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ISIS REPORT

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Debunking Gregory Jones Again

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On October 18, Gregory Jones published a response to ISIS's September 20 critique of his study on breakout timelines at the Natanz Fuel Enrichment Plant (FEP) in Iran. Jones maintains that Iran could fabricate 20 kg of weapon-grade uranium (WGU) -- enough for one nuclear weapon -- in two months in a breakout scenario at Natanz, while ISIS estimates that such a scenario would take at least six months. Unfortunately, his conclusions are founded on an unreliable method. As a result, his estimate dramatically understates the amount of time Iran would need to produce 20 kg of WGU at the FEP.

In emails with one of us, Jones made clear that his calculations rely entirely on a separative work calculator, such as the one found at www.wise-uranium.org, to determine the enriched uranium output of a centrifuge plant. A separative work calculator is a useful, but very basic, means of estimating enriched uranium output and the correlating timeframes. Despite its inordinate length, his new response included neither a detailed calculation to justify his controversial result nor a compelling explanation for his use of a separative work calculator to estimate WGU production at the FEP. He fails to address ISIS's critique that this method results in unreliable estimates when it is applied to this plant.

Jones attempts in this response to justify his application of a separative work calculation at the FEP almost entirely by citing an article published in 2008 by Alexander Glaser. In his response, Jones goes further and claims that his calculations are "an adaptation of calculations by Glaser." In reality, Jones merely used a separative work calculator and later attempted to justify his choice by citing Glaser. He has not performed any detailed calculations as Glaser and ISIS have done. But Jones's analysis has a bigger problem. Jones's justification depends on calculations made by Glaser that are not applicable to the estimation of the production of highly enriched uranium (HEU) at the FEP. Moreover, Glaser is aware of this problem.

In our initial critique, we did not address Jones's cavalier dismissal of information and data that contradicts his conclusions but that he did not access. In his August 9, 2011 paper, he does not appear to be aware of ISIS's newer calculations about breakout times at the FEP. Nonetheless, he must have been aware of U.S. government estimates, widely cited in the media about a year ago, that breakout at Natanz would require about a year. Here is what he writes about such estimates:

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"Other estimates of when Iran might be able to produce the HEU required for nuclear weapons are often given as flat statements with no supporting analysis. This is especially so for the estimates given by various U.S. government officials. In many cases these estimates appear to be merely wishful thinking. As I have written elsewhere, the distinguished intelligence analyst Roberta Wohlstetter noted a phenomenon where analysts when faced with an unpleasant reality instead engage in self-deception by constructing a more pleasant fiction that allows the analysts to avoid facing up to the more unpleasant reality."

Jones does not appear to have attempted to understand the reasoning behind the U.S. estimate, merely dismissing it as politicized intelligence. However, had he learned the basis of the U.S. estimate -- and U.S. officials relatively freely talked to non-governmental organizations (NGOs) about this estimate made by the Department of Energy -- he would have learned why his estimate is therefore viewed as so extreme. He also could have learned that, at that time, Israel assessed that breakout at the FEP would take less than a year but more than six months.

ISIS Estimates

Over a year ago, ISIS estimated that breakout at the FEP would take approximately six months, before the additional problems that Iran experienced over the past year at the FEP materialized. Naturally, the continued high rates of breakage, the decreasing enrichment levels attained at the FEP, and the decreasing average low-enriched uranium (LEU) output per IR-1 centrifuge over the past year only further complicate Iran's ability to make WGU at the FEP. Therefore, ISIS does not believe that Iran is currently capable of shortening this breakout time at the FEP.

It is true, as Jones points out, that ISIS used separative work calculations in the March 3, 2010 ISIS study *Supplement to Iran's Gas Centrifuge Program: Taking Stock*. However, for this study, ISIS used this method as a way to perform a worst-case assessment, namely an estimate of the least amount of time possible for Iran to breakout at the FEP. ISIS did not estimate the likely time in which a breakout would occur. Jones and the Nonproliferation Policy Education Center (NPEC) have misinterpreted our method and mistakenly implied that our estimate roughly matches theirs.[1]

When ISIS uses separative work calculators, they comprise only one part of a larger analysis that involves cascade design, plant performance, breakage rates, and other elements specific to the Natanz FEP and the IR-1 centrifuge design. Over a year and a half ago, ISIS decided to further modify its approach, taking into account a number of real-life problems experienced in FEP centrifuge cascade

[1] Jones claims that there are mistakes in the March 3, 2010 ISIS study *Supplement to Iran's Gas Centrifuge Program: Taking Stock*. However, what he points out in the study are not errors. Jones evidently does not realize that our estimates have different units, namely we use uranium hexafluoride mass, not just uranium mass, which is the unit he uses. He assumed we must have used the same unit as he did. Compounding his error, he misinterprets "several months" in the March 2010 study as "1.5 to 3.5 months," where he uses the wrong conversion factor to go from total weapon-grade uranium to the number of weapons and time to produce a weapon. He uses a conversion factor that is for uranium mass only. Admittedly, the units have been confusing in this debate, with uranium hexafluoride mass often confused with uranium mass. At ISIS, we have sometimes been guilty of not specifying which units we are using, and the March 3, 2010 paper is one of those cases. As a result, we have since instituted a policy to clearly state the units. However, the inability of Jones to recognize the alternative unit, which is typically listed along with the result in uranium mass in popular separative work calculators, is just another reason why we recommend that groups such as the Nonproliferation Policy Education Center, seek additional review of Jones's work before they publish it.

operation. Since then, ISIS has applied more sophisticated calculations by a well-known centrifuge expert who uses a fixed plant production model in the case of FEP breakout. Our critique of Jones's approach is derived from these improved, more realistic assessments and our extensive experience estimating breakout times at the FEP.