B51471CD86975&disposition=0&alloworigin=1>

⁴ The tails for these three steps are 2.0%, 11.8% and 46.9% respectively.

On September 4, 2020, the International Atomic Energy Agency (IAEA) published its latest safeguards update on Iran's nuclear program.⁵ This update reported that Iran's total stockpile of 4.5% enriched uranium as of August 25, 2020 was 1,252 kilograms. This is an increase of 378 kilograms since the IAEA's last inventory on May 20, 2020. Iran's current rate of increase is about the same as it has been for most of 2020 (3.9 kilograms per day). At this current rate of increase Iran will reach a total of 1,845 kilograms at about the same time as I calculated in my prior analysis, which is late January 2021, about four months from now.

Note that since it would take Iran two to two and a half months to then process this 4.5% enriched uranium into HEU, Iran would not have sufficient HEU for a nuclear weapon before March or April 2021. Even then Iran will probably not actually produce this HEU. It is more likely that Iran will accumulate additional 4.5% enriched uranium so that if it should eventually produce HEU it could have a sufficient quantity for more than one nuclear weapon. This is unlikely to occur before the end of 2021 at the earliest. As a result, it will probably be at least 2022 before Iran will actually construct and deploy nuclear weapons.

What is to be done to stop Iran's steady progress towards a nuclear weapon? There are many who believe that the best solution would be for the U.S. to return to compliance with the JCPOA. One of the main problems with this suggestion is that in January 2021 five years of this agreement will have already elapsed. Three years at that, in January 2024, some of the restrictions on Iran's centrifuge manufacturing and testing expire. In five years, January 2026, there will no longer be any restrictions on the number or types of centrifuges that Iran is allowed to deploy. Once Iran is operating a large number of advanced centrifuges, the time required for Iran to produce HEU for nuclear weapons would become quite short as President Obama admitted in 2015.⁶ Note that even though Iran would be very close to possessing the HEU for a nuclear weapon by operating large numbers of advanced centrifuges, it would still be in full compliance with the JCPOA. As long as the U.S. continued to comply with the JCPOA, it could not take any action to remedy this situation.

Since May 2018, when the U.S. reimposed heavy sanctions on Iran, Iran's currency has lost 70% of its value compared to the dollar, as it has been unable to export most of its oil. The economic hardship that has resulted from this devaluation has forced Iran to pay a steep price for maintaining its centrifuge enrichment program. Returning to the JCPOA would remove these sanctions, restoring Iran's economy and easing its path to a nuclear weapon.

Rather than having the JCPOA legitimize and ease Iran's obtaining the ability of acquire nuclear weapons whenever it wants, the U.S. should continue to impose heavy costs on Iran for its nuclear weapon efforts. The current U.S. program of maximum pressure appears to be the only chance to prevent an Iranian nuclear weapon in the long-term. Given the pace with which Iran is accumulating its 4.5% enriched uranium stockpile, there is still time to prevent an Iranian nuclear weapon. The current policy of maximum pressure should be maintained.

⁵ "Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council resolution 2231 (2015)," GOV/2020/41, International Atomic Energy Agency, September 4, 2020. <https://www.iaea.org/sites/default/files/20/09/govinf2020-41.pdf>

⁶ He said "...at that point the breakout times would have shrunk almost down to zero." See: "Transcript: President Obama's Full NPR Interview On Iran Nuclear Deal," April 7, 2015. <https://www.npr.org/2015/04/07/397933577/transcript-president-obamas-full-npr-interview-on-iran-nuclear-deal>