



JUNE 25, 2015

# EVALUATING KEY COMPONENTS OF A JOINT COMPREHENSIVE PLAN OF ACTION WITH IRAN

UNITED STATES SENATE FULL COMMITTEE ON FOREIGN RELATIONS

ONE HUNDRED FOURTEENTH CONGRESS, FIRST SESSION

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# **Evaluating Key Components of a Joint Comprehensive Plan of Action (JCPOA)**

## **Testimony of David Albright, President of the Institute for Science and International Security (ISIS) before the Senate Foreign Relations Committee**

**June 25, 2015**

The U.S. administration and its partners in the P5+1 are poised to conclude a momentous agreement with Iran designed to limit its nuclear programs in exchange for significant sanctions relief. Congress has a special responsibility to evaluate this agreement and judge its adequacy to protect U.S. national security interests in the short and long term. As part of this process, it should create legislation to codify the agreement, its implementation processes, critical interpretations of the agreement, reporting requirements, clarifications about violations and consequences of non-compliance, and steps needed to mitigate weaknesses in the agreement.

The legislative branch must determine if the agreement is adequate to achieve the goal it originally set out to achieve – namely instituting international confidence in the peaceful nature of Iran’s nuclear programs, not just for the duration of the accord, but for the foreseeable future. Special attention should be given to an agreement whose nuclear limits sunset after 10-15 years, potentially leaving the world with an even more insecure and heightened situation in Iran in terms of a greatly reduced Iranian breakout timeline, and more advanced centrifuges spinning and capable of creating weapon-grade uranium (WGU) within shorter periods of time.

The United States and its allies cannot be certain about their ability to rely mainly on intelligence after the extraordinary arrangements in an agreement end, long after sanctions are removed, and Iran has more freedom to augment its nuclear program. Iran’s regional neighbors would likely not wait to develop their own threshold nuclear capability in the face of an Iran that only a decade or two from now would be on the cusp of rapid breakout, capable of producing many nuclear weapons and within a shorter time period than it is today. Thus, Congress needs to proactively consider the implications of this deal for an “enrichment race” in the Middle East that could lead several countries to nuclear weapons capabilities in the next 10-15 years.

Congress should evaluate the technical limits and verification measures set out in the deal to ensure they adequately constrain Iran’s nuclear activities and capabilities and its ability to violate the agreement. In particular, the verification arrangements should ensure the reaching of an understanding about past and possibly on-going Iranian work on nuclear weapons and ensure prompt access to any Iranian sites, whether military or civilian. Enforcement will require maintaining leverage against Iran if it cheats, yet reliance on a snapback of sanctions as the only leverage in the case of an Iranian breakout appears deeply ineffective to pressure Iran to reverse course. In addition, the deal needs to be carefully scrutinized in how it guards against

incremental and more ambiguous violations and set out procedures to address this type of cheating.

As Senators think about how to evaluate a nuclear deal, one model is to follow procedures used when the President submits a treaty to the Senate for ratification. Although a Joint Comprehensive Plan of Action (JCPOA) is clearly an executive agreement by nature, it will have a significant impact on U.S. national security and warrants and deserves extraordinary Congressional scrutiny. This scrutiny should not only lead to an up or down vote of the agreement, it should result in legislation that enshrines and elaborates on its provisions and its implementation over time, and makes key interpretations of its provisions. While the Iran Nuclear Agreement Review Act of 2015 satisfies some of the following provisions, Congress should ensure that any new legislation includes those provisions and additional measures and supporting reporting requirements that go further, such as:

- A detailed description of the motivation, intent, and scope of the agreement;
- Key technical and policy interpretations of major provisions;
- Assessments about the adequacy of the agreement's verification regime;
- Clear statements of what constitutes violations, both material and incremental;
- National and international mechanisms to determine a violation and course of remediation;
- Consequences in case of Iranian non-compliance, in particular those that go beyond or complement the snapback of sanctions; and
- Procedures for addressing Iranian unwillingness to comply with remediation or cease the disputed activity.

While a full discussion of such legislation is beyond the scope of this testimony, a few examples would help clarify such an approach. It is important to state that the need for this agreement results from Iran's pursuit of nuclear weapons and secret nuclear capabilities and to provide details about these efforts. It would be useful that legislation lay out Iran's violations of its non-proliferation commitments and describe its history of non-cooperation with the International Atomic Energy Agency (IAEA).

The legislation could contain key interpretations of the deal. The Obama Administration has already stated one interpretation, namely that uranium enrichment is not a right of Iran under the Nuclear Non-Proliferation Treaty. Another it has articulated is that any production of uranium enriched over five percent after the end of the explicit prohibition on such production in the agreement (at year 15) would be viewed as a significant threat to U.S. and international security. Likewise, an interpretation by Congress could be that Iran's expansion of its nuclear program after year 10 of the agreement must be clearly related to the practical need for nuclear energy and consistent with a legitimate and economic, peaceful nuclear requirement.

The legislation could include reporting requirements that require more detailed reports than laid out in the Iran Nuclear Agreement Review Act. Examples include requirements for the administration to produce annual unclassified compliance reports, including review and determination of the on-going adequacy of the agreement's verification regime. More frequently, the administration should report on the adequacy of Iran's cooperation with the

IAEA. Congress should be informed quarterly about the size of Iran's low enriched uranium (LEU) stocks, both less than 5 percent and less than 20 percent enriched, and whether the breakout timelines remain as they should. The administration should also inform Congress in detail about the status of Iran's centrifuge research and development programs.

The legislation could also establish implementation steps. Some have suggested that there should be a senior administration official responsible for implementation. The IAEA's verification efforts in Iran should be supported with additional funding and other types of U.S. support. In addition, there should be actions to strengthen U.S. export control and counterproliferation efforts against Iran's illicit procurements for its missile and military programs and its potential illicit nuclear or nuclear-related procurements. As part of that effort, it is important to improve U.S. programs for the timely detection of Iran's illicit procurement attempts, utilizing and developing new technologies, and to expand cooperation with allies to improve timely detection of Iran's illicit trade.

The remainder of my testimony seeks to address specific questions posed by the Chairman in his invitation letter. Because of the complexity of some of the questions, a few of the responses are more technical than usually presented in Congressional testimony. Nonetheless, I hope the testimony is useful. If desired, I can provide additional supporting information or elaborations.

## **1) What criteria should Senators use to evaluate a prospective nuclear agreement with Iran?**

In particular, criteria weighing the adequacy of an agreement should include:

- ❖ The blockage of the four main pathways to the bomb: the Arak/plutonium production pathway, Natanz/enrichment and Fordow/enrichment pathways, and covert pathways.
- ❖ Achievement of a 12-month breakout timeline during the first ten years of the agreement and a six-month breakout timeline remaining at year 13.
- ❖ The size of the near 20 percent LEU stock is consistent with a 12 month breakout timeline. In particular, is the administration making assumptions to unreasonably exclude portions of a remaining stock of near 20 percent LEU?
- ❖ The methods, and their effectiveness or timeliness, in reducing Iran's 3.5 percent LEU stockpile from its current level of about 10,000 kg to the 300 kg cap agreed in the April 2015 interim agreement. How will this cap be maintained during the agreement?
- ❖ Adequate verification, including the adequacy of Additional Protocol Plus arrangements.
- ❖ Inspector access to Iranian sites where suspicious activity may be occurring, including military sites, anywhere and promptly, or "anytime," and certainly within 24 hours. In particular, if the agreement creates a P5+1 deliberative body that has the authority to decide upon IAEA access in case of an Iranian refusal, the length of the proceedings

should not increase access time significantly or create a process that Iran can exploit to buy time to hide or destroy evidence at suspect sites.

- ❖ An Iranian commitment not to conduct illicit nuclear and nuclear-related trade.
- ❖ A procurement channel under a United Nations Security Council resolution that controls a sufficient number and type of goods and includes adequate monitoring. As part of verifying Iran's compliance with this condition, the IAEA should ensure that Iran's procurement of nuclear and nuclear-related goods is within this channel and be mandated to investigate violations. The IAEA should be able to have access to the actual end users of goods imported by Iran through this channel and those who have illicitly procured outside this channel.
- ❖ The deal can survive stress tests, namely assessments of the durability and adequacy of the agreement against a variety of scenarios that project the status and behavior of the Iranian regime in the future, such as ten and fifteen years after the agreement is signed. It is critical to evaluate the agreement's projected goals and endpoints against an Iranian regime that acts more responsibly than today as well as less responsibly. The durability, strength, and value of any deal is truly measured against an Iranian regime that remains as it is today or worsens in terms of impact on U.S. interests regionally and internationally.
- ❖ Understandings that at year 13 after implementation of the deal, and in particular at year 15, any Iranian nuclear expansion of uranium enrichment efforts or building of heavy water reactors will be based on legitimate economic rationales and clearly needed for civilian purposes. Any indications, based on Iranian statements in the negotiations or learned by U.S. intelligence, that Iran intends to enrich over 3.67 percent after year 15 of the agreement should be weighted negatively.
- ❖ Evaluating the implications of the deal establishing a new norm that legitimizes uranium enrichment despite the lack of need for the enriched uranium and a history of non-compliance and non-cooperation with the IAEA. Will the deal herald an "enrichment race" that threatens U.S. interests regionally and more broadly? Congress should evaluate this threat of the spread of dangerous nuclear technologies and develop remediation steps to mitigate damages.

## **2) What concerns do you have about the interim agreement announced on April 2, 2015?**

Overall, the interim agreement achieved many U.S. objectives; however, it also raised several concerns. In an ISIS report published on April 11, 2015, we outlined in fuller terms the agreement's accomplishments, several weaknesses, and a number of unresolved issues.<sup>1</sup>

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<sup>1</sup> Albright et al., "P5+1/Iran Framework: Needs Strengthening," ISIS Report, April 11, 2015. [http://isis-online.org/uploads/isis-reports/documents/Assessment\\_of\\_Iran\\_Nuclear\\_Framework\\_April\\_11\\_2015-final.pdf](http://isis-online.org/uploads/isis-reports/documents/Assessment_of_Iran_Nuclear_Framework_April_11_2015-final.pdf)

The interim agreement succeeded in limiting the Arak heavy water reactor sufficiently, reducing Iran's centrifuge program in size, and increasing transparency and monitoring of a long-term deal. Other important provisions contained in the Fact Sheet of the interim deal include:

- No new enrichment facilities for 15 years;
- The removal and monitored storage of excess centrifuges and associated equipment and not their disablement in place, as was discussed in the past as a preferred possibility by the U.S. negotiators;
- In particular, the removal and monitored storage of the roughly 1,000 IR-2m centrifuges at the Natanz Fuel Enrichment Plant and the removal and storage of the several hundred IR-2m and IR-4 centrifuges at the Natanz pilot plant;
- The removal from Iran<sup>2</sup> or blending down of most of Iran's stock of about ten tonnes of 3.5 percent LEU and a long term cap of 300 kg of LEU hexafluoride enriched no more than 3.67 percent (Iran can possess other chemical forms of this LEU but these amounts must fall within the cap, after calculating their hexafluoride equivalent);
- Excess centrifuges and associated equipment can be used only as replacements for operating centrifuges and equipment, removing any need for further operation of IR-1 and IR-2m centrifuge manufacturing operations and procurements;
- Containment and surveillance of centrifuge component manufacturing plants; and
- A procurement channel for goods needed in authorized nuclear programs.

*Concerns:*

- ❖ There are numerous concerns about whether the deal adequately addresses limits on Iranian enrichment which have implications for maintaining the 12-month breakout timeline.

- The U.S. Fact Sheet about the interim agreement makes no mention of Iran's stock of near 20 percent LEU, in particular its fate. How much near 20 percent LEU will Iran retain? How will the excess be determined? Will that excess be shipped out of Iran or diluted to natural uranium? Maintaining a 12-month breakout timeline depends critically on the size of Iran's remaining stock of near 20 percent LEU and its accessibility in a breakout (see also question 6). As of June 30, Iran will retain a dangerously large stock of near 20 percent LEU, namely about 230 kilograms (kg) of near 20 percent LEU. This LEU will be in three principal categories, namely about 45 kg projected to be in oxide powder form, approximately 135 kg in waste, in scrap, or in-process and roughly 50 kg in fuel elements for the Teheran Research Reactor (TRR).<sup>3</sup> ISIS has recommended the stocks of oxide powder and in waste/scrap/process be blended down to natural uranium or shipped out of Iran. The LEU in fresh or unirradiated TRR fuel should also be made less usable in a breakout. One method to do that is to irradiate all the TRR fuel, at least partially, to increase the complication of extracting the LEU from the fuel. On the other

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<sup>2</sup> Iran may be reconsidering the option of sending LEU to Russia for fabrication into fuel for subsequent return to Iran for use in the Bushehr nuclear power reactor.

<sup>3</sup> David Albright and Serena Kelleher-Vergantini, "The U.S. Fact Sheet's Missing Part: Iran's Near 20 Percent LEU, (Updated June 5, 2015 with new IAEA data)," ISIS Report, June 5, 2015. [http://isis-online.org/uploads/isis-reports/documents/LEU\\_20\\_percent\\_update\\_June\\_5\\_2015\\_Final.pdf](http://isis-online.org/uploads/isis-reports/documents/LEU_20_percent_update_June_5_2015_Final.pdf)

hand, the administration appears willing to allow Iran to keep the bulk of this near 20 percent LEU, as long as it is mixed with aluminum, a step in the manufacturing process of TRR fuel. The JCPOA should be carefully scrutinized as to whether or how these recommendations are implemented and in particular it should be assessed as to whether the breakout calculations should include near 20 percent LEU recovered from LEU/aluminum mixtures. We believe they should.

- The interim agreement does not provide the mechanisms to reduce Iran's 3.5 percent LEU stockpile from its current level of about 10,000 kg to the 300 kg cap. Excessive stocks of 3.5 percent LEU also negatively impact the 12-month breakout timeline. About 4,000 kilograms of this LEU are slated to be converted into oxide powder, albeit far behind the schedule implied in the Joint Plan of Action (JPOA). In fact, Iran has not met its commitments at the end of the first period of the JPOA and its first extension to turn newly produced 3.5 percent LEU into oxide form. It is doubtful it will do so at the end of the current extension that ends on June 30, 2015. The administration has publicly downplayed this condition in the JPOA, focusing on a weaker condition that Iran feed the newly produced LEU into the uranium conversion plant, a technically simple step to accomplish. The result is that this 4,000 kg of LEU will likely be in several chemical forms, most not amenable to blending down to natural uranium without further chemical processing. Some of the LEU could be in chemical forms that may not be amenable to either blending down or shipping out of Iran. Congress should carefully scrutinize the arrangements in a deal to achieve a cap of 300 kg of 3.5 percent LEU hexafluoride equivalent.

- ❖ Of concern is the lack of a "soft landing" or slow return to shorter breakout timelines after year 10 and up to year 15. Iran will also be able to deploy advanced centrifuges after year 10. In fact, one senior negotiator described the arrangement for centrifuges as a reversed program in years one to ten, preparation for full development in years 10 through 13, and full development after year 13. A major concern is that Iran can return to short breakout timelines, likely far shorter than the two months or so projected today.

- Lack of limits on Iran augmenting its enrichment capacity after year 10. ISIS has recommended that breakout time should decrease no faster than one month per year, resulting in a breakout time of 7 months at year 15. During this five year period, no IR-2m, IR-4, or more advanced model centrifuges should be deployed.

- Lack of a "sunset clause" for the agreement authorizing the path forward for Iran, or at year 13 the ability for the P5+1, collectively or individually, using IAEA findings and other, nationally developed information, to determine if Iran's nuclear program is consistent with a peaceful program, exclusively for peaceful purposes, and expected to remain so. Such a positive determination would then free Iran to deploy large numbers of its centrifuges and thereby lower breakout timelines.

- Lack of a condition that explicitly states that Iran would not enrich beyond the 3.67 percent indefinitely, rather than the current provision to ban such enrichment for just 15 years. Iran is unlikely to have a civilian justification for producing enriched uranium

above 3.67 percent after year 15. Iran enriching at near 20 percent would undoubtedly risk increasing international concerns about its intentions and create precedents for other nations to follow.

- ❖ The weakness of provisions limiting centrifuge research and development (R&D) during the first ten years of the agreement.
  - No bans exist on Iran's research and development of the IR-6 and IR-8 centrifuges, the latter of which is up to 16 times more powerful than the IR-1 centrifuge. Failing to achieve such bans, the interim agreement does not appear to mitigate the risks of Iran being able to deploy these more powerful centrifuges after year 13, other than some negotiators stating that they believe that Iran will have trouble actually deploying them in the future.
- ❖ Lack of additional conditions on Iran's allowed work at the Fordow site for the indefinite future, because of its sensitive nature of being deeply buried and difficult to access or penetrate in the event of cheating or breakout.
  - An existing loophole in the interim agreement allows Iran to operate advanced centrifuges at Fordow after year ten, albeit not enriching uranium. ISIS has recommended that a deal should prevent Iran from ever using Fordow to enrich uranium or only allow it to enrich in IR-1 centrifuges.
  - After year 15, Iran could deploy any of its centrifuges at Fordow to enrich uranium, allowing it to reestablish Fordow as a uranium enrichment centrifuge plant with a capacity far in excess of its current capacity. Unless additional limits are included in the agreement, Fordow could re-emerge as a substantial uranium enrichment plant after year 15, housing advanced centrifuges 10 to 16 times more capable than the IR-1 centrifuge. So, instead of a plant with a current capacity of about 2,500 separative work units (swu) each year, the plant would have a capacity of 25,000- 40,000 swu per year. Since bans to produce near 20 percent LEU also sunset at year 15, this heavily fortified plant would be capable of producing enough weapon-grade uranium for a nuclear weapon within a few weeks, or enough WGU for two weapons in less than a month.

*Unresolved issues:*

- ❖ The interim deal was largely silent on verification conditions of key importance, including (described in detail under question 4, page 11):
  - Anywhere, anytime access to Iranian military sites,
  - The need for a broad centrifuge-related declaration,
  - A raw uranium import declaration,
  - Key import and export declarations of sensitive or dual-use goods, and
  - A plutonium related declaration.

Our concerns about the interim deal outlined above should not be construed as opposition to the deal, particularly since the deal has yet to be finalized. Our judgement about a deal has to await the final details. Our concerns, however, provide another measuring stick upon which to evaluate a final agreement.

### **3) What redlines do you believe Senators should hold in evaluating a prospective nuclear agreement with Iran?**

The U.S. government's redlines have been difficult to identify. Iran has been far clearer about its redlines. Nonetheless, if a redline is defined as a condition that if unmet would immediately mean that the deal would be rejected, several key ones that should be considered are:

- ❖ Estimated breakout time, or the time to produce one significant quantity of fissile material for a nuclear weapon, is adequate to allow enough knowledge and time for action or intervention to stop Iran. In the words of Undersecretary of State Wendy Sherman: "We must be confident that any effort by Tehran to breakout of its obligations will be so visible and time-consuming that the attempt would have no chance of success."
- ❖ The rollback of Iran's centrifuge program and Arak reactor modifications are irreversible during the duration of the agreement, or at least not significantly reversible within 12 months of Iran's initiation of a reversal;
- ❖ A clear, timely pathway exists whereby the IAEA's concerns are addressed about the possible military dimensions of Iran's nuclear program, both in the past and those possibly ongoing today. Ambiguity over Iran's nuclear weaponization accomplishments and residual capabilities risks rendering an agreement unverifiable by the IAEA. This pathway cannot simply involve Iran checking boxes and the IAEA or the United States accepting Iranian explanations. It must be accompanied by full Iranian cooperation with an IAEA investigation, including access to sites, people, and documents related to its past or possibly ongoing efforts; and
- ❖ Prompt IAEA access is guaranteed to all sites in Iran, whether military or not, if suspicious activities are reported.

### **4) Are there requirements on inspections or possible military dimensions (PMD) that you believe are essential to a successful agreement? Do you believe there are other required elements of a successful agreement?**

A prerequisite for a comprehensive agreement is for the IAEA to know when Iran sought nuclear weapons, how far it got, what types it sought to develop, and how and where it did this work. Was this weapons capability just put on the shelf, waiting to be quickly restarted? The IAEA needs a good baseline of Iran's military nuclear activities, including the manufacturing of equipment for the program and any weaponization related studies, equipment, and locations. The IAEA needs this information to design a verification regime and determine if Iran's nuclear program is peaceful today.

One important aspect of this issue has been the IAEA gaining access to a site at the Parchin military complex. This site is the alleged location of high-explosive testing linked to nuclear weapons development prior to 2004. Since the IAEA asked to visit this site in early 2012, Iran has reconstructed much of it, making IAEA verification efforts all but impossible. Tehran has undertaken at this site what looks to most observers as a blatant effort to defeat IAEA verification. Because of such extensive modifications, the IAEA, once allowed access, may not be able to resolve all its concerns. Thus, access to Parchin alone is no longer sufficient to resolve the issues underlying the IAEA's original request to access this site. The IAEA will need to visit related sites. One needs to now think of IAEA access to Parchin as including a list of actions that would involve the need for access to additional sites and individuals. More broadly, Iran will need to allow access to a range of sites as part of addressing the IAEA's PMD concerns.

For a deal to be verifiable, Iran will also need to agree to IAEA requests to interview key individuals, such as Mohsen Fakhrizadeh, a reputed leader of Iran's nuclear weapons efforts, and Sayyed Abbas Shahmoradi-Zavareh, former head of the Physics Research Center, alleged to be the central location in the 1990s of Iran's militarized nuclear research. The IAEA interviewed Shahmoradi years ago about a limited number of his suspicious procurement activities conducted through Sharif University of Technology. The IAEA was not fully satisfied with his answers and its dissatisfaction increased once he refused to discuss his activities for the Physics Research Center. Since the initial interviews, the IAEA has obtained far more information, some supplied by my institute, about Shahmoradi and the Physics Research Center's procurement efforts.<sup>4</sup> The need to interview both individuals, as well as several others, remains.

There had been an expectation, or at least a hope, that Iran would address the IAEA's PMD concerns prior to the June 30 deadline. However Iran has become more intransigent on this issue over the last several months, eliminating any such hope. Because this issue is fundamental to resolving the nuclear issue, Iran's intransigence requires extra assurance early on in any deal that it will comply with its safeguards obligations and meet the fundamental goal of a long term deal that Iran's nuclear program be strictly peaceful.

The administration has reportedly proposed to Iran that it allow access to a list of many sites and persons that are relevant to the IAEA's PMD concerns, prior to the lifting of key financial and economic sanctions. As of late last week, Iran had not accepted this list. But even if it does, it could mechanistically allow the IAEA access to these sites and persons while showing no real cooperation. As discussed above, the risk is too high that Iran would treat the exercise as simply checking a box, leaving the IAEA no further along in its effort to address its PMD concerns. If Iran can do this before the removal of sanctions, one can have little confidence that it will address the IAEA's concerns afterwards.

If Iran successfully stonewalls the IAEA prior to the lifting of sanctions, the IAEA's credibility will be undermined. Further, Iran may be able to maintain all of the knowledge and capabilities related to nuclear weapons that it has acquired and developed for a future date when it may want

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<sup>4</sup> See for example, Albright, Paul Brannan, and Andrea Stricker, "The Physics Research Center and Iran's Parallel Military Nuclear Program," ISIS Report, February 23, 2012. [http://isis-online.org/uploads/isis-reports/documents/PHRC\\_report\\_23February2012.pdf](http://isis-online.org/uploads/isis-reports/documents/PHRC_report_23February2012.pdf)

to break out of its non-proliferation obligations. Leaving Iran's past accomplishments in the shadows would solve nothing if in the future it can muster nuclear weapons capabilities unknown to the IAEA and the international community, to make nuclear weapons. As a result, Congress should look for more from the deal, namely prior to the lifting of sanctions, Iran should resolve in a significant and concrete manner the IAEA's concerns about its past and possibly ongoing work on nuclear weapons. Although Iran addressing all of the IAEA's PMD concerns would be ideal, that process will likely take years. The following aims to identify a sufficient set of conditions that are straightforward and realistic to achieve in the initial implementation period of an agreement. These conditions, or equivalent ones, should be included in a set of requirements that Iran must meet before key financial and economic sanctions are lifted:

- Iran accepting a robust list for visits to sites where nuclear weapons-related activities are alleged to have taken place (such as Parchin but involving at least a half a dozen sites); and access to key equipment, companies, and individuals identified by the IAEA as associated with past military nuclear related activities. Congress should on a classified basis compare this list to earlier proposed ones by the administration and its allies and require the administration to provide an explanation for which specific items were removed and why. (The list should not in any way be considered a final list; the IAEA will need to reserve the right to go to other sites, interview the same or different people, and obtain other documents as it seeks to finalize its PMD investigation, some of which will likely have to occur after the lifting of sanctions).
- The IAEA receiving full cooperation from Iran in its efforts to conduct a rigorous investigation of PMD issues.
- Prior to the lifting of key sanctions, the IAEA having time to assess the results of these visits and access and make a preliminary determination over whether it has made concrete progress. Such a positive IAEA determination would be necessary to lift sanctions.
- If appropriate, the IAEA issuing a provisional determination, and Iran not disagreeing, that it had a nuclear weapons program prior to 2004, parts of which may have continued after 2004.
- The U.S. intelligence community issuing a detailed unclassified dossier describing to the best of its knowledge, albeit incomplete, Iran's past nuclear weapons program and more recent activities that are useful for the development of nuclear weapons or that are associated with research in fields of nuclear weapons development, such as those conducted by the Organization of Defensive Innovation and Research (SPND), headed by Mohsen Fakhrizadeh.<sup>5</sup>

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<sup>5</sup>U.S. State Department, "Additional Sanctions Imposed by the Department of State Targeting Iranian Proliferators." Media Note, Office of the Spokesperson, Washington, DC, August 29, 2014.

<http://www.state.gov/r/pa/prs/ps/2014/231159.htm> The State Department note states:

"SPND was established in February 2011 by the UN-sanctioned individual Mohsen Fakhrizadeh, who for many years has managed activities useful in the development of a nuclear explosive device. Fakhrizadeh led such efforts in the late 1990s or early 2000s, under the auspices of the AMAD Plan, the MODAFL subsidiary Section for Advanced Development Applications and Technologies (SADAT) and Malek Ashtar University of Technology (MUT). In February 2011, Fakhrizadeh left MUT to establish SPND. Fakhrizadeh was designated in UNSCR 1747 (2007) and by the United States in July 2008 for his involvement in Iran's proscribed WMD activities. SPND took over some of the activities related to Iran's

- After the lifting of sanctions and the implementation of the deal, a lack of Iranian cooperation with the IAEA on the remaining PMD issues would be considered a material breach of the JCPOA. It should be noted again that the IAEA investigation of the PMD issues could last well past the date when key sanctions are lifted. This on-going IAEA investigation will require access to additional sites, individuals, and documents.

Olli Heinonen, former chief of IAEA safeguards and now at Harvard University's Belfer Center, has pointed out that Iran checking off a list is "not sufficient to provide understanding on how far Iran got in various parts of its weapons related R&D."<sup>6</sup> Such a list could be useful for the IAEA to establish "choke points," he added, which can be monitored to ascertain that a nuclear weapons program is not restored. This would require on-going, periodic access to these sites and individuals.

In addition, the IAEA investigation into PMD should be iterative, according to Heinonen. That means that new persons, sites, and documents may arise during the discussions. Access to those persons, sites, and documents should also be provided. One also has to keep in mind that some activities could have been moved or will be moved to other military sites. If any new suspicions arise, the IAEA will need access to those sites as well.

Heinonen also notes that it is important to dismantle any single use (nuclear weapon) capability in Iran, if they still exist. The agreement may go further, however, according to several negotiators, and ban certain nuclear weaponization-related activities. Examples of such activities include uranium and plutonium metallurgy and certain types of neutron generator and high explosive work. Achieving these bans and their verification conditions in the final deal is challenging but important to achieve.

A difficult verification area is whether Iran has obtained nuclear weapons assistance from other countries or cooperated with other countries on sensitive nuclear matters. The Khan network is suspected of having provided Iran with nuclear weapons designs. There are suspicions that Iran and North Korea are cooperating on nuclear matters. As a result, a challenge is how to verify that Iran is not outsourcing nuclear technology or cooperating with other countries on sensitive nuclear issues.

Verification conditions of key importance, some of which were outlined above, that are not addressed in the framework agreement or not addressed in much detail include:

**Anytime, Anywhere Access:** The IAEA will need anywhere, prompt, or "anytime" access to all relevant sites, facilities, material, equipment, people, and documents in Iran.

**Centrifuge Related Declarations:** In addition to the broader declarations needed to address the IAEA's PMD concerns, the verification arrangements will also depend on Iran declaring how many centrifuges, of all types, that it has made and its inventory of raw materials and equipment

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undeclared nuclear program that had previously been carried out by Iran's Physics Research Center, the AMAD Plan, MUT, and SADAT."

<sup>6</sup> Personal communication with Olli Heinonen.

for its centrifuge program. This baseline is necessary if the agreement is to provide assurances about the absence of secret centrifuge activities and facilities now and in the future.

With regard to establishing a baseline on the number of centrifuges made by Iran, verification of centrifuge manufacturing is necessary, including the declaration and verification of key raw materials and components. The declaration needs to include the origin and amounts of key raw materials and the total number of major components, including the number held in stock, the number manufactured or procured, and their fate. A description of the locations used to produce these goods will also be needed.

Without knowledge of past centrifuge manufacturing activities, centrifuge-related equipment and raw material inventories, and centrifuge-related procurements, verification cannot be adequate. Covert stocks of centrifuges and related equipment and materials could exist and be kept outside the purview of the inspectors. Ensuring a full declaration of the past should be a priority.

**Raw Uranium Declarations:** Another element is the rigorous verification of uranium obtained from abroad and produced domestically, via any method in the past, present, and future. The framework deal signed in early April provides for the continuous surveillance of uranium mills over a twenty five period. A final deal also needs to ensure that Iran cooperates with the IAEA in making a full, verified accounting of past uranium purchases and production.

**Key Import/Export Declarations:** Iran should also provide the IAEA with details of past and future imports, exports, and uses of key items listed under INFCIRC 254 parts 1 and 2 and other critical goods that are used in Iran's nuclear programs. These declarations would go beyond the ones in the Additional Protocol and Iran's commitment to make these declarations should be in the comprehensive deal.

**Plutonium Related Declarations:** As part of broader declarations, the JCPOA should also include a provision for verification of any past activities related to the separation of plutonium. These declarations should include information on any actual or attempted procurements related to acquiring capabilities to separate plutonium from irradiated material.

## **5) What effect do you believe a prospective agreement would have on the Nuclear Nonproliferation Treaty (NPT)? On regional proliferation?**

The Iran deal may have the unintended consequence of stimulating a uranium "enrichment race." In expectation of an Iran deal, Saudi Arabia is already indicating that it will match Iran's nuclear capabilities. Prince Turki bin Faisal, the 70-year-old former Saudi intelligence chief, has toured the world with the same message: "Whatever the Iranians have, we will have, too," he said at a conference in Seoul, South Korea. Other Sunni states apart from Saudi Arabia may accelerate their drive to develop their own domestic nuclear programs, even programs to enrich uranium, as they too seek to counterbalance Iran. Iran's other regional rivals such as Egypt and Turkey may seek to initiate or expand domestic nuclear enrichment programs in order to preserve their regional influence.

The deal, rather than curbing the spread of dangerous nuclear capabilities, could as one aftereffect create a new norm that legitimizes uranium enrichment programs almost anywhere, even when unneeded for a civilian nuclear program and conducted by a country posing a clear proliferation risk. Instead of a deal that sets conditions that are so onerous that no one would want to follow that path, the conditions on Iran may be seen as bearable to other states. Moreover, if they first act by placing their programs under IAEA safeguards, they may avoid the burdensome sanctions that Iran has faced, despite being in regions of tension such as the Middle East.

Congress and the administration must critically assess where the agreement will leave Middle East regional security after year ten of a deal and ascertain whether the agreement would leave the region in greater turmoil or actually succeed in reigning in future proliferation. A sound agreement that introduces unprecedented transparency for the foreseeable future into Iran's activities and intentions, while limiting its ability to expand its program immediately after the agreement sunsets, may be an agreement that Iran's neighbors could live with and exercise restraint over regarding their own nuclear development. However, the net result of this deal may leave the Middle East facing a greater nuclear proliferation danger from the spread of sensitive technologies stimulated by a new, dangerous norm legitimizing enrichment almost anywhere. As part of evaluating an Iran deal, Congress should evaluate this threat of the spread of dangerous nuclear technologies and develop remediation steps to mitigate damages.

In terms of impact on the NPT, the agreement's effects may be that non-nuclear weapon states (NNWS) more generally will exercise less restraint on developing fuel cycle capabilities that are of proliferation concern. They may view Iran's legitimized nuclear program as a new standard that can be reached by all NNWS. The Nuclear Suppliers Group and strong U.S. diplomacy will be required to convince additional states not to pursue the Iran path, which they may attempt through safeguarded means instead of trying to build covert advanced fuel cycle facilities, but with similar results for creating insecurity internationally and within their regions.

**6) How do you believe the administration is calculating break out time? Are they taking into account all forms of uranium that could be used to work toward a weapon?**

The administration's method of calculating breakout is classified and not available publicly. For many years we have also calculated breakout timelines in collaboration with centrifuge experts at the University of Virginia. Our understanding from U.S. officials is that the U.S. methods and ours are similar in approach. In some cases, we agree with the U.S. breakout estimates, particularly when we start from the same number and type of centrifuges and the same quantity and enrichment level of LEU. However, in other cases we have disagreements over the amount of LEU available for use by Iran in a breakout. In particular, we assess that Iran would have available more near 20 percent LEU in a breakout than does the U.S. government. As a result, in that case, our timelines are less than 12 months. We are also concerned that prior to a breakout Iran would accumulate more 3.5 percent LEU hexafluoride than allowed, namely 300 kg of LEU hexafluoride, enabling a faster breakout. The short-term consequences for exceeding this cap appear minimal.

In addition, we have concerns over whether the agreement will sufficiently ensure that Iran cannot reinstall excess, dismantled IR-1 and IR-2m centrifuges. In particular, 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.

After the limitations on centrifuge deployments start to end in year ten of the agreement, we believe that breakout timelines will begin to decrease steadily and too rapidly. In addition, Iran has significant potential to master advanced centrifuges by this time and thus reduce breakout timelines more rapidly than expected after year 13 of the deal.

Several of these issues are still in play in the negotiations and hopefully will be resolved to achieve and guarantee a 12 month breakout timeline during the first ten years of the deal and create a soft landing for breakout timelines afterwards. Nonetheless, during Congress' evaluation of an agreement, these issues should be closely scrutinized and evaluated and, if necessary, mitigation strategies called for and developed.

### **Similar Breakout Results as the Administration**

Our similarity in result to the U.S. administration's breakout estimates can be seen when considering the centrifuge limits Iran has accepted in the interim deal of April 2015. In the case of about 6,000 IR-1 centrifuges and a stock of 300 kilograms of 3.5 percent LEU hexafluoride and no available near 20 percent LEU hexafluoride, our breakout estimate would have a mean of about 12-14 months, where the minimum breakout time would be 11-12 months.<sup>7</sup> We have used the mean as the best indicator of breakout time and interpret the minimum time as a worst case. Thus, our estimate of breakout would confirm the United States' assessment that these limitations satisfy a 12-month breakout criterion.

### **Iran's Stock of Near 20 Percent LEU<sup>8</sup>**

However, breakout estimates depend critically on Iran's usable stock of near 20 percent LEU. For example, Iran can significantly lower breakout times by inserting into the cascades a relatively small amount of near 20 percent LEU. If it recovers only about 50 kilograms of near 20 percent LEU hexafluoride (or 34 kg of LEU (uranium mass), or about 15 percent of its current stock of near 20 percent LEU) within the first six months of breaking out, and we assume the same conditions as above, the mean breakout time becomes about 10-11 months, with a minimal time of about nine months. As a result, minimizing or ensuring that the near 20 percent LEU stock is unusable in a breakout is a necessity. The breakout times would be expected to be even lower, since if Iran decided to break out, it may have access to more near 20 percent LEU and it

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<sup>7</sup> More recent ISIS calculations that assume a more efficient average arrangement of the cascades lower our previous estimates somewhat compared to earlier ones. This reflects a view that Iran may keep under a deal its cascades that are the more efficient ones.

<sup>8</sup> For additional detail and sources see David Albright and Serena Kelleher-Vergantini, "The U.S. Fact Sheet's Missing Part: Iran's Near 20 Percent LEU, (Updated June 5, 2015 with new IAEA data)," ISIS Report, June 5, 2015. [http://isis-online.org/uploads/isis-reports/documents/LEU\\_20\\_percent\\_update\\_June\\_5\\_2015\\_Final.pdf](http://isis-online.org/uploads/isis-reports/documents/LEU_20_percent_update_June_5_2015_Final.pdf)

could also be expected to have accumulated additional 3.5 percent LEU above the cap of 300 kg (see below).

The accumulation of 34 kg of near 20 percent LEU (uranium mass) represents only a small fraction of Iran's inventory of this LEU. Despite the fact that Iran no longer has a stock of near 20 percent LEU in hexafluoride form ( $UF_6$ ), it continues to retain a significant portion of this material in the form of oxide ( $U_3O_8$ ) and in scrap and waste. As discussed earlier, in total, Iran possesses about 228 kg of near 20 percent LEU (uranium mass). Extrapolating to the end of June 2015, which is the end of the second extension under the JPA and the target date for a comprehensive agreement, Iran is estimated to have about 43 kg remaining in near 20 percent LEU oxide powder and about 130-134 kg in scrap, in waste, and in-process (all uranium masses). Only about 50 to 54 kg of this LEU are expected to be in Tehran Research Reactor (TRR) fuel, or only about 22-23 percent of the total near 20 percent LEU. This extrapolation assumes that Iran will fulfill its commitments under the second extension to use all 35 kg of LEU oxide to make fuel. If it does not, then the estimate of oxide powder will be slightly greater and the amounts in fuel slightly less than projected.

Much of this LEU material is in forms where the LEU could be recovered in a straightforward manner. Iran has stated that it intends to recover near 20 percent LEU from scrap. According to the May 2015 IAEA safeguards report on Iran, "In a letter dated 28 December 2014, Iran informed the Agency [IAEA] of the operational schedule for FPF [Fuel Plate Fabrication Plant at Esfahan] and indicated its intention to establish process lines for the recovery of uranium from solid and liquid scrap. In its reply dated 19 January 2015, the Agency requested that Iran provide further clarification. On May 19 2015, the Agency observed that the process lines had yet to commence operation and that Iran has continued its R&D activities related to the recovery of uranium from solid scrap." It is unknown how much near 20 percent LEU scrap Iran intends to recover. However, Iran moving to institute a scrap recovery capability poses a challenge to the deal, since the recovered LEU and the knowledge and experience gained by operating a scrap recovery operation would potentially allow Iran to speed up breakout.

The Obama Administration has been reluctant to discuss publicly the near 20 percent LEU and the media has largely missed this controversy. The April U.S. Fact Sheet does not discuss its fate at all. It does discuss a cap of 300 kg of LEU hexafluoride in Iran but this cap refers to LEU enriched under 3.67 percent and not the near 20 percent LEU.

U.S. officials have stated that the near 20 percent remaining in Iran would need to be mixed with aluminum, a step in making the fuel, or be in TRR fuel elements. Once so mixed, U.S. officials have stated that they remove this near 20 percent from consideration in breakout calculations. However, is this condition justified? The U.S. condition in fact may undermine its claim that the limits on Iran's centrifuge program achieve a 12-month breakout.

The near 20 percent LEU stock, unless largely eliminated or rendered unusable in a breakout, could be an important reserve in reducing the time to produce the first significant quantity of weapon-grade uranium and/or rapidly producing a second significant quantity of weapon-grade uranium (WGU).

The U.S. assessment is apparently that recovery of the near 20 percent LEU from aluminum, its subsequent conversion to uranium hexafluoride, and further enrichment would take so long that this LEU could not contribute significantly to a breakout in 12 months, or at least not to the first significant quantity of weapon-grade uranium. However, recovery of the near 20 percent LEU can be straightforward and the U.S. evaluation requires greater scrutiny. In Iraq's crash program to a nuclear weapon in 1990-1991, it put in place a capability to recover about 33 kilograms (uranium mass) of safeguarded unirradiated and slightly irradiated highly enriched uranium (HEU) from research reactor fuel. Based on Iraqi declarations and IAEA Action Team evaluations, which we possess, Iraq covertly installed the necessary equipment at the Tuwaita nuclear site in four months. It would have needed about a month to test the equipment with dummy fuel and another five months to recover the HEU from the fuel. This effort was stopped at the point of testing dummy fuel elements by the Gulf War bombing campaign which started in January 1991. Because of its far greater experience with uranium conversion, Iran is likely able to recover unirradiated near 20 percent LEU at a similar or faster rate from TRR fuel elements than Iraq. If Iran were to break out, it would undoubtedly secretly install and test the recovery equipment prior to breakout. Such activities would be very difficult for the IAEA or intelligence agencies to detect. Thus, the Iraqi experience suggests that Iran could be recovering near 20 percent LEU from LEU/aluminum mixtures, scrap, and fresh TRR fuel soon after starting its breakout and recover tens of kilograms within several months. This recovered LEU could be converted quickly into hexafluoride form in facilities also prepared in secret prior to breakout.

Iran may already be gaining experience in separating LEU from aluminum. In addition to making TRR fuel, Iran notified the IAEA on December 28, 2014 that it would start manufacturing miniature fuel plates for the Molybdenum, Iodine and Xenon Radioisotope Production (MIX) Facility, for the production of Molybdenum 99 in the TRR. As of May 13, 2015 the IAEA confirmed that one fuel plate containing a mixture of  $U_3O_8$  enriched up to 20 percent uranium 235 and aluminum were at the MIX Facility after transfer from the Fuel Plate Fabrication Plant and was being used for R&D activities for the production of specific isotopes, namely molybdenum 99, xenon 133, and iodine 132. According to the IAEA reports, since July 24, 2014, Iran has used 0.084 kg of near 20 percent uranium oxide for the purpose of producing molybdenum 99. As can be seen, the amounts of LEU used to make targets so far are very small. However, the processing of such targets after irradiation in the TRR can also provide experience in developing a capability to recover the LEU. Although the targets are processed to recover key isotopes, the processing provides experience in separating LEU from the aluminum.

In summary, the amount of Iran's near 20 percent LEU, in any form, should be reduced as much as possible to ensure that breakout periods remain at least 12 months, whether discussing overt or covert routes to a nuclear weapon. It is a mistake to leave large inventories of near 20 percent LEU in Iran in the form of scrap or in-process. The deal should require Iran to remove or blend down to natural uranium most of its near 20 percent LEU outside of TRR fuel. The obvious target is the expected 43 kg in oxide powder and the 130-134 kg in the form of scrap, waste, and in-process. These amounts total to 173-177 kg and represent roughly three quarters of Iran's stock of near 20 percent LEU. However, this step should be supplemented by irradiating any fresh TRR fuel. One method to do that is to irradiate all the TRR fuel, at least partially, to increase the complication of extracting the LEU from the fuel for use in a breakout.

## **Effect of 3.5 Percent LEU<sup>9</sup>**

Another consideration is that Iran may accumulate additional up to 3.67 percent LEU over the limit of 300 kilograms LEU hexafluoride (equivalent). After the deal is implemented, Iran will produce 3.5 percent LEU each month. How will this material be disposed of so that the limit is not exceeded? Based on past performance, with about 5,000 IR-1 centrifuges enriching at Natanz, Iran will produce about 100 kg of 3.5 percent LEU hexafluoride each month. In order to avoid potential monthly violations of the 300 kg provision, the P5+1 and Iran must agree on what to do with the monthly product, e.g. whether to ship out or dilute to natural uranium the newly produced LEU every month. The accumulation of a few hundred kilograms of 3.5 percent LEU over the limit will lower the breakout times to near or just below 12 month, assuming no availability of near 20 percent LEU. Accumulations of more than 500 kilograms of 3.5 percent LEU hexafluoride start to lower breakout times more significantly, particularly with access to even relatively small amounts of near 20 percent LEU hexafluoride, namely 25-50 kg, or 17-34 kg LEU (uranium mass), which is only about 7-15 percent of Iran's stock of near 20 percent LEU.

The impact of large excess stocks of 3.5 percent LEU and the availability of residual stocks of near 20 percent LEU should also be considered. If Iran accumulates stocks of 3.5 percent LEU hexafluoride above 1,000 kilograms and can access relatively quickly only 50 kilograms of near 20 percent LEU hexafluoride, it could reduce breakout times to less than six months.

## **Effect of Re-Deployed IR-2m Centrifuges**

A major gain in the April 2015 interim agreement is that Iran must dismantle its excess centrifuges and place them in monitored storage. For a time, negotiators considered leaving the centrifuges in place and disconnecting their piping. The latter option had the disadvantage of allowing a relatively rapid reinstallation of centrifuges, if Iran decided to breakout, with the result that it could lower breakout times below 12 months. Fortunately, this option was dropped.

However, in the former, better option, reinstallation also needs to be evaluated. Beyond the general provision, few details are available about this dismantlement and storage arrangement. A question is whether Iran could re-deploy a significant number of these centrifuges within several months of deciding to breakout. Armed with thousands more IR-1 centrifuges, or 1,000 of the more powerful IR-2m centrifuges, Iran could lower breakout times well below 12 months. It is important for Congress to obtain answers to the following questions: Where will the dismantled IR-2m centrifuges be stored and under what conditions? How quickly does the administration assess that these IR-2m centrifuges could be brought back into operation at the Fuel Enrichment Plant or elsewhere? What is the basis for such an estimate? What would be the effect on the breakout timeline of the successful reestablishment of the 1,000 IR-2m centrifuges at Natanz or elsewhere during the first six months of a breakout? Without answers to these questions, the information is not sufficient to allow us to analyze the possibility of significantly

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<sup>9</sup> For additional detail and sources see: Albright and Kelleher Vergantini, "Iran's Stock of Less than Five Percent Low Enriched Uranium, June 2015 Update" ISIS Report, June 2, 2015, [http://isis-online.org/uploads/isis-reports/documents/Irans\\_35\\_stocks\\_of\\_LEU\\_June\\_2015\\_Final.pdf](http://isis-online.org/uploads/isis-reports/documents/Irans_35_stocks_of_LEU_June_2015_Final.pdf)

lowering breakout timelines via reinstallation of excess centrifuges, particularly IR-2m centrifuges. In evaluating a final deal, this issue needs to be carefully scrutinized.

### **Breakout Estimates in Years 10-13 and afterwards**

There is little information in the Fact Sheet or elsewhere about the numbers and types of centrifuges the agreement allows Iran to install in from years 10 through 13. Based on discussions with negotiators, these values will be controlled by limitations on the numbers and types of centrifuges and on the separative work output. According to one negotiator, the goal is to allow a buildup in Iran's centrifuge capability that will reach an agreed breakout time of six months in year 13. The centrifuge arrangements from years 10 through 13 are said to be complex, particularly since Iran will undoubtedly want to deploy advanced centrifuges and will unlikely want to deploy IR-1 centrifuges. A shift to deployment of advanced centrifuges complicates the analysis because so little is known about their capabilities and performance. There is scant independent information about Iran's advanced centrifuges, such as the type of information about IR-1 centrifuges available from the IAEA. In any case, information about these centrifuge arrangements in years 10 through 13 is unavailable at this time. Breakout evaluations must await this information, although they may be far more uncertain than ones involving IR-1 centrifuges.

The Fact Sheet mentions very few restrictions past year thirteen of any deal. An important question is what will Iran's breakout time be at year 14 and 15 and afterwards? There appears to be no limitations that would prevent Iran from reducing its breakout time significantly after year 13 of a deal. In fact, Iran could quickly develop breakout timelines in years 14 and 15 that would be measured in less than a few weeks.

### **7) What challenges do you foresee in verifying Iranian compliance with a prospective agreement?**

Verifying Iran's compliance with an agreement could be straightforward, but history suggests that it will not. Several challenges that could be faced include:

- ❖ Ensuring that sneak out to produce weapon-grade fissile material is detectable quickly;
- ❖ Iran's historically poor track record on adherence to its safeguards agreement and on-going non-cooperation with the IAEA could reoccur during the deal, complicating verification and the determination of either compliance or violations;
- ❖ Coping with incremental cheating on the provisions of the deal, in particular getting Iran to backtrack or stop such cheating;
- ❖ Guaranteeing that Iran's stock of LEU goes down to 300 kg and stays there. There are many potential problems. Equipment problems, whether real or faked, could delay blend down operations. Iran could delay shipments overseas because it cannot find buyers willing to pay Iran's price or use the LEU to make fuel.

- ❖ Reducing Iran's stock of unirradiated near 20 percent LEU. In addition to the breakout concerns discussed earlier, if this LEU stock is not reduced significantly in size, it may be difficult to prevent Iran from recovering near 20 percent LEU from scrap for use in the Tehran Research Reactor. Iran may argue that it does not have enough fuel to operate the reactor. Moreover, if stopped from recovering this LEU from scrap, Iran may press to enrich new near 20 percent LEU to fuel the TRR. To head off this potential development, the agreement should commit and facilitate Iran buying near 20 percent fuel from abroad.
- ❖ Assuring a P5+1/Iran dispute resolution or violation resolution mechanism functions quickly and adequately to address problems. The P5+1/Iran mechanism may clash with the IAEA's dispute resolution method, which typically involves taking problems or non-compliance to the Board of Governors. Iran may seek to exploit these differing dispute resolution methods to its advantage.
- ❖ Ensuring prompt IAEA access to suspicious sites without undue delays, assuming that the Iran will commit to IAEA access of all sites;
- ❖ Iran seeking to weaken or reverse agreed upon transparency arrangements;
- ❖ Ensuring that Iran is abiding by the rules of the procurement channel. Moreover, it may be difficult to persuade other states, such as China, to implement and enforce these rules;
- ❖ Detecting and thwarting any unauthorized imports for a covert Iranian nuclear program or to accumulate goods for use in surging centrifuge production once the deal's provisions end or Iran decides to walk away from the deal;
- ❖ Convincing other countries to enforce new or on-going controls and sanctions aimed at preventing Iran from making unauthorized imports of goods;
- ❖ Unauthorized research and development, and experimentation at declared or undeclared sites;
- ❖ Iranian military constituencies, or even civilian ones, not treating the obligations in the deal as seriously as the Atomic Energy Organization of Iran. These Iranian constituencies or entities may not view the consequences the same way, and they may be more willing to violate aspects of the deal in pursuit of their own aims. This problem may arise in particular with regard to the procurement channel but it could also occur if a military entity seeks to undertake work useful for the development of nuclear weapons;
- ❖ Maintaining implementation and verification of a deal as a major U.S. priority; and
- ❖ Guarding against downplaying future violations of a long term deal for the sake of generating or maintaining political support for the deal.

## **Evaluating Key Components of a Joint Comprehensive Plan of Action with Iran.**

Prepared Statement by

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In the near future, the Obama Administration is likely to transact a deficient nuclear agreement with Iran. The parameters of the accord that have already been publicized should give all cause for concern. The agreement is permissive in terms of the technologies that it allows. The sunset clause ensures that after a passage of time Iran can build an industrial-sized nuclear infrastructure. Its much touted inspection regime relies on the leaky confines of the Nuclear Non-Proliferation Treaty (NPT). During the process of negotiations, Iran has cleverly sustained its essential redlines while the United States has systematically abandoned the sensible prohibitions that have long guided its policy toward this important security challenge.

**Evolving Positions:** Iran's nuclear position and its basic redlines have remained fairly consistent. Upon the inauguration of President Hassan Rouhani and the advent of serious negotiations between the United States and Iran, Supreme Leader Ali Khamenei outlined his parameters for an acceptable deal. Khamenei insisted that Iran's right to enrich had to be acknowledged and that its enrichment capacity had to be industrialized. "The issue of research and development should definitely receive attention," stressed the Supreme Leader. Nor was Khamenei prepared to close any facilities as he insisted on "preserving organizations and sites that the enemy cannot destroy." In essence, Iran's position was that it will enrich uranium at an industrial scale, it will continue to develop cutting edge nuclear technologies, and that none of its installations would shutter.

The American position has undergone a remarkable set of transitions. In December 2013, President Barack Obama insisted:

in terms of specifics, we know that they don't need to have an underground, fortified facility like Fordow in order to have a peaceful nuclear program. They certainly don't need a heavy-water reactor in Arak in order to have a peaceful nuclear program. They don't need some of the advanced centrifuges that they currently possess in order to have a limited, peaceful nuclear program.

As late as March 2014, Secretary of State John Kerry similarly stressed, "At Fordow, yes, if it's a secret and it's hidden and it's under a mountain and all of that, it raises questions about why would a peaceful program need that." During his tenure as the White House press secretary, Jay Carney assured his audience that as "part of a comprehensive solution, we will require that Iran dismantle a significant portion of its nuclear infrastructure related to uranium enrichment."

A careful reading of both the Joint Plan of Action and the Lausanne framework reveal that none of these expectations have come to fruition. The underground Fordow facility will remain open and house a thousand centrifuges. The Arak heavy-water plant is to remain in place, but will presumably undergo modifications whereby it produces less fuel. Moreover, a vast portion of Iran's enrichment infrastructure will not be dismantled. Iran's expanding fleet of ballistic missiles for which there is no purpose other than delivering a nuclear payload will remain unaddressed. The issue of Iran's military experimentation with nuclear technologies is unlikely to be resolved. The sanctions architecture will attenuate and the notion of snapping back sanctions is delusional. The agreement itself is term-limited and once it expires there will be no restrictions on Iran's nuclear program.

In essence, during the negotiating process, Khamenei has carefully advanced his objectives and sustained his mandates. Conversely, the United States has made a series of concessions that make the possibility of reaching a good deal difficult to envision.

**Principles That the United States Relinquished:** In the coming weeks, there will be much debate about Iran's enrichment capacity, the nature of the inspection regime and the possibility of restoring America's coercive leverage. The proponents of the deal will insist that all their concessions were born out of pragmatism and that the final deal still imposes meaningful restraints on Iran's nuclear program. They will portray their critics as insisting on unrealizable terms. This debate should not lose sight of the fact that the final agreement contradicts principles that have underwritten long-standing U.S. policy.

*National Needs:* Since the disclosure of Iran's illicit nuclear plants in 2002, the international community wrestled with the question of what type of civilian nuclear program Iran is entitled to. At that time, the United States contrived the notion of national needs as determining the scope of Iran's atomic infrastructure. In the simplest terms, uranium is enriched to make fuel rods that then power reactors. Given the fact that Iran does not have a reliable capacity to make fuel rods or reactors, it was decided it should have only a modest enrichment program comprised of few hundred centrifuges. Such a program would offer Iran a face-saving claim that it is enriching uranium while ensuring that its small program could not be misused for military purposes.

It is precisely this important principle that the Obama Administration abandoned in 2014 for sake of a one-year breakout timeline. Suddenly, Iran could sustain its vast enrichment capacity so long as its breakout potential was delayed by one year. Even this one-year breakout period is not static and will be impacted by Iran's installment of advanced centrifuges in the latter stages of the impending deal. As President Obama conceded recently, "What is a more relevant fear would be that in year 13, 14, 15, they have advanced centrifuges that enrich uranium fairly rapidly, and at that point the breakout times would have shrunk almost down to zero." It is important to note that a zero-breakout period means that Iran's surge to the bomb would be undetectable.

*Trust and Confidence of the International Community:* The second principle that was abandoned during the process of negotiations is the point at which Iran can rejoin the NPT community. As a signatory of the NPT Iran does have certain rights and privileges. However, given its history of concealment and fraud, there had to be a balance between its rights and its obligations. The position of the United States was that once Iran convinced the international community that its nuclear program was strictly for peaceful purposes, only then could it expand its capacity. For that to happen, the International Atomic Energy Agency (IAEA) had to certify that it is satisfied with Iran's compliance record and the United Nations Security Council had to vote to allow Iran to rejoin the NPT community. This was indeed a high bar.

Once more, the Obama administration jettisoned this sensible precaution for the sake of a sunset clause. Under the impending agreement, after the expiration of the sunset clause Iran has the right to build up its nuclear program to whatever size it wishes. In essence, Iran can become like Japan, a nation whose massive nuclear program puts it inches away from a bomb. As a peaceful, democratic state, Japan can be trusted with such a capability. As a dangerous, revisionist regime, the Islamic Republic cannot be offered such forbearance.

Since the advent of nuclear arms in the late 1940s, the policy of the United States—both Republican and Democratic administrations—has been to restrict the expansion of sensitive nuclear technologies, such as reprocessing plutonium and enriching uranium. The United States has worked aggressively to stop allies such as South Korea and Taiwan from obtaining such capabilities. At times, Washington had to strain its alliances in order to sustain its proliferation principles. One alliance that was damaged as the result of nuclear ambitions was America's ties to the Shah of Iran.

It is the standard Islamic Republic talking point that the United States looked the other way and indeed assisted the Shah as he sought to develop a nuclear weapons capability. This nonsensical claim has been accepted as a truism by many U.S. policymakers and analysts. The historical record belies such claims. Successive U.S. administrations rejected the Shah's quest for completion of the fuel cycle and refused to give him access to sensitive nuclear technologies. The United States insisted that Shah forgo the capacity to either enrich uranium or reprocess plutonium. And these demands were made of a regime that was a reliable U.S. ally. The Obama Administration has conceded to an adversarial theocracy bent on upending the regional order what previous U.S. administrations refused to grant to a strategic ally.

**What Kind of Islamic Republic Emerges After the Agreement Expires?** The credibility of any nuclear agreement between the United States and Iran depends on the type of Islamic Republic that emerges after the sunset clause expires. Those favoring the accord hint that a more benign Iran is inevitable as temptations of commerce and benefits of global integration will empower pragmatic elite inclined to set aside the pursuit of the bomb. As with other hopes of Iranian moderation, the latest plea is likely to evaporate in the paradoxes of clerical politics. The most likely outcome of the deal is not just a more hawkish theocracy but one in command of an industrial-size nuclear infrastructure.

Supreme Leader Khamenei's natural affinities are with the reactionary elements of his regime. As he contemplates his own succession, he will need to safeguard not just his republic but also its revolutionary values. For Khamenei and his cohort, the Islamic Republic is the custodian of a mandate from heaven and its task remains to press on with its Islamist mission. This, after all, is a revolution without borders. Khamenei is not interested in a prosperous state that has forfeited its ideological claims and takes its place in a region at ease with American power. He appreciates

that the best way of ensuring the revolution is to entrust the state to his loyal disciples.

In the aftermath of the fraudulent presidential election of 2009, the Islamic Republic teetered on collapse. The system was suddenly faced with not just popular disaffection, but also elite fragmentation. In the meantime, Iran's nuclear truculence was resulting in debilitating sanctions and a severe economic crisis. As an astute student of history, Khamenei has carefully assessed the collapse of Soviet satraps in Eastern Europe and how prolonged financial stress undermined the foundations of those republics. The fortification of the regime required an arms control agreement, but one that preserved its nuclear apparatus while abrogating all essential sanctions. Khamenei is insistent on his redlines, stressing the need for an “instant annulment of sanctions.” And as far as intrusive monitoring is concerned, the supreme leader is similarly dismissive, “One must absolutely not allow infiltration of the security and defense realm of the state under the pretext of inspections.”

For now the moderates such as President Hassan Rouhani and his aides serve Khamenei's purpose. They are the attractive face of the Islamic Republic, seemingly pragmatic and always reasonable. They are in power to transact an arms control agreement and their utility will diminish, if not disappear, once the accord is reached. The cagey supreme leader must have known that his hardliners were unsuitable interlocutors for Western powers looking to come to terms with sensible Iranians. The concessions granted to Rouhani by the West would be unthinkable to reactionaries such as the former lead negotiator, Saeed Jalili. After an agreement is reached, however, Khamenei will need the help of the hardliners to protect his republic. Far from ushering the age of moderation, an agreement is likely to presage a sharp right-wing shift in Iran's domestic politics.

Once the sunset clause expires and Iran gets to the edges of nuclear arms, will its hawkish rulers choose to restrain their atomic appetite? The lessons of North Korea are indeed instructive. It is beyond doubt that the possession of nuclear arms has contributed to the prolongation of the Kim dynasty. Every time a dear leader dies, the entire international community hopes for a smooth transition to another dear leader for sake of maintaining central control of North Korea's nuclear arsenal. The deliveries of fuel and food, which are the lifeblood of the hermitic republic, persist in the hope of ensuring stability.

Iran can count on similar forbearance even if it just limited itself to becoming a threshold nuclear state. The great powers are as likely to be concerned about its longevity and the

disposition of its nuclear network as they are about North Korea's. Any democratic opposition will likely be greeted with caution if not indifference. The Islamic Republic will become too dangerous to fail.

**Parameters of an Acceptable Agreement:** As the negotiations unfold, it is important to insist on a number of points to assure that the agreement will be an advantageous one for the United States and the international community:

1. Restore the original principles that have long guided U.S. policy. This means that the scope of Iran's program has to be defined by national needs and that the sunset clause has to be replaced with the notion of Iran satisfying the international community that its program is strictly for peaceful purposes before it becomes a member of the NPT in good standing.
2. The Possible Military Dimensions (PMD) of the program must be categorically resolved as a *prelude* to a final agreement. This issue deals with important topics such as undeclared procurement activities and work on triggering devices. These issues are indispensable for understanding the full scope of Iran's military experimentation with nuclear technologies.
3. "Anywhere, Anytime" inspections must be implemented. The Islamic Republic tends to view international law as a conspiracy and all the evidence marshalled against it by the IAEA as manufactured and fraudulent. It is a regime that disdains global norms and views itself as unbound by legal strictures. The only plausible means of ensuring compliance with such a regime is to grant inspectors unfettered access to all sites and scientists. Any agreement that falls short of such inspection modality will not be able to deal with a country with such a sordid history of concealment and deception.
4. Iran's ballistic missiles, which are an important aspect of its nuclear weapons program, have to be part of the agreement. As mentioned, these missiles have no function other than delivery of a nuclear payload. It was the Obama Administration itself that insisted on the inclusion of ballistic missiles in the UN Security Council Resolution 1929 that it crafted in June 2010. It is the redline that the administration itself drew and it should not be allowed to abandon yet another one its own prohibitions.

The success of any arms control agreement hinges on whether it can permanently arrest the momentum toward proliferation of dangerous technologies. It may also be hoped that such an accord will inject a measure of responsibility in impetuous leaders and perhaps empower those prone to accede to international mandates. There is no indication that the contemplated deal with Iran will achieve any of these objectives. The impending agreement, whose duration is time-limited and sets the stage for the industrialization of Iran's enrichment capacity, places Tehran inches away from the bomb. Paradoxically such a state may yet be governed by hardline actors nursing their own hegemonic regional designs.

## Senate Foreign Relations Committee Hearing

### “Evaluating Key Components of a Joint Comprehensive Plan of Action With Iran”

Thursday, June 25, 2015

Statement of Dr. Jim Walsh

MIT Security Studies Program

Mr. Chairman, Mr. Ranking Member, and Members of the Committee:

It is an honor to be with you today to discuss a possible Iran nuclear agreement.<sup>1</sup> I sit here with this distinguished panel, whose members I have known for many years, and whose work I have

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<sup>1</sup>I would like to thank the many people who helped with my testimony, including Angela Nichols, Angela Canterbury, Ed Levine, Michelle Lee, Tim MacDonald, Jen Greenleaf, and Tom Collina, to name a few.

admired. I want to personally thank you for your efforts to address the Iranian nuclear issue. I can say with confidence that sustained Congressional leadership is a key reason why we have a negotiation in the first place, and why we may yet have a long-term agreement on Iran's program. Absent Congressional leadership, we would not be here today, and absent Congressional leadership in the future we will not be where we need to be.

I come to this topic as a scholar of nuclear weapons decision-making and someone who has provided assessments to Republican and Democratic presidents, as well as to Republican and Democratic Members of Congress, as they have wrestled with proliferation challenges. As regards Iran in particular, I have studied and written about its nuclear program for more than 15 years. I have been to Iran many times and have spent hundreds of hours in meetings with Iranian officials, including three Iranian Presidents, discussing nuclear and regional issues. Much of my work has been with a group of colleagues associated with the Iran Project, and over the years we have produced a number of reports that have been signed by more than 40 of America's most senior, retired military, diplomatic, and national security officials, including General Anthony Zinni, Brent Scowcroft, Michael Hayden, and Tom Pickering.<sup>2</sup> Of course, my comments today are mine alone.

In my testimony, I want to directly address the set of questions you have put to me. My answers are organized around four topics:

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<sup>2</sup> See, for example, *Weighing Concerns and Assurances about a Nuclear Agreement with Iran: A Briefing Book*, New York: The Iran Project, June, 2015; *Weighing the Costs and Benefits of Military Action Against Iran*, New York: The Iran Project, September, 2012.

- 1) The appropriate criteria for evaluating a future agreement
- 2) The minimum requirements that any agreement should meet
- 3) The challenge of verification, including inspections, Possible Military Dimensions (PMDs) issues, and breakout time
- 4) The impact of an agreement on nonproliferation in the region, and more generally

My summary judgment is inspections, PMDs, and breakout are all issues that policymakers will want to carefully consider. For the reasons described below, I judge that the risks posed by these challenges are real but manageable and not in excess of what similar agreements with similar kinds of countries have been able to successfully navigate. I also judge that an agreement is likely to bolster the cause of nonproliferation, both in the region and globally.

## **I. Criteria for Evaluating a Future Nuclear Agreement with Iran**

Selecting the appropriate criteria for assessing an agreement requires that one step back and be clear about the intended objective and the context in which an agreement will operate, both as it relates to Iran in particular and to nonproliferation more generally.

### I.1. Objective

The simplest and most sensible objective is to prevent Iran from acquiring nuclear weapons, whether by indigenous manufacture or via the transfer of material and equipment from third parties. This includes both uranium and plutonium based nuclear weapons.

## I.2. Context

Assessment is more than simply listing the things that could go wrong or right with an agreement. In theory, lots of things can happen, but in practice few of those possibilities come true. Experience and data enable analysts to distinguish between what is more likely and what is unlikely. This, in turn, makes it possible for policymakers to weigh costs, benefits, and tradeoffs.

In this case, the context is defined, in part, by Iran's past and present nuclear behavior. The most authoritative guides to Iran's nuclear program are the International Atomic Energy Agency (IAEA) reports and the Director of National Intelligence's (DNI) testimony and statements. According to the DNI, Iran had a structured nuclear weapons program that began in the late 1990s and was halted in 2003. In 2012, the DNI reported that:

“Iran has the ...capacity to eventually produce nuclear weapons, making the central issue its political will to do so. ...We assess Iran is keeping open the option to develop nuclear weapons, ... should it choose to do so. We do not know, however, if Iran will eventually decide to build nuclear weapons.”<sup>3</sup>

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<sup>3</sup> James R. Clapper, “Unclassified Statement for the Record on the Worldwide Threat Assessment of the U.S. Intelligence Community for the Senate Select Committee on Intelligence,” Office of the Director of National Intelligence, January 31, 2012, p 6,

He goes on to say that Iran's nuclear choices will reflect a cost-benefit approach.

Each of these findings has important implications for a nuclear agreement with Iran. The fact that the Islamic Republic once had an illicit nuclear program reinforces the possibility that it might again consider that option and underlines the importance of verification.

The fact that Iran possesses a basic nuclear capability, and that political will, not technical capacity, will determine the nuclear endgame suggests that any agreement will need buy in from Iran, if it is to be successful. Iran knows how to build a centrifuge, and neither sanctions nor military strikes can change that. In the long-term, the best way to insure that Iran does not acquire nuclear weapons is for Iran to embrace its non-nuclear posture.

Perhaps most importantly, the DNI has assessed that Iran has not yet made a decision to pursue nuclear weapons and may or may not make such a decision in the future. This would imply that the moment is ripe for an agreement that would lock Iran into a political decision and a policy path that takes it down a non-nuclear road.

Selecting appropriate criteria for assessment should also be informed by the broader nonproliferation context. Iran is not the first country to violate its NPT obligations. It is not the first country to have an enrichment program. It will not be the first country to enter into a nuclear agreement, if there is one. The United States and the IAEA have decades of experience

with preventing and reversing proliferation. That experience can help policymakers make informed determinations of risk.

As contemporary scholars of nuclear studies have repeatedly pointed out, the historical record for non-proliferation is a surprising story of success.<sup>4</sup> Dark predictions of nuclear spread did not come true; we do not live in a world of dozens of nuclear weapons states. In fact, the rate or pace of proliferation has steadily declined since the 1960s, with fewer and fewer countries joining the nuclear weapons club each decade. The pool of potential proliferators is the smallest it has ever been, and since the end of the Cold War, more countries have given up their weapons assets than joined the nuclear club. In short, nonproliferation is one of America's greatest policy successes. Congress can take a major share of credit for that outcome, from the efforts of Senator McMahon and later Senator Pastore and on through the work of this committee today.

Of course, not all the news is good. North Korea and the A.Q Kahn network are reminders that there is still difficult work to be done, and that success requires continued effort. The unambiguous evidence to date suggests, however, that it is possible to prevent and even reverse proliferation.<sup>5</sup>

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<sup>4</sup> On the surprising success of nonproliferation efforts, see Mitchell Reiss, *Without the Bomb: The Politics of Nuclear Non-proliferation*, (New York: Columbia University Press, 1988); Mitchell Reiss, *Bridled Ambition: Why Countries Constrain Their Nuclear Capabilities*, (Washington: Woodrow Wilson Center Press/Johns Hopkins University Press, 1995); Jim Walsh, *Bombs Unbuilt: Power, Ideas, and Institutions in International Politics*, (Cambridge, MA: MIT Doctoral Dissertation, May, 2000; Robert J. Einhorn, Mitchell B. Reiss, and Kurt M. Campbell, eds., *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, (Washington, D.C. : Brookings Institution Press, 2004).

<sup>5</sup> Some 30 countries started down the path to nuclear weapons and reversed course. In some cases the pursuit was exploratory; in other cases it involved full-blown weapons programs. Countries that considered nuclear weapons acquisition include Taiwan, South Korea, Egypt,

The data also suggests that negotiated agreements are a powerful tool for achieving nonproliferation objectives.<sup>6</sup> There is scholarly debate about the causes of America's nonproliferation success, and one should assume that a variety of factors contribute, but my own research suggests that, contrary to my expectations, nonproliferation agreements can have a profound effect. From the Nuclear Nonproliferation Treaty to the Libya nuclear agreement, negotiated agreements are among the most important tools governments have for preventing and reversing proliferation.

In summary, the selection of appropriate criteria for an agreement should be informed by Iran's past cheating, the fact that Iran already possesses a basic nuclear capability, the opportunity presented by the absence of an Iranian decision to pursue nuclear weapons, and the success of past nonproliferation efforts.

### I.3. Evaluation Criteria

Given the objective, what we know about Iran in particular, and what we know about the track record of nonproliferation agreements in general, it is possible to outline several criteria that policymakers can use to evaluate a nuclear agreement with Iran.

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Libya, Iraq, Iran, Germany, Italy, Japan, Yugoslavia, Romania, Brazil, Argentina, Sweden, Switzerland, Australia, Canada, Indonesia, and Spain, among others.

<sup>6</sup> On the effectiveness of nonproliferation agreements, see Matthew Fuhrmann and Yonatan Lupu, "Do Arms Control Treaties Work? Domestic Politics and the Constraining Power of the Nuclear Nonproliferation Treaty," January 7, 2015 [Working Paper.]; Jim Walsh, "Learning From Past Success: The NPT and the Future of Nonproliferation," Paper no. 41, Oslo: Weapons of Mass Destruction Commission, 2006. Contrary to popular understanding, the rate of proliferation peaked in the 1960s and has declined in every ensuing decade.

These criteria take the form of both questions and principles.

A. Does an agreement substantially advance the objective of preventing Iran from acquiring a nuclear weapon?

This is the most important criterion, though others are also important. No agreement can be perfect, and there is no such thing as zero risk, but agreements can dramatically reduce the risks of proliferation.

B. Is the agreement sustainable?

It is not enough to simply get an agreement. If a good agreement immediately falls apart, it is a bad agreement. Sustainability requires that all sides follow through on their commitments. It means minimizing the reasons why an agreement might fail (e.g., cheating) and maximizing the reasons an agreement will succeed (e.g., all parties see timely benefits). Most of the discussion so far has focused on minimizing the causes for failure, and indeed even more narrowly on break out. But there are many ways agreements can fail (failure to launch, disagreements over the meaning of terms, etc.), and prudent policymakers should be attentive to all of them.

What has been completely ignored is the other half of the equation: maximizing causes for success. Coercion and threats alone will not be sufficient. If Iran or the other parties feel that they are not getting anything out of the agreement, it will collapse. There has to be buy in. It is again worth noting the DNI's assessment. Whether Iran acquires a nuclear weapon or not depends, not on technical issues, but on its political will to do so. It has not yet decided to go for the bomb, so this agreement provides a chance to put Iran on a path, where it never makes that

political decision. For that to work, the agreement must produce benefits for Iran. It is these benefits that will create new political incentives, new political winners and losers within Iran, and a consolidation of its non-nuclear status.

C. Using simple, broad measures, how does an agreement compare to the status quo?

One quick and dirty way to get a general picture of an agreement is to ask how an agreement compares with the period before the agreement. The metric most commonly invoked in this regard has been breakout time, but there are other important measures as well. A simple one is the number of IAEA inspectors/inspections/inspection hours deployed to Iran. Secretary Amano suggested after the JPOA that the IAEA would have to double the number of inspectors in Iran. A comprehensive agreement could require that IAEA again increase the number of inspectors to support an enhanced level of verification. A third metric is the relative transparency achieved by the verification measures. Does the agreement expand the number of sites and activities subject to inspection, the amount of data being gathered for verification, the kinds of data being collected for verification, and/or the degree to which different kinds of information are combined for the purpose of verification?

D. How does the agreement compare with other successful (and unsuccessful) nuclear agreements?

Are its provisions stronger or weaker than previous agreements? What provisions does an agreement have that are different from previous agreements? Are there elements of past agreements that are missing from this agreement?

E. How does an agreement compare to the other alternatives for dealing with Iran's nuclear program?

The basic alternatives include doing nothing, imposing new sanctions, use of military force, and walking away from the negotiations with the hope that Iran will return to the bargaining table to make new concessions. Analysts will debate the merits of these alternatives, but the point is that no agreement can be evaluated by itself, without reference to the costs and benefits of the other courses of action.

F. Avoid myopically focusing on any single number.

The history of nonproliferation and arms control agreements is littered with domestic debates that devolved into fights over a single number. During the Cold War, it was often the number of launchers. For the Iran negotiations, it has typically been the number of centrifuges or breakout time. This is not to suggest that launchers, centrifuges, and breakout are unimportant, but they are each one piece of a larger constellation of issues. Myopically focusing on one number rarely tells us anything useful about an agreement. Doing so strips away other important metrics and hides from discussion the important political factors that are more likely to determine the ultimate outcome. Again, as the DNI has said, Iran's nuclear future is essentially a political question, and so ignoring the political variables and instead focusing on a narrow technical issue is likely to yield a flawed evaluation.

G. Adopt a "whole of agreement" approach.

A rigorous evaluation would not only avoid a myopic focus on a single number, it would affirmatively seek to assess the agreement as an inter-connected whole. There are good technical reasons for an integrated approach. Virtually every aspect of the agreement is related to other parts of the agreement. Looking at the number of centrifuges is perfectly reasonable, but it does not tell you much unless you also know the type of centrifuges that will be allowed, how the centrifuges will be operated, the final form of enriched material, and so on. Members of Congress should resist the strong and natural temptation to cherry pick or focus one aspect of the agreement, and considering it apart from the rest of the agreement.

#### H. Assessment should avoid making perfect the enemy of the good.

There is no such thing as a perfect agreement, free of risk. In public policy there are always risks – risks from action, risks from inaction. But as history has repeatedly demonstrated, an agreement that greatly advances nonproliferation and US national security does not have to be perfect. If perfect were the standard, we would have no NPT, no arms control agreements with the Soviet Union, no nuclear deal with Libya, no Proliferation Security Initiative, and the like – all of which have advanced American national security.

The Nuclear Nonproliferation Treaty, arguably the single most important and effective nonproliferation tool ever devised, has numerous flaws. It has no enforcement clause; it provided for nuclear testing (for peaceful purposes); it did nothing to limit the fuel cycle or nuclear material. Safeguards arrangements in 1970 were a pale, weak cousin to what we have today. Had the NPT been up for consideration today rather than 45 years ago, it might have been rejected for its flaws. And doing so would have been a gigantic error of enormous consequence.

The NPT, like all nonproliferation and arms control agreements, was not perfect and did not eliminate all risk, but it was spectacularly successful. It helped prevent the cascade of proliferation that virtually every government and academic analyst had predicted in the years prior to its passage.

In today's discussions on Iran, advocates of perfection are everywhere. Some critics want the nuclear agreement to include important but nevertheless unrelated issues such as terrorism and human rights – a burden that no effective nonproliferation agreement has previously been required to meet.

Others will accept nothing less than the dismantlement of Iran's nuclear program and want to "prevent" Iran from having a nuclear weapons capability. Setting aside the fact that the DNI assesses that Iran *already has* that capability, and the fact dismantlement is a political impossibility, this approach would be disastrous. Eliminating facilities would not eliminate Iran's knowledge of how to build a centrifuge. Absent facilities to inspect, the IAEA would have no justification for inspections and monitoring. Dismantlement would mean that thousands of nuclear scientists and engineers would suddenly be out of work and thus available to other countries with nuclear ambitions or for an Iranian clandestine program – one that would then be more difficult to detect as inspections declined.

The dangers of insisting on the "perfect" extend beyond the issue of dismantlement. On verification, PMDs, and other issues some analysts have advocated for nothing less than perfect,

zero risk outcomes. Doing so increases the danger that there will be no agreement, and that Iran will be left unconstrained to pursue whatever nuclear ambitions it has or may have in the future.

#### I.4. Summary

Evaluating an agreement is not about listing all the things that could go wrong (or right) with an agreement. All actions carry risk, including not acting at all. The task for policymakers is to determine which risks are more likely, find ways to minimize those risks, and weigh trade-offs between risks and actions intended to minimize them. As we have seen with the NPT and other nonproliferation agreements, “good enough” can produce great outcomes.

## **II. Minimum Requirements**

Any final agreement will take the form of a highly complex, interconnected set of technical and political obligations. As suggested above, requirements in one part of the agreement will likely have implications for other parts of the agreement. And since we do not yet have a final agreement, it is not yet possible to make complete and specific judgments about what an agreement should contain. Still, one can offer some examples as well as some general principles.

It seems to me that any agreement would have to include the following elements:<sup>7</sup>

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<sup>7</sup> This list is intended as illustrative, not all-inclusive.

1. Adherence to what might be called Additional Protocol “Plus,” that is, Iran would implement the requirements of the Additional Protocol but for some period of time go beyond the Additional Protocol in terms of the level of transparency provided
2. Adherence to the revised Code 3.1 of the Subsidiary Arrangements to its safeguards agreement
3. Changing the design for the Arak reactor
4. No reprocessing
5. Limits on the level of enrichment
6. Limits of the number of centrifuges
7. Limits on the types of centrifuges that operate
8. Limits on the size of the material stockpile
9. Limits on the composition of the material stockpile
10. Iran must resolve all outstanding issues with the IAEA, and the agency must certify that it is satisfied with the results of its inquiry
11. Prompt but reciprocally proportioned sanctions relief
12. A process for the timely investigation of alleged violations
13. Provision for the reintroduction of sanctions following a material breach of the agreement by Iran.

### **III. Challenges to Verification**

#### III.1. Verification in Context

Verification will be central to any agreement, and three challenges in particular have received attention: inspections, PMDs, and breakout time.

Before considering each, it makes sense to step back and put verification in a broader historical context.

III.1.A. The United States and the international community have decades of experience with nuclear verification. The prospect of an agreement with Iran is not the first time policymakers have had to address questions about breakout and sneak out. As with all policy instruments, there is no perfection, but past verification instrumentalities –ones not nearly as robust as those available today --have proven in practice to be highly effective tools for nonproliferation.

III.1.B. Verification has grown progressively stronger over time. This is true legally and institutionally, as the mandate for international safeguards and inspections has expanded and become more intrusive over time. (It would be inconceivable to someone at IAEA in 1970 that an inspector could go military sites.) Progress has also been made operationally. The science and technologies available for verification today are far more powerful than were available in the past. The combination of strong international data collection and advanced national technical means represents a new era in verification.

III.1.C. According to US government assessments, Iran has no structured nuclear weapons program, has not made the decision to build nuclear weapons, operates no clandestine nuclear

facilities, and will now open itself to the most intrusive multi-lateral verification arrangement ever negotiated. Those are favorable conditions for a verification regime.

III.1.D. Verification will be enhanced by the fact that Iran is probably the most watched country in the world – a fact unlikely to change any time soon. The US, Russia, France, Britain, Germany, Israel, Saudi Arabia (and the other Gulf states) all have their eyes on Iran. Many, including Iranian opposition groups, will be looking under every haystack and in every corner for the first signs of non-compliance.

### III.2. Inspection

Inspection is a critical piece of the verification architecture. It is not the only piece,<sup>8</sup> but any IAEA inspection regime has to provide inspectors with a mandate sufficient to accomplish their mission. That mission or objective is the timely notice of possible non-compliance with the agreement.

Achieving the objective of timely notice does not require that IAEA have instant or all encompassing knowledge of everything that Iran does. Rather it requires the ability to collect information on potential violations such that the United States and the international community can take actions to end and reverse non-compliance, before Iran is able to acquire a nuclear weapon. Meeting that requirement does not require that inspectors take up residence at all of

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<sup>8</sup> IAEA also has a variety of other, important tools, including material accountancy, open source analysis, environmental sampling, and the like.

Iran's nuclear facilities. Instead, it requires, as Mark Fitzpatrick of Britain's International Institute for Strategic Studies has suggested, "access where needed, when needed."<sup>9</sup>

One reason the Additional Protocol is a minimum requirement for any agreement is that it already provides the legal authority for the agency to go to any facility about which it has cause for concern. Of course, inspectors cannot simply run around the country visiting any sensitive site they want for no reason. No country would accept that and in any case, it would be counter-productive.

The Additional Protocol, with its concepts of complementary and managed access -- together with all the other types of information the agency collects, and augmented by whatever new arrangements are agreed to -- will provide the IAEA, the US, and the international community with information and insight into Iran's nuclear program at a level never previously achieved.

### III.3. Possible Military Dimensions

Unresolved questions about Iran's nuclear weapons program in the late 1990s and early 2000s prevent the IAEA from closing Iran's nuclear file. The core outstanding issues involve Iran's experiments with neutron transport and high explosives. No comprehensive agreement with Iran is possible without Iran resolving these concerns with the agency.

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<sup>9</sup> Mark Fitzpatrick, "Inspecting Iran Anywhere, But Not Anytime," *IISS*, June 16, 2015, <http://www.iiss.org/en/politics%20and%20strategy/blogsections/2015-932e/june-3809/inspecting-iran-anywhere-but-not-anytime-ce4d>

Since November 2013, the agency and Iran have made progress on part of the PMD portfolio and many of the other items in the Framework for Cooperation, the plan of action negotiated between IAEA and Iran. Of the 18 practical measures Iran is obliged to carry out under the Framework, Iran has carried out 16, but the 2 that remain concern PMD and are the most sensitive. The IAEA also invited Iran to propose additional practical measures to address all resulting questions.<sup>10</sup>

My guess is that these will be satisfactorily resolved but not before a comprehensive agreement has been reached in principle. From a bargaining perspective, it does not make sense for Iran to settle these awkward issues absent a comprehensive agreement.

Recently there has been some debate about what is required for the PMD file to be closed. Some have argued that the agency needs to know virtually everything about the past program and talk to all of its personnel in order to establish a “baseline” for verification.

Perfect knowledge is both unlikely and unnecessary. Even if one could interview every Iranian nuclear official or scientist, it is improbable they would be forthcoming. Some of the information that dates back more than a decade may simply be out of date or irrelevant or irretrievable (e.g., having gone to the grave with a particular official). I have personally studied the nuclear weapons efforts of more than a dozen countries, and one never knows everything, especially about programs that occurred years ago.

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<sup>10</sup> IAEA, SIR (Safeguards Implementations Report) 2014, GOV/2015/30, p. 7.

The objective should be sufficient information about Iran's past nuclear activities, such that an agreement can be effectively verified. More information is almost always preferred, but it is important to distinguish what is necessary from what is useful.

One should also weigh the relative value of any one piece of information with information collected from other sources. Information collected by IAEA, the UN Panel of Experts, the US Treasury, national intelligence, and other sources provide a detailed picture of Iran's program, one that has enabled the sanctioning of individuals, government organizations, and private concerns involved in Iran's nuclear program.

The IAEA has considerable experience with these kinds of investigations. Iran is not the first country to have its nuclear program investigated. South Korea, Egypt, and Taiwan have been scrutinized for illicit or undeclared research activities.<sup>11</sup> In South Africa, Ukraine, Kazakhstan, and Belarus, the IAEA had to verify the exclusively peaceful nature of nuclear programs in countries that had once possessed nuclear weapons or inherited weapons assets. In Libya, the international community did the same in circumstances where the country gave up its program voluntarily through negotiation and in Iraq with a country where the process was involuntary. Given the agency's experience and expertise, it is in a strong position to assess what information is required to close Iran's file.

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<sup>11</sup> See, for example, IAEA Press Office, "IAEA Board Concludes Consideration of Safeguards in South Korea," November, 2004, <https://www.iaea.org/newscenter/news/iaea-board-concludes-consideration-safeguards-south-korea>; Paul Kerr, "IAEA Investigating Egypt and Taiwan," *Arms Control Today*, January 1, 2005, [http://www.armscontrol.org/act/2005\\_01-02/Egypt\\_Taiwan](http://www.armscontrol.org/act/2005_01-02/Egypt_Taiwan).

In summary, the P5+1 does not need to know everything before it can do anything, and the truth is that we already know a great deal about Iran's program. The IAEA should be left to its job. If they are unable to close Iran's file, because Iran lacks the political will to take the necessary steps, then there will be no agreement.

#### III.4. Breakout Time

The issue of breakout time, the time required for a country to produce one bomb's worth of material, has been a central theme in discussions about a nuclear agreement for some time. It is a traditional concern, being an issue requiring consideration for most nonproliferation and arms control agreements, and it makes sense – up to a point—to extend break out time as far as reasonably possible.

Nevertheless, I do have concerns about the use of the concept in recent discussions. As the members of the executive branch have readily admitted, the definition of breakout time is flawed. It does not include the time needed to take a lump of fissile material and fashion it into a useable, reliable nuclear weapon. The DNI and others in the US government and in the Israeli atomic and military establishments have suggested that this would require an additional year or more.<sup>12</sup>

It also has to be said that no country in the history of the nuclear age has broken out in order to build one bomb, a notion that does not actually make a lot of sense. Two bombs worth of material would be a little more realistic, though a deeply conservative estimate, and that alone would double the breakout time calculations.

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<sup>12</sup> Paul Kerr, "Iran's Nuclear Program: Status," Congressional Research Service, 7-5700, October 7, 2012.

And while every policymaker who evaluates a nonproliferation or arms control agreement should take seriously the possibility of successful breakout, it is worth keeping in mind that it is quite rare, with North Korea being really the only example. That does not mean that one should ignore the risk -- far from it. But neither should one exaggerate the risk. Nor should policymakers focus on breakout to the exclusion of other risks to an agreement.

A final concern about the breakout discussion is that it appears to be a game of moving the goalposts. When Prime Minister Netanyahu gave his famous speech at the UN General Assembly in 2012, he argued that the red line should be:

“Before Iran gets to a point where it’s a few months away or a few weeks away from amassing enough enriched uranium to make a nuclear weapon.”<sup>13</sup>

Later, when discussing a prospective nuclear agreement, Secretary of State Kerry referred to a 6-month breakout time, significantly beyond the Prime Minister’s “few months or weeks.” Critics shifted their stance and insisted that nothing less than a year would do. Then, when the framework for a comprehensive agreement was announced in April, and it included a 1-year of breakout time, opponents shifted yet *again*, saying that a year was insufficient. One imagines that if a new comprehensive agreement is announced in the coming weeks, and it promises a year and a half of breakout time, opponents will say that only two years will do. And again,

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<sup>13</sup> <http://www.algemeiner.com/2012/09/27/full-transcript-prime-minister-netanyahu-speech-to-united-nations-general-assembly-2012-video/>

none of these estimates include the additional year plus it would take to weaponize the fissile material.

Again, the broader context suggests that the near and medium term risks are low. Breakout is exceedingly rare. The DNI has said that even under the standards of the JPOA, “Iran would not be able to divert safeguarded material and produce enough WGU [weapons-grade uranium] for a weapon before such activity would be discovered.”<sup>14</sup> And again, the DNI has assessed that Iran has not made the decision to acquire nuclear weapons.

And it is worth underlining again that preventing breakout depends not only on the deterrence that comes from verification and timely notice, but fundamentally and for the long-term, from Iran buying in – seeing that the benefits of nuclear abstention are greater than the benefits of nuclear weapons, and locking in that political commitment for decades to come.<sup>15</sup>

### III.5. Concerns Going Forward

Inspections, PMDs, and breakout are all verification issues that policymakers will want to carefully consider. For the reasons described above, I judge that the risks posed by these challenges are real but manageable, and not in excess of what similar agreements with similar kinds of countries have been able to successfully navigate.

Nevertheless, I do have two concerns going forward.

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<sup>14</sup> Paul Kerr, “Iran’s Nuclear Program: Status,” Congressional Research Service, 7-5700, October 7, 2012.

<sup>15</sup> Efraim Halevy, “Obama Was Right, Iran Capitulated,” May 6, 2015, <http://www.ynetnews.com/articles/0,7340,L-4644691,00.html>

First, verification could be more challenging in the out years of the agreement if Iran decides to vastly expand its nuclear infrastructure. It is simply a fact of nuclear life that the bigger the nuclear enterprise the more difficult it is to assure that small amounts of material have not been diverted.

That does not mean, axiomatically, that verification will be insufficient or that Iran will cheat, but it is something policymakers will want to be attentive to. For example, it would be to everyone's interest, particularly Iran's, if Tehran takes its resources and invests them in natural gas production rather than a large nuclear infrastructure. Policies might be pursued that encourages that choice. A future administration should also consider developing and negotiating a follow-on agreement with Iran, one whose verification regime will be best suited to the size of Iran's program some 20 years out.

Second, the IAEA has to have the financial and technical support to carry out its expanded mandate. More inspectors, more inspections, more analysts to follow procurement or open sources, the deployment of new technologies – this all costs money. The director of the IAEA estimated that the JPOA would require the agency to double its number of inspectors. The agency's 2014 costs to its extrabudgetary account increased by *a third (1/3) in one year* just to cover the cost of new verification in Iran. A dollar for an IAEA inspection is a dollar well spent, and the US Congress, keeper of the purse, should take a leadership role in providing IAEA with the resources it needs to not only implement today's safeguards but to develop and deploy advances in safeguards technology and methodology.

#### **IV. An Agreement's Impact on Global and Regional Nonproliferation**

A comprehensive agreement that prevents Iran from acquiring nuclear weapons will represent a significant win for the nonproliferation regime and will have positive nonproliferation effects in the region. The alternative, an Iran with an unconstrained nuclear program, would have a contrary effect, adding unwanted pressure on the nonproliferation regime.

A successful agreement sends the message that violating the NPT carries significant costs, but that if a country abandons its nuclear ambitions, it can avoid those costs. Often analysts focus on the first message (imposing costs) and forget the second, which is a mistake. The history of the nuclear age includes dozens of countries that started down the path to nuclear weapons but that stopped and reversed course. If countries, having decided to pursue nuclear weapons, believe that there is no off ramp or alternative, then they will conclude that they have no choice but to continue down that path towards nuclear weapons.

In addition, it appears that this agreement will break new ground with respect to safeguards and verification. As new precedents, they offer the possibility of more widespread adoption and becoming a standard feature of the nonproliferation regime.

A nuclear agreement might also add modest momentum to international efforts to establish a Weapons of Mass Destruction Free Zone in the Middle East.

Some analysts have expressed the concern that a nuclear agreement that leaves Iran with any centrifuges will spur countries in the region to develop their own enrichment capabilities and following that, nuclear weapons.

This outcome appears unlikely for several reasons.

First, in 70 years of nuclear history, there is not a single case of proliferation caused by a safeguarded enrichment program. There have been 10 nuclear weapons states. Some weapons programs began in response to another country's nuclear weapons program, others not until nuclear tests, but none to a safeguarded enrichment program. Governments tend to be reactive by nature -- not proactive -- and nuclear weapons are not a small undertaking. Non-nuclear weapons states that have safeguarded enrichment programs, like Japan and Brazil, have not caused neighboring countries to acquire nuclear weapons.

Second, if a limited enrichment infrastructure was viewed as a grave, proliferation-tripping threat, then why have the countries in the region failed to do anything for the last 10 years. Iran has had centrifuges since 2003, but Saudi Arabia and others have done virtually nothing. It is difficult to believe that after curtailing its centrifuge program and submitting to new and rigorous verification, the governments in the region would *then* decide to respond.

Third, the set of countries cited as potential proliferation threats -- Saudi Arabia, Turkey, and

Egypt -- appear far from a nuclear weapons option.<sup>16</sup> There are many reasons for this conclusion, not least being that since the Iran-Iraq War, many countries have come to believe that a strong military alliance with the United States is their preferred route to security. A bomb program would put that directly at risk.

## V. Concluding Thoughts

A nuclear agreement with Iran, should it be concluded, could represent a pivotal moment for American nonproliferation policy, if not for the nuclear age. There are risks, as there are risks with inaction and with other policy alternatives. I cannot render a final judgment until seeing the provisions of the final agreement, but if an agreement is concluded along the lines of the framework described in April, this may well constitute one of the strongest multi-lateral nonproliferation agreements ever negotiated.

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<sup>16</sup> On Turkey see, Mark Hibbs, "The IAEA's Conclusion About Turkey," *Arms Control Wonk*, April 16, 2015, <http://carnegieendowment.org/2015/04/16/iaea-s-conclusion-about-turkey/i799>; On Saudi Arabia, see Colin H. Kahl, Melissa G. Dalton, and Matthew Irvine, "Atomic Kingdom: If Iran Builds the Bomb, Will Saudi Arabia Be Next?", Center for New American Security, February 2013, [http://www.cnas.org/files/documents/publications/CNAS\\_AtomicKingdom\\_Kahl.pdf](http://www.cnas.org/files/documents/publications/CNAS_AtomicKingdom_Kahl.pdf); Zachary Keck, "Why Pakistan Won't Sell Saudi the Bomb," *National Interest*, November 18, 2013, <http://nationalinterest.org/commentary/why-pakistan-wont-sell-saudi-the-bomb-9416>. On Egypt, see Dina Esfandiary and Ariane Tabatabai, "Why Nuclear Dominoes Won't Fall in the Middle East," *Bulletin of Atomic Scientists*, <http://thebulletin.org/why-nuclear-dominoes-wont-fall-middle-east8236>; Jessica C. Varnum, "Middle East Nuclear Race More Rhetoric Than Reality," *World Politics Review*, May 14, 2015, <http://www.worldpoliticsreview.com/articles/15769/middle-east-nuclear-race-more-rhetoric-than-reality#>; Jim Walsh, "Egypt's Nuclear Future: Proliferation or Restraint?", In *Forecasting Proliferation*, William Potter, ed, Palo Alto: Stanford University Press, 2010.

Even if that is true, however, it will mark the beginning, not the end. The real task ahead is locking Iran into a non-nuclear future such that it never again makes the decision to pursue nuclear weapons. That task will require the energetic efforts of both the Executive branch and the US Congress, and not least the Foreign Relations Committee.

It has been a great honor to appear before this august body. If I can be of service in the future, I stand ready to do so.

Thank you.