

Adequate Verification Under a Comprehensive Iran Nuclear Deal

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“Iran’s Noncompliance with its International Atomic Energy Agency Obligations”

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**By
David Albright
President, Institute for Science and International Security**

Difficult-to-bridge differences remain between Iran and the P5+1 group of countries (the United States, Britain, France, Germany, Russia, and China) over a final, comprehensive solution on Iran’s nuclear program sought under the November 2013 Joint Plan of Action (JPA). A critical set of issues involves the adequacy of verification arrangements that would be in place to monitor Iran’s compliance with the deal. Much of this verification effort will be overseen by the International Atomic Energy Agency (IAEA). The United States has recognized that the current verification arrangements in Iran, namely a comprehensive safeguards agreement (CSA), even if supplemented by the Additional Protocol, are not sufficient in the case of the Islamic Republic of Iran. Tehran’s long history of violations, subterfuge, and non-cooperation require extraordinary arrangements to ensure that Iran’s nuclear program is indeed peaceful. A priority of the on-going negotiations is establishing legally binding measures guaranteeing this adequate verification.

On a separate but linked negotiating track, Iran and the IAEA have been working in a step-wise approach to address the IAEA’s concerns about Iran’s alleged past and possibly on-going work on nuclear weapons development and other possible military dimensions (PMD) of Iran’s nuclear program. However, this IAEA/Iran track has gone poorly, and Iran has shown increasingly an unwillingness to address the IAEA’s concerns. Despite the approaching deadline to come to a comprehensive accord, the Islamic Republic recently denigrated the IAEA’s efforts to bring Iran into compliance with its safeguards obligations. Iran’s March 11, 2015 official communication regarding the IAEA’s most recent quarterly safeguards report showed that the Iranian government continues to dissemble and stonewall the inspectors and remains committed to severely weakening IAEA safeguards and verification in general.¹ Without a fundamental

¹ In this communication, Iran rejected several components of the IAEA’s investigation as unwarranted. See IAEA Information Circular, “Communication dated 11 March 2015 received from the Permanent Mission of the Islamic

shift in Iran's views on safeguards and verification, the prospect of obtaining adequate verification measures fades.

Adequate verification is critical to a long-term deal in terms of verifying activities at declared nuclear sites and more importantly ensuring the absence of undeclared nuclear material and facilities. Although the interim deal under the JPA strengthened the monitoring of declared sites, it did little to increase the IAEA's ability to detect and find covert sites and activities. Inspectors have regularly reported in quarterly safeguards reports on Iran that the IAEA is not in a position to provide credible assurance about the absence of undeclared nuclear material and activities in Iran, and therefore to conclude that all nuclear material in Iran is used for peaceful activities.

Whether this situation changes will largely depend on the ability of the United States and its partners to create a long term agreement that creates legally binding conditions on Iran that go beyond those in the comprehensive safeguards agreement and the Additional Protocol. A critical question will be whether the agreement establishes a verification regime adequate to promptly catch Iranian cheating.

There are many reasons why an agreement must require extraordinary verification arrangements. The most critical reasons are Iran's violations of its safeguards agreement, actions which have been inconsistent with that agreement and a peaceful nuclear program, and its long history of non-cooperation with the IAEA. Examples include:

- The IAEA found that Iran had violated its comprehensive safeguards agreement prior to 2004 on multiple occasions, including, to name a few, importing natural uranium without notifying the IAEA, enriching uranium to test centrifuges, experimenting with plutonium separation and laser enrichment, and allegedly carrying out weaponization experiments, possibly including nuclear material. (See appendix 1).
- Iran built several nuclear facilities in secret, including the Natanz centrifuge plant, the Fordow centrifuge plant, the Kalaye Electric centrifuge research and development site, the Physics Research Center at Lavisan-Shian linked to undeclared military nuclear work, the Lashkar Ab'ad laser enrichment facility, and the Arak heavy water production plant. In addition, Iran created a secret centrifuge manufacturing complex, parts of which are still secret today.
- Iran has depended extensively on illegal overseas procurement for its nuclear programs in violation of national laws and UN Security Council resolutions; at least one illegal procurement for the Arak reactor complex was attempted after the JPA went into effect (although not a violation of the JPA, it violated UNSC resolutions). (See Appendix 2).
- Iran unilaterally stopped implementing Code 3.1 of its CSA in 2006, an act the IAEA called inconsistent with its safeguards agreement. Code 3.1 of the subsidiary arrangement of the safeguards agreement requires a state to declare a nuclear site when it authorizes or starts to design a nuclear facility and to submit design information as work proceeds.

Republic of Iran to the Agency regarding the Report of the Director General on the Implementation of Safeguards in Iran," INFCIRC/873, March 17, 2015.

- Iran has not allowed the IAEA to visit a site at the Parchin military complex or other sites associated with past work on nuclear weapons research and development and other military nuclear activities.
- Iran has delayed inspectors' access to sites and extensively modified buildings or the sites themselves in apparent efforts to thwart IAEA verification methods which aim to detect undeclared activities and facilities. Iran attempted to prevent these methods from succeeding in 2003 at the Kalaye Electric centrifuge research and development site but was caught; its efforts at sanitization and concealment succeeded at the Lavisan-Shian site, which it bulldozed and rebuilt into an athletic facility after suspicion was raised that it was allegedly involved in military nuclear work; Iran's efforts may yet succeed to conceal from environmental sampling and other verification techniques any past work at the Parchin site where high explosive tests related to nuclear weaponization may have been conducted.
- Iran has stonewalled the IAEA's efforts to resolve its concerns about the possible military dimensions of its nuclear programs. (See Appendix 3).

Iran has in general been in compliance with the conditions of the JPA. However, it enriched in the IR-5 centrifuge, an act inconsistent with its JPA undertakings.² When confronted by the United States, Iran quickly backed down and even took additional steps to increase confidence that enrichment in this centrifuge would not happen again. However, Iran has not shown a willingness to back down on more fundamental issues, such as resolving the IAEA's PMD concerns, halting its illicit nuclear procurements, and fully cooperating with the IAEA. On less important issues, Iran is more cooperative but on the difficult ones, its record remains problematic.

Iran has carried out unprecedented violations, both in the length and depth of these violations, and has been non-cooperative with the IAEA and UN Security Council. There is a significant confidence deficit between Iran and much of the international community. As a result, verification conditions in a long term deal will likewise need to be rigorous, unprecedented, and long lasting. These extraordinary conditions need to remain in place for at least twenty years. This time frame should be sufficient for the IAEA to achieve full confidence in the absence of undeclared Iranian nuclear materials and facilities and in the peaceful nature of Iran's nuclear programs.

To that end, several measures are needed to ensure adequate verification in a long term deal:

- Iran addressing the IAEA's concerns about Iran's past and possibly on-going nuclear weapons work. If no concrete progress is forthcoming by July 1, a deal should not be signed. If Iran in good faith asks to delay demonstrating concrete progress until after a deal is signed, it should not receive any sanctions relief until it fulfills this commitment, along with providing a road map on resolving the rest of the IAEA's PMD concerns. Visits to Parchin and related sites and access to key individuals should be part of the demonstration of concrete progress;

² After enrichment and measurement of enrichment level was achieved, the enriched material and depleted uranium was mixed together, becoming natural uranium.

- Maintenance of United Nations Security Council sanctions on proliferation-sensitive goods during the duration of a deal. These sanctions are a fundamental part of ensuring that Iran is not secretly outfitting undeclared nuclear facilities and activities; and
- Establishment of binding language guaranteeing the IAEA snap inspections, or anywhere, anytime inspections, and broader Iranian declarations about its activities than required in the Additional Protocol, lasting for longer than the reported term of a deal, or about twenty years until the IAEA has satisfactorily concluded its PMD investigation and several more years have passed wherein Iran is compliant with its NPT obligations.

1) Achieve Concrete Progress in Resolving Concerns about Iran’s Past and Possibly Ongoing Nuclear Weapons Efforts Prior to Any Sanctions Relief

Despite a great effort over the last year and half, the IAEA has learned little from Iran that has added to the inspectors’ ability to resolve its concern about Iran’s past and possibly on-going work on nuclear weapons research and development. For years, the inspectors have unsuccessfully asked the Islamic Republic to address the substantial body of evidence that it was developing nuclear weapons prior to 2004 and that it may have continued some of that, or related work, afterwards and even up to the present. Before sanctions are removed, concrete progress is needed on the central issue of whether Iran has worked on nuclear weapons and is maintaining a capability to revive such efforts in the future. A deal also needs to lay out a road map of how and when Iran will address the IAEA’s remaining PMD concerns.

Supreme Leader Ali Khamenei often declares that nuclear weapons violate Islamic strictures. His denials are not credible. The United States, its main European allies, and most importantly the IAEA itself, assess that Iran had a sizable nuclear weapons program into 2003. The U.S. intelligence community in the 2007 National Intelligence Estimate (NIE) agreed: “We assess with high confidence that until fall 2003, Iranian military entities were working under government direction to develop nuclear weapons.” European governments and the IAEA have made clear, the United States less so, that they believe Iran’s nuclear weapons development may have continued after 2003, albeit in a less structured manner. In its November 2011 safeguards report, the IAEA provided evidence of Iran’s pre- and post-2003 nuclear weaponization efforts. The IAEA found, “There are also indications that some activities relevant to the development of a nuclear explosive device continued after 2003, and that some may still be ongoing.”³ To reinforce this point to Iran, the United States in late August sanctioned Iran’s Organization of Defensive Innovation and Research (SPND), headed by Mohsen Fakrizadeh, the suspected military head of the nuclear weapons program in the early 2000s and perhaps today. SPND is a Tehran-based entity established in early 2011 that is “primarily responsible for research in the field of nuclear weapons development.”⁴ Thus, there is widespread evidence and suggestion that

³ IAEA Director General, Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran, GOV/2011/65, November 8, 2011, Para. 45. http://isis-online.org/uploads/isis-reports/documents/IAEA_Iran_8Nov2011.pdf

⁴U.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 media 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

Iran has worked on developing nuclear weapons and that some of those activities may have continued to today.

Despite the overwhelming evidence, Iran denies it has ever worked on nuclear weapons. Some argue that Iran should not have to confess its past; its face should be saved, they argue. However, making this determination should not be the role of U.S. negotiators. The power to make a determination about Iran's past or ongoing military nuclear work resides with the IAEA. Moreover, emphasizing such an approach emboldens Iran to further resist the IAEA and necessary verification arrangements, ultimately threatening the viability of any deal. If Iran is allowed to "save face" and not address the IAEA's PMD file, it will ultimately be given the ability to maintain the remnants or continued efforts of this military nuclear work, hidden from inspectors and the international community.

Addressing the IAEA's concerns about the military dimensions of Iran's nuclear programs is fundamental to any long-term agreement. Although much of the debate about an agreement with Iran rightly focuses on Tehran's uranium enrichment and plutonium production capabilities, an agreement that side-steps the military issues would risk being unverifiable. Moreover, the world would not be so concerned if Iran had never conducted weaponization activities aimed at building a nuclear weapon. After all, Japan has enrichment activities but this program is not regarded with suspicion. The establishment of Iran's peaceful intentions, resting on solid verification procedures, is critical to a serious 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. Moreover, to develop confidence in the absence of these activities—a central mission—the IAEA will need to periodically inspect these sites and interview key individuals for years to come. Without information about past military nuclear work, it cannot know where to go and who to speak to. The IAEA may require the duration of an agreement to conduct this investigation even with absolute transparency and cooperation on the part of Iran. It would require several more years wherein Iran is compliant with its obligations in order to have confidence in Iran's commitment.

The situation today makes it impossible for the IAEA to determine with confidence that nuclear weapons activities are not on-going. The IAEA already has the legal right to pursue these questions, including accessing military sites, under the comprehensive safeguards agreement with Iran. Despite this right, Iran has refused to allow the IAEA access to military sites. Early in the JPA negotiations, according to U.S. officials involved in the negotiations, Iranian negotiators

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

said that the Iran Revolutionary Guard Corps would not allow the IAEA access to its military sites. Of course, this demand is unacceptable. Nevertheless, because of Iran's refusal to abide by its safeguards obligations, a long term deal needs to include clear, legally enforceable conditions allowing the IAEA prompt access to military sites where suspicious activities have been detected or reported.

One outstanding case of Iran's refusal to allow access to military sites involves 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. Undoubtedly, the IAEA will need to visit related sites. A deal should not be signed unless Iran has allowed the IAEA access to Parchin and related sites.

Iran continues to say no to IAEA requests to interview key individuals, such as Fakrizadeh 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, at a time when Iran's current head of the Atomic Energy Organization of Iran was head of this university and aware of Shahmoradi's activities. 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.⁵ The need to interview both individuals, as well as others, remains.

If Iran is able to successfully evade addressing the IAEA's concerns now, when biting sanctions are in place, why would it address them later when these sanctions are lifted, regardless of anything it may pledge today? Iran's lack of clarity on alleged nuclear weaponization and its noncooperation with the IAEA, if accepted as part of a nuclear agreement, would create a large vulnerability in any future verification regime. Iran would have succeeded in creating precedents to deny inspectors access to key military facilities and individuals. There would be essentially no-go zones across the country for inspectors. Tehran could declare a suspect site a military base and thus off limits. And what better place to conduct clandestine, prohibited activities, such as uranium enrichment and weaponization? After all, the Fordow centrifuge plant was originally built in secret at a military site and only declared to the IAEA after Iran learned it was exposed.

Iran would have also defeated a central tenet of IAEA inspections—the need to determine both the correctness and completeness of a state's nuclear declaration. As Iran's March 11 communication to the IAEA makes clear, Iran actively opposes the IAEA's ability to carry out this well-established mission.

⁵ 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

Without resolving the PMD issues, the history of Iran's previous military nuclear efforts may never come to light and the international community would lack confidence that these capabilities would not emerge in the future. Moreover, Iran's ratification of the Additional Protocol or acceptance of additional verification conditions, while making the IAEA's verification task easier in several important ways, would not solve the basic problem posed by Iran's lack of cooperation on key, legitimate IAEA concerns. Other countries contemplating the clandestine development of nuclear weapons will certainly watch Tehran closely.

Iran still has plenty of time before July 1, 2015 to address all the IAEA's outstanding PMD concerns. Solving this issue does not require a *mea culpa* from Iran. Numerous approaches have been explored that can provide a mechanism to postpone a potentially embarrassing, albeit needed, admission. A simple acknowledgement of a past military nuclear program would be a positive step, and absent that, a decision not to dispute an IAEA finding on the matter. If no concrete progress is forthcoming by July 1, a deal should not be signed. If Iran in good faith asks to delay demonstrating concrete progress until after a deal is signed, it should not receive any sanctions relief until it fulfills this commitment, along with providing a road map on resolving the rest of the IAEA's PMD concerns. Visits to Parchin and related sites and access to key individuals should be part of the demonstration of concrete progress.

2) Maintain Sanctions on Proliferation Sensitive Goods

An often overlooked aspect of verifying against Iran's construction of secret nuclear sites or any other undeclared activities is preventing Iran's illegal procurements of critical goods and technologies. Iran depends on the foreign acquisition of a wide range of goods for its nuclear programs and has undertaken extensive and elaborate overseas illegal procurements in order to build its nuclear facilities. However, similar to its attitudes toward the IAEA and safeguards, Iran views others' national trade control laws and UN Security Council sanctions with contempt. On August 30, 2014, Iranian President Hassan Rouhani stated on Iranian television: "Of course we bypass sanctions. We are proud that we bypass sanctions." Few, if any, presidents proclaim such pride in conducting internationally illegal activities.

Evidence indicates that in the last few years Iran has been conducting its illegal operations to import goods for its nuclear program with greater secrecy and sophistication, necessitating greater attention to this issue. A long term nuclear agreement should ban Iranian illicit trade in items for its nuclear programs while creating additional mechanisms to verify this ban.

Because of Iran's extensive commitment to smuggling, a long term deal must create a basis to end, or at least detect with high probability, Iran's illicit procurement of goods for its nuclear programs. Such a verified ban is a critical part of ensuring that Iran is not establishing the wherewithal to:

- Build secret nuclear sites,
- Make secret advances in its advanced centrifuge or other nuclear programs, or
- Surge in capability if it left the agreement.

A comprehensive nuclear agreement is not expected to end Iran's illicit efforts to obtain goods for its missile and other military programs. Iran appears committed to continuing its illicit operations to obtain goods for a range of sanctioned programs. Given Iran's sanctions-busting history, a comprehensive nuclear agreement should not include any provisions that would interfere in efforts of the international community to effectively sanction Iranian military programs.

These conditions argue for continuing all the UNSC and national sanctions and well-enforced export controls on proliferation-sensitive goods. Such goods are those key goods used or needed in Iran's nuclear programs and nuclear weapon delivery systems, the latter typically interpreted as covering ballistic missiles.

Sanctions should continue on the listed goods in the UNSC resolutions, many of them dual-use in nature, and more generally on those other dual-use goods that could contribute to uranium enrichment, plutonium reprocessing, heavy water, and nuclear weapon delivery systems (see United Nations Security Council resolution 1929, par. 13). The latter is often referred to as the "catch-all" provision and mirrors many national catch-all requirements in export control laws and regulations. In the case of Iran, this provision is especially important. Without illicitly obtaining the goods covered by catch-all, Iran would be severely constrained in building or expanding nuclear sites.

Verified Procurement Channel for Authorized Nuclear Programs

The six powers must carefully include in any agreement an architecture to mitigate and manage proliferation-related procurement risks. A priority is creating a verifiable procurement channel to route needed goods to Iran's authorized nuclear programs. The agreement will need to allow for imports to legitimate nuclear programs, as they do now for the Bushehr nuclear power reactor.

A challenge will be creating and maintaining an architecture, with a broader nuclear procurement channel, that permits imports of goods to Iran's authorized nuclear programs and possibly later to its civilian industries, while preventing imports to military programs and banned or covert nuclear programs. The UNSC and its Iran sanctions committee and Panel of Experts, the IAEA, and supplier states will all need to play key roles in verifying the end use of exports to Iran's authorized nuclear programs and ensuring that proliferation sensitive goods are not going to banned nuclear activities or military programs.

The creation of the architecture should be accomplished during the negotiations of the long-term deal, although its implementation may need to wait. It will be important that the architecture, whether or not implemented later, be established at the very beginning of the implementation of the long-term agreement in order to adequately deal with this issue.

The reason for creating a verified procurement channel is that Iran's legitimate nuclear activities may need imports. The "modernization" of the Arak reactor would probably involve the most imports, depending on the extent to which international partners are involved. A sensitive area will be any imports, whether equipment, material, or technologies, which are associated with the heavy water portion of the reactor, in the case that the reactor is not converted to light water.

Another sensitive set of possible imports involves goods related to the separation of radionuclides from irradiated targets, although goods for reprocessing, i.e. separating plutonium from irradiated fuel or targets, would be banned since Iran is expected to commit in the long-term agreement not to conduct reprocessing. Nonetheless, allowed imports could include goods that would be close in capability to those used in reprocessing, since the boundary in this area between sensitive and non-sensitive equipment is very thin. These goods will therefore require careful monitoring. Iran's centrifuge program, if reduced in scale to the levels required for U.S. acceptance of a deal, will result in a large excess stockpile of key goods for IR-1 centrifuges. This stock should last for many years, eliminating the need for most imports. Nonetheless, the centrifuge program may need certain spare parts, raw materials, or replacement equipment. If Iran continues centrifuge research and development, that program may require sensitive raw materials and equipment. Needless to say, the goods exported to Iran's centrifuge programs will require careful monitoring as to their use and long term fate.

Iran's non-nuclear civilian industries and institutions may also want to purchase dual-use goods covered by the sanctions, but this sector should not expect to be exempted from sanctions during the duration of the deal or at least until late in the deal. Iran must prove it is fully complying with the agreement and will not abuse a civilian sector exemption to obtain banned goods for its nuclear, missile, or other military programs. With renewed economic activity and as part of efforts to expand the high-tech civilian sector, Iranian companies and institutions engaged in civilian, non-nuclear activities can be expected to seek these goods, several of which would be covered by the catch-all condition of the resolutions. Examples of dual-use goods would be carbon fiber, vacuum pumps, valves, computer control equipment, subcomponents of equipment, and other proliferation sensitive goods. Currently, these civil industries (Iran's petro-chemical and automotive industries are two such examples) are essentially denied many of these goods under the UNSC resolutions and related unilateral and multilateral sanctions. However, if civilian industries are to be eventually exempted from the sanctions, this exemption must be created with special care, implemented no sooner than many years into the agreement, and monitored especially carefully. Iran could exploit this exemption to obtain goods illicitly for banned activities. It could approach suppliers claiming the goods are for civil purposes but in fact they would be for banned nuclear or military programs. Such a strategy is exactly what Iran's nuclear program has pursued illicitly for many years, including cases where goods were procured under false pretenses by the Iranian oil and gas industry for the nuclear program. There are also many examples of illicit Iranian procurements for its nuclear program where Iranian and other trading companies misrepresented the end use to suppliers.

This architecture covering proliferation sensitive goods should remain in place for the duration of the comprehensive agreement. The six powers must carefully plan for eventualities now and design and implement an architecture that prevents future Iranian illicit procurements under a comprehensive agreement.

3) Implement an Additional Protocol "Plus"

Many have discussed conditions necessary to verify an agreement with Iran, particularly ones that would supplement the Additional Protocol, sometimes collectively called the Additional Protocol "Plus" or "AP Plus". Despite its central importance, the Additional Protocol by itself is

necessary but not sufficient to verify a comprehensive solution with Iran. These supplementary provisions will need to create a guarantee of snap inspections, sometimes called anywhere, anytime inspections, and a critical baseline of information, including how many centrifuges Iran has made, how much natural uranium it has produced and is producing annually, and its inventory of raw materials and equipment for its centrifuge program. This baseline is necessary if the agreement is to provide assurances about the absence of secret nuclear activities and facilities.

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.

Another element is the rigorous verification of uranium obtained abroad and produced domestically, such as in uranium mines and mills. The amounts of uranium will need to be carefully verified.

A third step is that Iran would agree to provide the IAEA with details of past and future imports, exports, and uses of key items listed under INFCIRC 254 part 1 and 2 and other critical goods that are used in Iran's nuclear programs.

A fourth area is the 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.

A fifth element is language that guarantees on-going visits and verification of any key facilities, materials, and components associated with the former military dimensions of Iran's nuclear programs. These verification activities would follow Iran's satisfying the IAEA's concerns about the military dimensions of its nuclear programs. These on-going activities would help provide assurance that no undeclared weaponization activities have resumed.

The deal will need to carefully establish more intrusive inspection arrangements than those found in existing safeguards agreements. The IAEA has powerful inspection tools, including special inspections in the comprehensive safeguards agreement and managed access in the Additional Protocol,⁶ which can enable inspectors to access undeclared sites and locations. However, in both cases, there is a consultation process, which the IAEA would need to go through with Iran. Although the IAEA has methods to call for an inspection without delay, ultimately, the IAEA depends on the cooperation of the state, and it has to be ready to justify its needs for access. This situation is inadequate in a deal with Iran.

Because of Iran's history of denying or delaying the IAEA access to sites, taking actions to hide activities at sites, and generally abusing the consultation process with the inspectors, a deal needs to include legally binding provisions that ensure the IAEA prompt access to sites. The IAEA

⁶ Article 4.d of Additional Protocol.

must have the ability to conduct snap inspections, or anytime, anywhere inspections on notice, during the life of an agreement.

Thank you for the opportunity to testify today.

Appendix 1⁷:

Specific Violations of the Comprehensive Safeguards Agreement, Pre-2004

From the mid-1980s to 2003 Iran violated its safeguards agreement with the IAEA by failing to declare numerous activities required by Iran's safeguards agreement with the IAEA, primarily involving experiments with nuclear material. Though several IAEA reports describe these violations, the November 2004 IAEA safeguards report on Iran provides an especially detailed summary of Iran's overall nuclear program, including specific NPT violations.⁸ According to the IAEA, Iran failed to declare the following major activities:

- **Uranium Imports:** Iran failed to report that it had purchased natural uranium (1,000 kg of UF₆, 400 kg of UF₄, and 400 kg of UO₂) from China in 1991, and its subsequent transfer for further processing. Iran acknowledged the imports in February 2003.

- **Uranium conversion:** Iran did not inform the IAEA of its use of the imported uranium in tests of its uranium conversion processes, including “uranium dissolution, purification using pulse columns, and the production of uranium metal, and the associated production and loss of nuclear material.” Iran acknowledged this failure in February 2003.

- **Uranium enrichment:** Iran failed to report that it had used 1.9 kg of the imported UF₆ to test P1 centrifuges at the Kalaye Electric Company centrifuge workshop in 1999 and 2002. In its October 2003 declaration to the IAEA, Iran first admitted to introducing UF₆ into a centrifuge in 1999, and into as many as 19 centrifuges in 2002. Iran also failed to declare the associated production of enriched and depleted uranium.

- **Hidden Sites:** Iran did not declare to the IAEA the existence of a pilot enrichment facility at the Kalaye Electric Company Workshop, and laser enrichment plants at the Tehran Nuclear Research center and at Lashkar Ab'ad. Because experiments at these sites involved the use of nuclear material in equipment, Iran was obligated to report them to the IAEA.

- **Laser Isotope Enrichment Experiments:** Iran failed to report that in 1993 it imported 50 kg of natural uranium metal, and that it used 8 kg of this for atomic vapor laser isotope separation (AVLIS) experiments at Tehran Nuclear Research Center from 1999 to 2000, and 22 kg of the metal for AVLIS experiments at Lashkar Ab'ad from 2002 to 2003.⁹ These activities were ultimately acknowledged in an October 2003 declaration.

- **Plutonium Experiments:** Iran did not report to the IAEA that it had produced uranium dioxide (UO₂) targets, irradiated them in the Tehran Research Reactor, and then separated the plutonium from the irradiated targets. Iran also failed to report the production and transfer of waste associated with these activities and that it had stored unprocessed irradiated targets at the Tehran Nuclear Research Center. In later meetings with the IAEA, Iran said that it conducted the plutonium separation experiments between 1988 and 1993 using shielded glove boxes at the Tehran Nuclear Research Center.

⁷ Excerpted from Albright and Jacqueline Shire, “Iran’s NPT Violations – Numerous and Possibly Ongoing?” ISIS Report, September 29, 2006. <http://isis-online.org/uploads/isis-reports/documents/iranntptviolations.pdf>

⁸ <http://www.iaea.org/Publications/Documents/Board/2004/gov2004-83.pdf>

⁹ International Atomic Energy Agency, “Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran,” GOV/2003/75, 10 November 2003, Annex 1, p. 2. 3

Appendix 2:

Major Illicit Iranian Procurements in Violation of UN Security Council Sanctions and National Trade Controls

Iran's wide-ranging illicit procurement efforts have centered on outfitting its gas centrifuge program and Arak nuclear reactor project in defiance of a host of supplier countries' national trade controls and of United Nations Security Council sanctions resolutions that require Iran to suspend both programs.¹⁰ The UN Security Council first passed a resolution demanding a suspension of Iran's nuclear programs in 2006 under resolution 1696.¹¹ But Iran continued to conduct smuggling operations regularly to outfit its sanctioned nuclear programs. Intelligence agencies and the IAEA found that Iran also conducted illicit procurement to supply its secret nuclear weapons program until at least 2004;¹² European countries have detected procurements after 2004 related to nuclear weapons development.¹³ Iran continues these operations throughout the period of the Joint Plan of Action, although the agreement did not explicitly denote that Iran would suspend illicit procurement activities.

Some prominent examples of major procurements made or attempted by Iran in recent years include:

- In 2012, a major U.S. sting operation led to the arrest of an Iranian working with a Chinese company to send or attempt to send U.S. and European-origin goods to Iran and Iranian companies or entities via transshipment through China. The sought-after goods, which included tons of maraging steel, vacuum pumps, pressure transducers, mass spectrometers, and accessories, were dual-use items intended for and critical to the operation and advancement of Iran's gas centrifuge program.¹⁴
- Qiang Hu, a Chinese citizen, was charged in the United States for violating U.S. export controls by selling thousands of pressure transducers, which measure pressure in gas centrifuge cascades, to unnamed customers through his position of sales manager at MKS Instruments Shanghai Ltd. in China.¹⁵ Iran was a likely recipient. Hu worked with two colleagues and two phony Chinese trading companies to fraudulently obtain U.S. export licenses for over \$6.5 million worth of pressure transducers.

¹⁰ For additional, detailed examples, see ISIS, "Illicit Trade: Case Studies." <http://isis-online.org/studies/category/illicit-trade/>

¹¹ United Nations Security Council Resolution 1696 (2006), July 31, 2006. http://www.isisnucleariran.org/assets/pdf/UNSC_res_1696.pdf

¹² Report by the Director General, *International Atomic Energy Agency (IAEA), Implementation of the NPT Safeguards Agreement and the relevant provisions of Security Council resolutions in the Islamic Republic of Iran*, November 8, 2011. http://isis-online.org/uploads/isis-reports/documents/IAEA_Iran_8Nov2011.pdf

¹³ David Albright and Christina Walrond, *The Trials of the German-Iranian Trader Mohsen Vanaki: The German Federal Intelligence Service Assesses that Iran Likely Has a Nuclear Weapons Program*, ISIS Report, December 15, 2009. http://isis-online.org/uploads/isis-reports/documents/MohsenCaseStudy_update_15Dec2009.pdf

¹⁴ David Albright and Andrea Stricker, "Major U.S. Sting Operation Arrests Iranian in Nuclear Smuggling Network," ISIS, August 12, 2012. http://isis-online.org/uploads/isis-reports/documents/US_case_gas_centrifuge_equipment.pdf

¹⁵ Department of Justice Press Release, "Chinese National Charged in Massachusetts with Illegal Exports of Sensitive Technology to China," May 23, 2012. <http://www.justice.gov/usao/ma/news/2012/May/HUQiangchargesPR.html>.

- A Swedish naturalized citizen, originally from Iran, was convicted in 2013 for running a small Swedish trading company that attempted to illegally export gas centrifuge relevant valves and vacuum pumps to Iran. Many previous dual-use exports to Iran were successful.¹⁶
- In 2011, an Iranian trading company, Jahan Tech Rooyan Pars Co., sought via a commercial Chinese web site 100,000 ring magnets, whose dimensions matched those of ring magnets of Iran's IR-1 centrifuge. This number of ring magnets was enough for 50,000 IR-1 centrifuges.¹⁷
- According to a senior U.S. official interviewed by The Washington Post, Iran was detected in 2010 trying to buy carbon fiber in China, a material used in fabricating advanced gas centrifuges.¹⁸
- In 2009, a Chinese company, Roc-Master Manufacture and Supply Company, working on behalf of an Iranian client, brokered a deal for 108 European-made pressure transducers with a distributor of this equipment located in Taiwan. The Taiwanese distributor misled the European manufacturer that the end user was in China, but instead forwarded the pressure transducers to Iran.¹⁹
- Starting in 2007 and continuing into 2011, Iran sought 1,767 valves from Germany for its IR-40 heavy water reactor at Arak and planned to pay \$6 million for these valves.²⁰ The Iran-based Modern Industries Technique Company (MITEC) which is responsible for the design and construction of the Arak reactor, was the entity that sought the valves abroad. MITEC has been listed under United Nations Security Council sanctions since 2010. The major players in the procurement scheme, including Hossein Tanideh, an Iranian procurement agent, were arrested in Turkey and Germany.
- From 2006 to the present, the United States has tracked a Chinese company's sales of missile and nuclear related materials to Iran, including illegally accessing the U.S. financial system to receive payments from Iran. The prominent case of the sanctioned Chinese company, Limmt, and its owner, Li Fang-Wei, has showcased China's inaction on enforcing sanctions against Iran.²¹ In 2009, the United States first indicted Li and Limmt, and in 2014, the United States released a new indictment and a reward for Li's arrest.²²
- In 2006, a private Chinese manufacturing company under false pretenses acquired vacuum pump systems from a European company's Chinese subsidiary. These pumps were manufactured in Europe and

¹⁶ Swedish indictment of Shahab Ghasri, September 24, 2011.

http://www.exponerat.info/wpcontent/uploads/2012/12/iranier_Smuggling-tekn-utrust-Iran-B-3487-11-stämning.pdf; *Report of the Panel of Experts on Iran established pursuant to resolution 1929 (2010)*, June 5, 2013, paras 23-27 and 111.

¹⁷ David Albright, "Ring Magnets for IR-1 Centrifuges," ISIS Report, February 13, 2013. http://isis-online.org/uploads/isis-reports/documents/iran_ring_magnet_13Feb2013.pdf

¹⁸ John Pomfret, "Chinese Firms Bypass Sanctions on Iran, U.S. Says," *The Washington Post*, October 18, 2010.

¹⁹ "How Nuclear Equipment Reached Iran," The Associated Press. March 1, 2010.

²⁰ Cathrin Gilbert, Holger Stark, and Andreas Ulrich, "Operation Ventilator," *Der Spiegel*, 40/2012. See also *Report of the Panel of Experts on Iran*, June 5, 2013.

²¹ Andrea Stricker, "A Smuggler's Use of the U.S. Financial System to Receive Illegal Payments from Iran," ISIS Report, October 23, 2009, updated February 11, 2011. http://isis-online.org/uploads/isisreports/documents/Limmt_Li_Fang_Wei_23Oct2009_update9Feb2011.pdf

²² David Albright, Andrea Stricker, and Donald Stewart, "Serial Proliferator Karl Li: China's Continued Refusal to Act," ISIS Report, May 8, 2014. <http://isis-online.org/isis-reports/detail/serial-proliferator-karl-li-chinas-continued-refusal-to-act/20>

intended for use exclusively in China. Nonetheless, the Chinese manufacturing company sent them to Iran without official approval.²³

- In the last few years, Iran acquired significant quantities of high quality carbon fiber, a good usable in its advanced gas centrifuges. The carbon fiber, made in Japan, was sold to a U.S. company, which in turn sold it to an EU country. It was subsequently sold to other companies within the EU, and ultimately trucked to Iran via Turkey.

²³ David Albright, Paul Brannan, and Andrea Scheel, “How Cooperation between a Company and Government Authorities Disrupted a Sophisticated Illicit Iranian Procurement,” ISIS Report, January 12, 2009. http://isisonline.org/uploads/isis-reports/documents/Pumps_China_12January2009.pdf

Appendix 3:

Update on the IAEA/Iran Framework for Cooperation and Resolution of Possible Military Dimensions (PMD): Effort Remains Stalled

Iran has pledged under a Framework for Cooperation with the IAEA to resolve all outstanding issues relating to the possible military dimensions of its nuclear program. These issues were detailed in an annex in the IAEA's November 2011 safeguards report.²⁴ The evidence underlying the outstanding issues is viewed by the IAEA as "overall, credible." Iran has told the IAEA that "'most of the issues' in the Annex to GOV/2011/65 (the November 2011 safeguards report) were 'mere allegations and do not merit consideration.'"²⁵

The IAEA reiterated in September 2014 that with regard to its investigation:

The Board of Governors has confirmed on numerous occasions, since as early as 1992, that para. 2 of INFCIRC/153 (Corr.), which corresponds to Article 2 of Iran's Safeguards Agreement, authorizes and requires the Agency to seek to verify both the non-diversion of nuclear material from declared activities (i.e. correctness) and the absence of undeclared nuclear activities in the State (i.e. completeness).

The IAEA has stated it needs to conduct a "system" assessment of the outstanding PMD issues, and that "this will involve considering and acquiring an understanding of each issue in turn, and then integrating all of the issues into a "system" and assessing that system as a whole."

Although Iran has pledged to cooperate on addressing the past and present issues related to the possible military dimensions of its nuclear program, the latest IAEA Iran safeguards report from February 19, 2015 notes no further progress on resolving them. In particular, Iran has not proposed any new practical measures to resolve its PMD file in a fourth step under the IAEA/Iran Framework for Cooperation. It has also not addressed the last two measures in the third step of the Framework for Cooperation that had been agreed upon in May 2014. These two measures concern the initiation of high explosives and neutron transport calculations possibly related to the development of nuclear weapons. In August 2014, the IAEA had also invited Iran to propose new measures for a new step in the Framework for Cooperation, but, as of early March 2015, Iran has failed to do so.

Requests to Access Parchin Site

In February 2012 the IAEA requested a visit to a site at the Parchin military site which it has not yet been granted. Instead, the IAEA (and ISIS) has tracked via satellite imagery the apparent sanitization efforts by Iran to conceal past activities at the site over the past two plus years since the IAEA first asked to visit.²⁶ The IAEA reports that the activities that have taken place at the site since its request for access have likely "undermined its ability to conduct effective verification" and that Iran must address its questions and provide access to the site.

²⁴ Report by the Director General, *Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council Resolutions in the Islamic Republic of Iran*, GOV/2011/65, November 8, 2011. http://isis-online.org/uploads/isis-reports/documents/IAEA_Iran_8Nov2011.pdf

²⁵ Report by the Director General, *Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council Resolutions in the Islamic Republic of Iran*, GOV/2014/43, September 5, 2014. <http://isis-online.org/uploads/isis-reports/documents/gov-2014-43.pdf>

²⁶ "Iran: ISIS Reports with Imagery," <http://isis-online.org/isis-reports/imagery/category/iran/>

The IAEA reported in its February 2015 safeguards report viewing in satellite imagery further activity at the Parchin military site. It has observed construction materials, vehicles, and other equipment present at a specific location at Parchin where the nuclear weapons-related high explosive activities are alleged to have taken place. Similarly, through analysis of commercial satellite imagery dated between August 12, 2014 and January 31, 2015, ISIS also detected various activities and the presence of construction materials at the site in question. In the most recent imagery, resurfacing or re-asphalting activities could be seen as well as cleanup of construction materials and debris, all of which would be consistent with the IAEA's findings.²⁷

²⁷ David Albright, Serena Kelleher-Vergantini, and Christopher Coughlin, "Modifications at the Parchin Site: A Comprehensive Timeline; New Imagery Suggests Re-Asphalting," ISIS Report, February 11, 2015. http://isis-online.org/uploads/isis-reports/documents/Parchin_February_11_2015_Final.pdf