

## Nuclear Proliferation Prevention Project



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### Misleading Spin on Centrifuges

By [Alan J. Kuperman](#)

July 6, 2015

Graham Allison and Gary Samore [misconstrue](#) my recent [New York Times op-ed](#), so I appreciate this opportunity to set the record straight, and to document my article's assertion that President Obama has greatly exaggerated his main pitch for the pending Iran deal: that it would substantially prolong the "breakout time" needed for Iran to produce enough highly enriched uranium for a nuclear weapon.

My critics and I agree on one point. If Obama's three assumptions were correct – (1) that Iran could use only about 5,000 centrifuges for uranium enrichment, (2) that Iran would start with unenriched uranium and no more than 300kg of 3.5%-enriched uranium, and (3) that an Iranian nuclear weapon would require a "significant quantity" of highly enriched uranium, as defined by the International Atomic Energy Agency (IAEA) – then the breakout time would be about one year. However, each of these assumptions is falsely optimistic. Based on more realistic assumptions, the actual breakout time under the pending deal would be only about three months, as explained in my op-ed and documented below.

First, Allison and Samore mischaracterize my argument about Iran's ability to reconstitute backup centrifuges. They claim that I said Iran could "instantly" and "immediately" do so. To the contrary, my article stated that "these additional centrifuges would need to be connected, brought up to speed and equilibrated with the already operating ones," a gradual process. They also criticize my argument on grounds that such an expansion "would be caught immediately," but that is obvious since my article explicitly focused on an "overt" breakout scenario.

Notably, Allison and Samore concede that reconstituting backup centrifuges – including Iran's 1,000 more efficient, second-generation IR-2 centrifuges – is "not a prohibitively lengthy task" and could be accomplished in "weeks" or "months," which was one of my main points. Obama's calculation, by contrast, seems ludicrously to assume that none of the 14,000 backup centrifuges would be reconstituted in a breakout. The danger of that rosy assumption was highlighted in recent [Senate testimony](#) by David Albright of the Institute for Science and International Security, who warned: "We are worried that Iran will be able to reinstall about 1,000 IR-2m centrifuges and some number of IR-1 centrifuges in several months, a timeframe we assess as sufficient to allow these centrifuges to significantly reduce the breakout timeline below 12 months."

Second, Allison and Samore claim I am wrong that the deal would permit Iran to keep enriched uranium in solid form that could be reconverted to hexafluoride gas and thereby provide a head-start on enriching to weapons grade. They assert that Iran would export all such uranium or blend it down to eliminate its enrichment. I wish they were right, but Iran explicitly has refused to do so, insisting it must retain, for example, its near 20%-enriched uranium to fuel a research reactor. Albright and Serena Kelleher-Vergantini document that Iran has more than 200kg of such uranium, which incorporates 90 percent of the enrichment necessary to reach weapons-grade. As they [write](#): "If Iran can reconvert simply . . . 16 percent of its current stock of this material, it can reduce a 12 month breakout timeline to about eight months," or by one-third. If Iran used more than 16% of its current stock, it could reduce the timeline further.

Third, Allison and Samore claim I underestimate how much weapons-grade uranium Iran would require for a nuclear weapon. Obama's breakout calculations seem to assume that Iran would need a "significant quantity" of highly enriched uranium, defined by the IAEA as containing 25kg of the fissile isotope U-235, equivalent to 27kg of 93%-enriched weapons-grade uranium. Allison and Samore claim that only an "expert bomb maker" could make a nuclear weapon from a smaller amount of highly enriched uranium. But no one, including the IAEA, has ever said that a significant quantity is the minimum required for a nuclear weapon. Indeed, the reflected critical mass of weapons-grade uranium can be 20kg or less, according to [Los Alamos National Laboratory](#).

Implosion-design bombs further reduce the required amount of weapons-grade uranium. A widely cited [study by the Natural Resources Defense Council](#) provides three estimates for the amount of highly enriched uranium needed for a nuclear weapon to produce a yield on the order of the Hiroshima atomic bomb. The study's *highest* estimate is 13kg, for a bomb-maker with "low technical capability," leading to my contention that Iran would need only half the amount of weapons-grade uranium claimed by Allison and Samore. This assumption is conservative, because the study says that a "high technical capability" bomb-maker would need much less – only 4kg of weapons-grade uranium.

In light of these facts, it is straightforward to estimate a more realistic breakout time under the pending deal, compared to Obama's claim of twelve months. First, since Iran would require only half as much weapons-grade uranium – 13kg instead of 27kg – the breakout time should be halved to six months. Second, since Iran could easily convert one-sixth of its stockpile of near 20% enriched uranium from solid to gas to enable a head-start on enriching to weapons-grade, the breakout time should be cut by another third, from six to four months. Third, since Iran could gradually reinstall its backup centrifuges, starting in the first two months with its 1,000 more efficient second-generation IR-2s that would nearly double its enrichment capacity, the breakout time should be reduced by another month, from four to three months.

Allison and Samore rightly ask "what state would break out to a single bomb?" But it is President Obama, not I, who has made this scenario the focus of public debate, by repeatedly claiming that the deal would increase the overt breakout time from 3 months to one year. My article merely disproved this claim.

Yet, it is worthwhile to consider how this scenario would play out. Iran could kick out inspectors and race for the bomb, reinstalling backup centrifuges and converting its near 20% enriched uranium to gas to further enrich to weapons grade. Three months later, Iran could declare that it possessed a nuclear weapon and would use it in retaliation against any country that dared to attack its nuclear facilities, as they produced more weapons-grade uranium to expand its arsenal. Of course, Iran might be bluffing that it had produced a nuclear weapon. But the point of my calculations and citations is that under the pending deal the world could not rule out the possibility that Iran had produced a nuclear weapon after just three months. Thus, the pending deal would buy very little improvement on breakout time, contrary to Obama's claim.

Some may argue that other aspects of the pending deal make it worthwhile. However, in light of President Obama's misleading spin on "breakout time," the U.S. Congress should remain vigilant regarding all of the Administration's claims about the pending agreement.

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Alan J. Kuperman is associate professor and coordinator of the [Nuclear Proliferation Prevention Project](#) at the University of Texas at Austin, and editor of [Nuclear Terrorism and Global Security: The Challenge of Phasing out Highly Enriched Uranium](#) (Routledge, 2014).