AVOIDING STALEMATE IN THE IRAN NUCLEAR NEGOTIATIONS: FOCUS ON PRACTICAL NEEDS

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With the six-month interim agreement between Iran and the P5+1 countries now in effect, negotiations on a comprehensive deal to resolve the Iran nuclear issue get underway in Vienna on February 18th. Implementation of the interim agreement appears to be going smoothly, but prospects for early progress in the upcoming talks are very limited.

Indeed, there is a risk that, from the outset, the parties will lock themselves into entrenched and widely divergent positions that will make it more difficult and time-consuming later to reach agreement. The following discussion suggests a way of approaching the negotiations that might reduce those risks and increase the likelihood of early, productive exchanges.

BRIDGING THE WIDE DIFFERENCES ON ENRICHMENT

The main impediment to early progress is the significant difference between the United States and Iran on the size and composition of the civil nuclear program Iran will be allowed to have under a comprehensive agreement. The most difficult issue will be uranium enrichment, which Iran says it needs to produce fuel for its civil nuclear energy needs but which also provides the capability to produce weapons-grade uranium for nuclear weapons.

Although the Obama Administration would strongly prefer a total ban on enrichment in Iran, it recognizes that such an outcome is not achievable, given the strong consensus across the Iranian political spectrum that abandoning enrichment would constitute a surrender of Iran's nuclear "rights" and a humiliating capitulation to U.S. pressure. The Administration is prepared to accept an Iranian enrichment program as part of an agreement. But it insists that any such program be subject to strict limits capable of ensuring that Iran will not have a rapid "breakout" capability. In other words, the Administration wants to be confident that, if Iran attempted to break out of the agreement and build nuclear weapons, it would not have sufficient time to enrich enough weapons-grade uranium for a single nuclear bomb before the international community could intervene decisively to stop it.

Lengthening the so-called "breakout timeline" – the period between initial breakout steps and the accumulation of enough weapons-grade uranium for a bomb – would therefore be a key U.S. requirement for any agreement. The length of Iran's breakout timeline depends on its enrichment capacity, which in turn is a function of the number of centrifuges, the efficiency of the centrifuge types used, and the amount of uranium at various enrichment levels used as feedstock. The lower the enrichment capacity, the longer the breakout timeline.

How long is long enough? From the time breakout steps are detected, how much time would the United States and international community need to intervene decisively to prevent Iran from producing enough weapons-grade uranium for a nuclear weapon? This is essentially a political judgment. To err on the side of caution, it would be desirable to plan for the possibility of a series of steps – detection of evidence by the IAEA or intelligence agencies of possible breakout activities, clarification of any ambiguities regarding that evidence, consultations among key parties on the meaning of that evidence, private diplomatic efforts to press Iran to forgo and reverse breakout, deliberation and possible action by the IAEA Board and U.N. Security Council, imposition of strong sanctions and other coercive measures, and ultimately, if all else fails, the use of military force.

How long would such a sequence of actions require? Comfortably, probably a year, but six months, or perhaps even shorter, could be adequate. It is possible to make estimates of the Iranian enrichment capacities that would translate into these various breakout timelines. For example, David Albright, respected head of the Institute for Science and International Security, calculates that, with 4000 first-generation centrifuges (i.e., IR-1s) and stocks of 3.5 percent and near-20 percent enriched uranium, Iran could produce enough weapons-grade uranium for a single nuclear weapon in about six months. This would require a reduction of about 75 percent in the number of Iranian centrifuges currently installed. (Iran now has about 19,000 installed centrifuges, with close to 10,000 operating.)

It would be possible to produce the same six-month breakout timeline by altering the variables – for example, by reducing permitted enriched uranium stocks and increasing the permitted number of centrifuges. Or to lengthen the timeline to one year, restrictions on the numbers and types of centrifuges and on available enriched uranium stocks would have to be significantly tighter.

Setting aside the political judgment of how long the minimum breakout timeline should be – and the specific limits on Iranian enrichment capacity that would be needed to ensure that timeline – it is already clear that Iran has a very different view from the United States on the size and composition of an acceptable enrichment program. In an interview during the Davos World Economic Forum, President Rouhani seemed to rule out any dismantlement of existing centrifuges. Ali Salehi, head of the Atomic Energy Organization of Iran, recently said that Iran will continue to develop advanced centrifuges, claiming it is now working on a centrifuge "15 times more powerful" than the existing model. In response to U.S. statements that the Arak heavy-water reactor and the Fordow enrichment facility have no justification in a civil nuclear program, various senior Iranian officials have stressed that Iran is determined to proceed with both facilities.

There is a risk that these sharply contrasting views on an acceptable Iranian enrichment program – with the U.S. and its partners pressing for major reductions in Iranian enrichment capability and Iran seeking to maintain and even expand it – will lead to an early impasse in the negotiations. Rather than get locked in by tabling specific and widely divergent proposals on numbers and types of centrifuges and on uranium stocks, the negotiators might usefully focus on a concept incorporated in the Joint Plan of Action (JPA) that Iran and the P5+1 adopted last November 24th in Geneva – namely, "practical needs." In the JPA, the negotiators agreed that a comprehensive solution to the Iran nuclear issue would involve "a mutually defined enrichment programme with mutually agreed parameters consistent with practical needs."

By configuring and sizing Iran's enrichment capabilities to serve the practical needs of Iran's civil nuclear energy program – the actual needs of a realistic program, not the hypothetical needs of an aspirational one – it may be possible to meet Iran's civil nuclear goals while at the same time assuring the United States and its P5+1 partners that Iran will not have a rapid breakout capability.

WHAT ARE THE PRACTICAL NEEDS OF IRAN'S CIVIL PROGRAM?

What are Iran's practical needs for enrichment? An immediate practical need is to have enough uranium fuel enriched to near-20 percent to run the Tehran Research Reactor (TRR), which produces medical isotopes and tests fuel assemblies for various reactors. But Iran has already produced enough near-20 percent enriched uranium to fuel the TRR for well over a decade, which is why Iranians nuclear officials were prepared to support the suspension of the production of near-20 percent enrichment under the JPA.

Iran also has a practical need to run its nuclear power reactor at Bushehr, which was supplied by Russia. But the Russia-Iran contract on Bushehr provides that Russia will supply the enriched uranium fuel for the reactor for at least 10 years, and Russia is willing to continue supplying fuel for Bushehr for the life of the reactor. Iran and Russia are reportedly negotiating the sale of a second power reactor. Presumably that too could receive enriched fuel from Russia – if desired, for the life of that reactor as well.

Another future practical need is Iran's declared intention to design and build four small light-water research reactors to meet the country's medical isotope production and nuclear research needs. Although Iran has often referred to these reactors, the construction and operation of the first of them is still years away. Why light-water reactors? Because light water-moderated, enriched uranium-fueled reactors are better suited to producing medical isotopes, testing fuel assemblies, and conducting research than heavy water-moderated, natural uranium-fueled reactors like the currently configured Arak reactor, which is optimized for plutonium production. In terms of the needs of light water research reactors for enrichment uranium, they are fueled with very small amounts of enriched uranium, amounts Iran could produce with a fraction of its current enrichment capacity.

Another potential need is to provide fuel for Iranian indigenously designed and constructed power reactors. For years, Iranian nuclear officials have talked about building such reactors, which would require much more enriched uranium fuel than the small research reactors. But notwithstanding occasional Iranian references to such indigenous power reactors, there are no public indications that such a project has gotten very far, and the likelihood that any such reactor will be built and operating in less than 15-20 years is probably remote. Even then, it would almost surely be more economical for Iran to rely on highly efficient foreign suppliers of enriched uranium to fuel such reactors.

So if we look realistically at Iran's actual practical needs for indigenously produced enriched uranium, we see that the needs are small – especially in the near term – and can be met with an enrichment program significantly smaller than currently exists in Iran.

We would expect the Iranians to reflexively dismiss non-Iranian judgments regarding their national needs. When Undersecretary Wendy Sherman testified recently that the U.S. sees no need for the Arak reactor or Fordow enrichment facility in a civil nuclear program, Deputy Foreign Minister Araghchi bristled: "We don't in any way give them permission to decide on behalf of the Iranian people what we need and what we don't need. This decision is ours and relates to our independence."

While challenging foreign assessments of Iran's needs as a matter of principle, the Iranians will make the case that their practical need for indigenously produced enriched uranium is much greater than Western estimates. They can be expected to state their longstanding position – repeated recently by President Rouhani – that Iran's goal is 20,000 megawatts of nuclear-produced electricity, which is the output of 20 Bushehr reactors and would require many times Iran's current enrichment capacity to produce the necessary enriched fuel. Most non-Iranian experts have regarded the 20,000 figure as wildly aspirational, a number concocted simply to provide a justification for a large enrichment capability.

The Iranians can be expected to come up with other "needs" for an expanded enrichment program, among them that they must produce enough enriched uranium for power reactors because they cannot trust the Russians to be reliable suppliers of fuel. Aside from this being a gratuitous insult to the country that defied the international community by building Bushehr and insisting on a carve-out from Security Council restrictions to complete and fuel it, it ignores a variety of means to guarantee a timely and reliable fuel supply, such as stockpiling several re-loads of fabricated Bushehr fuel within Iran.

Or they may say that they need to ramp up enrichment capacity and enrichment production now to meet the future fuel needs of the indigenously designed and constructed power reactors they plan to build. But as far as we know, those reactors are still on the drawing boards and are at least many years away. Moreover, the fuel needs of power reactors are much greater than even the more advanced Iranian centrifuges are capable of fulfilling with any acceptable number of centrifuges and in any reasonable time frame. Unless Iran can compete with the world's most efficient centrifuge enrichment operations, which countries as technologically advanced as Japan have been unable to do, it will make sense for Iran to do what many countries with significant power programs have done – rely on foreign suppliers for enriched fuel for power reactors.

COOPERATING TO ADDRESS IRAN'S PRACTICAL NEEDS

Early in the negotiations, before Iran or the P5+1 countries have tabled specific proposals on the civil nuclear capabilities Iran can have under the agreement, the two sides should sit down with nuclear energy experts present and discuss the practical needs of the Iranian civil program. That discussion will not be easy. Iranians can be expected to start off with inflated notions of their needs as a justification for retaining and expanding their nuclear infrastructure, especially their enrichment capacity. And if the Iranians are determined to ensure a short breakout timeline, the discussion will go nowhere. But if Iran is serious about pursuing a civil nuclear energy program – and not just preserving the capability for rapid breakout – the Iranians may come to realize that they can meet their civil nuclear goals, even advance those goals effectively, while at the same time satisfying the international community that it is not insisting on a rapid breakout capability.

The P5+1 and wider international community can help Iran reach that conclusion by offering various forms of cooperation in the civil nuclear field. For example, as part of a package deal that would include converting Arak to a light water-moderated, enriched uranium-fueled reactor, the P5+1 and research reactor designers and producers such as Argentina and Australia could cooperate with Iran to design and construct the four modern light water research and medical isotope production reactors that Iran says it wants to build.

They could also cooperate to produce the necessary near-20 percent enriched fuel for the five research and isotope-producing reactors (i.e., the four plus Arak). Iranian 5 percent enriched uranium could be sent abroad for enrichment to near-20 percent and then sent back to Iran, where foreign technicians could cooperate with Iranian technicians in fabricating the fuel. Alternatively, with suitable constraints and monitoring measures, Iran could be permitted to produce enough near-20 percent enriched uranium oxide on a "just in time" basis to fabricate fuel for the five research reactors – also with the cooperation of foreign technicians but without having to send 5 percent uranium outside Iran for further enrichment. Other than this small, "just in time" working stock of near-20 percent uranium, Iran would not retain any near-20 percent material, either in gaseous or oxide form.

Iran would also have only a limited practical need for keeping enriched uranium below-5 percent in Iran. As discussed just above, a portion of it could be used to produce research reactor fuel. The remainder of it could be sent to Russia to contribute to the fabrication of fuel for Bushehr. A significant benefit for Iran would be if Russia invited Iranian technicians to come to Russia to be trained in fuel fabrication for Bushehr. Arrangements might also be worked out for eventually permitting fuel fabrication for Bushehr in Iran, although here too "just in time" procedures would be needed to avoid excessive accumulations of enriched uranium that could give rise to breakout concerns.

The current number of roughly 19,000 centrifuges – mostly first-generation IR-1s – is hardly needed to meet Iran's practical civil nuclear needs. The IR-1s, especially, are inefficient machines, prone to break down, and have little place in a modern civil nuclear program. To meet the relatively modest needs of Iran's current civil program, Iran can afford to accept a major reduction in the current level – to around 4000 IR-1s or a lower number if the more efficient IR-2ms either replace them or are added to the mix.

From the standpoint of a future Iranian civil nuclear program, it makes little sense to rely on the IR-1 or even the more advanced models Iran is now exploring. Over the long term, if Iran's truly wants a peaceful and economical program and if it succeeds in building a significant number of power reactors, it will want to have either a highly efficient centrifuge that can compete with today's most advanced enrichment providers or it will rely on the international enrichment market as many countries with nuclear programs do. In the short term, with very little practical need for enrichment, it can afford to greatly reduce existing centrifuges and instead concentrate on R&D for the future.

Iranian centrifuge R&D could give rise to concerns, because the more efficient the centrifuge, the shorter the breakout timeline and the smaller and more concealable a covert enrichment facility could be. But with effective monitoring – including monitoring capable of ensuring that no production or covert storage of advanced centrifuges is taking place – the risks of centrifuge R&D can be reduced, especially if the efficiency levels of the machines (i.e., SWU levels) are limited and only allowed to increase over time.

The current Fordow enrichment facility could be turned into a venue for Iranian nuclear R&D – for centrifuge R&D and other nuclear research activities. To reduce breakout concerns, existing centrifuge cascades would have to be removed from the facility, and limits would have to be placed on the numbers of centrifuges that could be operated there for R&D purposes.

While Iran is likely to rely for many years on the foreign supply of power reactors, it will presumably continue its efforts to design and construct a power reactor indigenously, which is far more challenging than the construction of a small research reactor. P5+1 cooperation with Iran on indigenous power reactors may be possible, but it would be far more possible if the P5+1 had confidence that the reactors would be fueled with enriched uranium acquired on the world market rather than produced indigenously, which would require a much greater domestic enrichment capacity than would be required to support the modest, near-term enrichment needs discussed earlier.

FRAMING THE ISSUE IN A MORE PROMISING WAY

If the upcoming negotiations become framed simply as the United States seeking to reduce much of Iran's current nuclear infrastructure and Iran seeking to preserve it, the talks could soon reach an impasse. Iranian opponents of an agreement will charge the U.S. with pressuring Iran to compromise its nuclear rights, negate what the nation has proudly achieved at great expense, and undermine its future civil nuclear energy plans. Iranian negotiators would be under strong pressure to dig in their heels.

Focusing on the practical needs of Iran's civil nuclear program could create a less confrontational atmosphere and perhaps elicit a less defensive Iranian reaction. It could encourage the Iranians to take a hard look at their current nuclear facilities and capabilities and, if they are genuinely interested in using nuclear energy for peaceful purposes, to consider what would best serve the interests of their future civil nuclear program.

It might bring them to recognize that holding onto an unnecessarily large number of obsolete centrifuges – just because the United States has called for reducing them – hardly makes sense. Nor does continuing to build a reactor not configured properly for its intended purpose of producing medical isotopes, or planning to produce enriched uranium for Russian-supplied reactors when Russia can provide the fuel much more cheaply and efficiently. It might also encourage Iran to consider how collaboration with the P5+1 and other interested countries – in such areas as the design, construction, and fueling of modern research reactors and fuel fabrication for power reactors – could provide long-term benefits for its civil nuclear program.

In general, focusing on practical needs might demonstrate that what the United States and its P5+1 partners consider necessary to prevent a rapid nuclear breakout capability is not inconsistent with the requirements of a sound and growing Iranian civil nuclear energy program.

No matter how the parties approach the upcoming talks, reaching agreement will be hard. But focusing on practical needs could lead to some productive exchanges and reduce the likelihood of early stalemate.

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