

* We produced this study in 2019 at the request of the administration for an internal discussion on sketching out its position. It is not the current administration's or the Institute's position, although the Institute supports the general thrust, especially the need to go beyond JCPOA limits and for Iran to provide the IAEA a verified complete nuclear declaration. We have not updated the study since then, but we believe that it is useful today in a public discussion. *

NEGOTIATING A NEW IRAN NUCLEAR DEAL

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The United States should seek a new or modified nuclear agreement with Iran that verifiably denies it all routes to producing or acquiring a nuclear weapon, or otherwise maintaining nuclear weapons capabilities. This includes ensuring that Iran does not have pathways to nuclear weapons for the foreseeable future and that its nuclear programs are verifiably peaceful. Inherent to that determination is a finding prior to, or early on, in the implementation of any new or modified deal that there is a high level of confidence in the absence of undeclared Iranian nuclear materials and facilities. Under no circumstances should the United States diminish or abandon the campaign of maximum economic pressure against Iran until its conditions are met.

A new approach is needed to deal with the Iran nuclear issue in light of the sustained, threatening nature of Iran's advanced nuclear capabilities to international peace and security, as well as the proliferation risk they continue to pose for the Middle East region. This threat has not been eliminated by the time-bound nuclear limitations and, in effect, partial inspection procedures implemented under the Joint Comprehensive Plan of Action (JCPOA) and associated United Nations Security Council (UNSC) Resolution 2231. The United States should build a new nuclear agreement, or failing that, create supplementary terms to the existing agreement that significantly strengthen it.

All options must focus on:

- Improving verification, in particular, achieving adequate transparency and inspector access by the International Atomic Energy Agency (IAEA) to all necessary Iranian sites, individuals, documentation, and equipment, including rectifying the weakening of Nuclear Non-Proliferation Treaty (NPT) safeguards, i.e. the Comprehensive Safeguards Agreement (CSA) and the Additional Protocol (AP), that was done via the JCPOA;
- Addressing the continued existence of Iran's uranium enrichment and plutonium production programs and their supporting infrastructure;
- Creating a regional zone free of reprocessing and enrichment among Gulf States that encompasses, among others, Iran, Iraq, Saudi Arabia, and the United Arab Emirates (UAE);
- Reorienting any Iranian personnel engaged in current nuclear weapons-related activities as determined by the IAEA and parties to the deal, and the closure of any centers or entities such as exist in SPND (the Organization for Defense Innovation and Research) engaged in on-going nuclear-weapons related work.
- Ensuring an end to Iran's illicit procurements for its nuclear, missile, and arms programs;

- Ensuring no Iranian cooperation with North Korea or other states on nuclear programs and ballistic missiles;
- Banning and verifiably ending Iran’s longer-range nuclear-capable ballistic missile and cruise missile programs and creating limits on shorter range missiles and cruise missiles; and
- Establishing effective, domestic U.S. oversight of Iranian compliance with any nuclear agreement and reporting requirements to Congress.

The United States must prioritize negotiating a new nuclear agreement, or at least, supplementing the conditions in the JCPOA, well before the start of the sunset of restrictions on Iran’s nuclear program in 2023. That same year, the missile embargo in UN Security Council Resolution 2231 will expire. Most immediately, the administration must deal with the end of the arms embargo, scheduled to end in October 2020, during President Trump’s term in office. Moreover, the agreement may collapse in the near term if Iran continues to violate its limits.

Scope and Content

This memo lists: 1) several proposed “best” provisions of a new nuclear deal, and 2) optional alternatives that could be pursued as modifications or supplements to the current deal.

While the question of how to build P5+1 support for such changes, and how to achieve Iranian acquiescence to them, is largely outside the scope of this memo, two key points are worth noting:

- A new agreement could receive more support from allies, and perhaps be more palatable to the Iranians, if it is portrayed, to the extent possible, not as a renegotiation or replacement of the JCPOA itself but rather as a new agreement extending and supplementing the JCPOA, with a large focus on addressing the matter of expiration of key JCPOA restrictions on Iran’s nuclear program.
- The administration should present Iran the choice between a new agreement and an unrelenting American pressure campaign.

This memorandum principally addresses nuclear capabilities and leaves to other experts most matters of Iran’s medium and short-range ballistic and cruise missiles, conventional arms, regional malign activities, support for terrorist groups, human rights violations, and related issues, as laid out in Secretary of State Pompeo’s list of 12 demands. Sanctions relief as well as other incentives, dependent on or timed with Iran fulfilling its commitments, are not addressed.

U.S. policy should be to: 1) deny Iran all routes to producing or otherwise acquiring a nuclear weapon, or otherwise meaningfully maintaining nuclear weapon capabilities; and 2) ensure adequate verification. New provisions or modifications in eight broad areas are included here:

- I. Reaching a New or Modified Deal
- II. Question of UN Resolution 2231
- III. Transparency, Access, Military Nuclear Activities, Broader Conclusion
- IV. Nuclear Limitations - two sets of options are presented

- V. Procurements
- VI. Cooperation with North Korea and other states
- VII. Missiles and Conventional Arms Restrictions
- VIII. Effective U.S. Oversight of Iranian Compliance and Congressional Reporting

I. Reaching a New or Modified Deal

Option 1 (best):

New agreement. The most desirable approach is the negotiation of a new deal. Certain key changes will require a new agreement with Iran, which should be approached, ideally, as a treaty subject to Senate ratification. Such a new agreement may require the passage of a new UN Security Council resolution that incorporates the changes relating to Iran’s nuclear program, as well as additional embargoes on conventional arms and long-range delivery systems, including ballistic missiles and cruise missiles. While the UN Security Council has the legal authority under Chapter VII to require Iran to restrict its nuclear program even without Iranian concurrence, experience shows that Iran is more likely to comply with UN restrictions to which it has agreed.

Option 2 (alternative):

Modifying or replacing portions of the JCPOA. A second approach is to modify or replace portions of the current deal, but doing so is unlikely to receive broad support in the United States. There are two potential methods for negotiating changes to the JCPOA using the current deal’s framework. The first method is to use the mechanisms within the JCPOA, in particular the Joint Commission, to institute interpretations, reinterpretations, and perhaps even modifications, of limitations or provisions. There are indications, particularly in Joint Commission decision documents, that the relevant member state governments interpret the Joint Commission as having the authority to modify the JCPOA to some extent. The second method is to negotiate side arrangements (which would preferably be made public) that would supplement the JCPOA. Both methods are complicated by the United States’ withdrawal from the deal. In addition, not all necessary changes to the JCPOA are likely to be achievable via the Joint Commission or side deals, and the negotiating framework within the Joint Commission may be too limited.

II. Question of UN Resolution 2231

Option 1 (best):

Due to Iran’s on-going violations of the JCPOA, the “snapback” provisions of the JCPOA are implemented, including a vote at the UN Security Council to formally end UN Resolution 2231 (2015) and reinstitute previous international resolutions and sanctions against Iran’s nuclear, missile, and conventional arms programs. This approach is warranted and can be initiated by one of the “E3” (France, Germany, or Britain). It would be done for the purpose of reestablishing prior international law against Iran’s nuclear programs and activities; preventing the end of international bans on Iran’s import of conventional arms,

missile, and nuclear equipment; and rendering imports and exports for or from those programs prohibited under international law. An end to UNSCR 2231 would also re-engage the international community with the threat of Iran's nuclear, missile, and conventional arms activities. The reinstatement of prior resolutions would entail the re-establishment of the UN Iran sanctions committee and its Panel of Experts to monitor sanctions implementation.

“Snapback” may be diplomatically disruptive and controversial and would require the credible threat of U.S. sanctions to hold other countries to the terms of prior resolutions. Legal opinions differ on the question of the United States' ability to invoke snapback as a withdrawn party to the JCPOA, but there is no dispute over one of the E3 being able to do so.¹

Option 2 (alternative):

Replacement or new UN resolution following a new nuclear deal or as part of the modification of the JCPOA. Both a modified agreement using the existing deal, and certainly a new deal, will require the passage of a new UN Security Council resolution to replace UNSCR 2231, incorporating the changes relating to Iran's nuclear program as well as additional embargoes or changes on conventional arms and long-range delivery systems, including ballistic missiles and cruise missiles, and procurement activities. This path would have the benefit of P5+1, and hopefully Iranian, consensus. However, lapses to the arms embargo, and even the missile embargo, may occur before such a new deal could be reached and a new UN resolution passed.

III. Transparency, Access, Investigation of Military Nuclear Activities, Broader Conclusion, Reorienting of Nuclear Weapons Program Personnel

No alternative sets of options are provided because all provisions listed are urgently needed in a modified or new deal.

Iranian agreement to policy of full transparency and access, allowing of deep investigation into past and present nuclear weapons-related activities, reaching a Broader Conclusion by IAEA, and re-orienting nuclear program personnel. A best set of options would include Iran allowing the IAEA to conduct a full investigation into its past and possibly on-going nuclear weapons activities, including an investigation into the Nuclear Archive files captured by Israel, prior to the relaxation of any sanctions. A new or modified deal should require Iran to submit to such a full, in-depth IAEA investigation as part of its effort to reach a Broader Conclusion in Iran, allowing timely access to former military nuclear sites, people, and documentation, with the goal of developing a correct and complete description of all past or ongoing Iranian nuclear activities. Until Iran correctly and completely answers previous questions from the IAEA about such activities, explains who was involved, what actions were taken, and where they took place, there can be no international confidence that the development of nuclear weapons capabilities has ceased. It is vital that past Iranian activities be understood in sufficient detail to provide a baseline understanding of how far Iran may have been or may be along the path to nuclear

¹ Germany, as a non-P5 member, would need the veto of the United States, France, or Britain in the UN Security Council for the vote on the resolution that must pass with P5 unanimity to prevent the snapback of sanctions.

weapons. Iran should understand that its lack of full cooperation in the reaching of a Broader Conclusion will delay the ending of U.S. and other sanctions.

In a new provision, Iran's past military nuclear weapons program personnel or those who work on projects that would be discontinued under a new or modified agreement, would be reoriented or assigned to new tasks. Any related administrative centers or functions would be closed down.

These provisions would also entail remediating the weakening of standard NPT safeguards practices that occurred under the JCPOA. It should be noted that some of the JCPOA's useful provisions could be incorporated, and two in particular are delineated below. The provisions would include:

1. Formal and immediate ratification of the IAEA Additional Protocol by the Iranian parliament;
2. Provision entailing ongoing, continued monitoring and declarations of uranium inventories at Iran's uranium mines and mills, Gchine and Saghand, or any new such locations, which is outside the scope of the CSA and AP, but is currently covered in the JCPOA for a period of 25 years;
3. Iranian agreement to permit the IAEA to conduct an expedited, full-scope investigation under an effort to reach a Broader Conclusion of the absence of nuclear-weapons related activities in Iran;
4. Iran permitting IAEA access to any site, personnel, or documentation it requires following standard Comprehensive Safeguards Agreement and Additional Protocol procedures and timelines (24 hours under the AP, discarding the JCPOA's longer allowed timeline of 14-21 days);
5. Full access to Iranian personnel, past and present, documentation of any kind, including the Nuclear Archive files, and equipment associated with nuclear direct- or dual-uses, relevant to developing a more complete understanding of Iran's past and present nuclear weapons programs and its past and ongoing gas centrifuge and reprocessing programs;
6. Immediate removal from Iran of any nuclear weapons-related equipment, paper and electronic files, and documentation, whether archived or not, along with its verified destruction, the latter occurring following an end to the IAEA's investigations;
7. In the case of nuclear weapon-related equipment and certain computer models with dual-uses, Iran would need to submit a declaration of such equipment and their current uses as well as information on computer models to the IAEA, and subject that list to IAEA verification, additional requests for access by the IAEA as needed or information warrants, and member state approval of its continued use of the equipment.
 - a. A new or modified agreement would include, and mandate its verification by the IAEA, of Section T of Annex 1 of the JCPOA, which usefully supplements the more general limitations in the NPT and contains bans on Iranian nuclear weaponization activities, namely activities which could contribute to the design and development of a nuclear explosive device.² Under current JCPOA

² Section T, Annex 1, JCPOA covers: *ACTIVITIES WHICH COULD CONTRIBUTE TO THE DESIGN AND DEVELOPMENT OF A NUCLEAR EXPLOSIVE DEVICE*

82. *Iran will not engage in the following activities which could contribute to the development of a nuclear explosive device:*

arrangements, Section T is inadequately verified. Iran would need to submit a declaration of Section T-relevant equipment and their current uses, and subject that list to IAEA verification, additional requests for access by the IAEA as needed or information warrants, and the agreement's governing body/Joint Commission approval of continued use of the equipment;

8. IAEA mandate to provide full quarterly reporting to its Board of Governors on its investigation, including details about Iran's nuclear materials and activities (omitting safeguards sensitive information and Iranian confidential technical information as appropriate), as well as its own verification activities and investigations;³
9. Fuller reporting on the activities of any agreement's member state governing body, under the current deal, known as the Joint Commission. For example, currently, there is no public Joint Commission reporting.
10. To facilitate its work under UNSCR 2231, the Security Council annually selects one of its members to serve as its Facilitator for various tasks related to implementation of the resolution. Under a new or modified deal, public reporting should include regular

82.1. Designing, developing, acquiring, or using computer models to simulate nuclear explosive devices.

82.2. Designing, developing, fabricating, acquiring, or using multi-point explosive detonation systems suitable for a nuclear explosive device, unless approved by the Joint Commission for non-nuclear purposes and subject to monitoring.

82.3. Designing, developing, fabricating, acquiring, or using explosive diagnostic systems (streak cameras, framing cameras and flash x-ray cameras) suitable for the development of a nuclear explosive device, unless approved by the Joint Commission for non-nuclear purposes and subject to monitoring.

82.4. Designing, developing, fabricating, acquiring, or using explosively driven neutron sources or specialized materials for explosively driven neutron sources.

³ Currently, the IAEA provides minimal reporting on JCPOA implementation to the member states, accommodating Iran's excessive demands for secrecy. Some conditions in the JCPOA encourage this excessive secrecy. As part of strengthening the technical integrity and transparency of a new or modified agreement, the following list includes what should be included, but has not been in current IAEA reporting, with few exceptions, in a new or modified deal:

- a. Iran's total inventory of enriched uranium stocks and their chemical forms and how much is included in any low enriched uranium cap (currently set at 300 kg under the JCPOA) and how much is exempted from this cap;
- b. quarterly enrichment production output at Natanz;
- c. the status of stable isotope production efforts at Fordow and elsewhere;
- d. natural uranium production and imports; heavy water quarterly production and total inventory domestically and in Oman or other off-shore locations;
- e. status and progress in centrifuge R&D and reporting on the number of centrifuge rotor tubes, bellows, rotor assemblies, and other key centrifuge parts manufactured and stored;
- f. status of construction and operation of advanced centrifuge assembly facilities at Natanz and elsewhere;
- g. the status of key equipment suitable to make centrifuge rotor tubes or bellows;
- h. locations, characterizations, and monitoring of hot cells;
- i. work carried out to date on the Arak reactor;
- j. other nuclear activities, to be determined;
- k. any verification activities related to enforcement of the CSA and AP;
- l. any progress on its PMD investigation and reaching a Broader Conclusion, not limited to complementary accesses to sites, interviews, and reviews of documentation;
- m. any disputes with Iran over interpretation or implementation of JCPOA conditions and the CSA and associated AP, as well as any progress or problems in reaching a Broader Conclusion.

briefings by the UN Security Council Facilitator. The reports of this Facilitator would cover all aspects of the implementation of UNSCR 2231 and any replacement or follow-on resolution;

11. Reorientation of any Iranian personnel engaged in current nuclear weapons-related activities as determined by the IAEA and the agreement's governing body, in review of that reporting. Personnel would be assigned to new tasks and/or considered for foreign assistance or employment to ensure the integrity of this process and that no leakage of nuclear weapons-relevant knowledge occurs. Centers or administrative functions of any of these activities, such as those in SPND (the Organization for Defense Innovation and Research) (the successor entity allegedly charged with organizing potentially ongoing Iranian nuclear weapons or dual-nature programs), would be closed;
12. Key sanctions against Iran would expire only when the IAEA formally reaches an unanimously accepted Broader Conclusion that all nuclear material in Iran remains in peaceful activities; this conclusion is unanimously voted on and accepted by the deal member states as adequate, and all other aforementioned activities are implemented. U.S. policy should be not to accept the IAEA reaching a Broader Conclusion or the lifting of sanctions without full resolution of the outstanding issues about Iran's past secret nuclear activities, including those associated with possibly on-going elements of Iran's nuclear weapons programs.
13. The UN Secretary-General should receive a broader mandate to investigate the implementation of, and potential compliance issues related to, UNSC Resolution 2231 and any replacement resolution. Toward that end, member states would share more procurement-related information with the Secretary-General and allow access to goods in member states that have been interdicted and prevented from going to Iran under UNSCR 2231 or a new or replacement resolution. Furthermore, the process of placing additional entities on the relevant UN resolution sanctions list would be eased.

IV. Nuclear Limitations

Set 1 of options (best):

Permanent end to uranium enrichment and reprocessing in Iran, including certain proliferation-prone reactors, and disposal or removal of excess materials and equipment.

The ideal way to remove the threat of Iran's uranium enrichment and reprocessing programs in the long term is to verifiably close them down. This would also end Iran's domestic production of nuclear fuel for use in power reactors. Iran has never been able to offer an economically justifiable enrichment program that can produce enriched uranium more cheaply and efficiently than that which it could import from other countries. Reprocessing will likewise remain highly uneconomical. This policy approach acknowledges the threat posed by the existence of continued uranium enrichment of any kind and reprocessing whose facilities and products could be diverted for military purposes and that the Iranian nuclear threat would only be on standby, ready to be activated as a regional threat at a time of Iran's choosing. Removing this threat, or at least reducing it significantly (see option 2), and addressing the other, non-nuclear matters simultaneously, would lead to a marked improvement in Iran's relations, economic stability, and future growth.

This approach should not be limited to Iran but extended to all the Gulf States. An agreement should be reached to ban enrichment and reprocessing regionally not only in Iran but also in Saudi Arabia, Iraq, and other Gulf States. This broader negotiation should start immediately.

Parties to such an arrangement would need to expect that most national and international sanctions against Iran would have to be removed along the process, carefully balancing concern for Iranian reneging with decisions about which sanctions are removed. Iran may also seek to develop an alternative justification for the closure of more of its nuclear programs as a face-saving mechanism. In addition, Iran will likely not agree to such an approach unless it is seriously worried about imminent economic or regime collapse. Therefore, several years of maximum pressure sanctions may be required before Iran would agree.

Moreover, verifying the absence of all such on-going nuclear programs will be a difficult task for the IAEA, with deep access required to any site it requires visiting. This approach would need to be accompanied by the strongest verification approach, as laid out in section III.

The following lists key conditions in this option:⁴

1. Iran would agree to permanently end its uranium enrichment and reprocessing programs by:
 - a. Exporting its current stocks of enriched uranium in all forms; and all stocks of natural uranium hexafluoride;
 - b. Dismantling and destroying or verifiably removing from Iran all gas centrifuge uranium enrichment infrastructure, including centrifuge cascades and test stands, process lines, uranium hexafluoride production, and centrifuge manufacturing in facilities and parts and equipment that cannot be used for a non-nuclear civil uses or are not unanimously approved for such use by parties to the deal;
 - c. Dismantling and exporting or destroying its uranium conversion capabilities at Esfahan or elsewhere;
 - d. Immediately closing the Fordow Fuel Enrichment Plant;
 - e. Closing or reorienting the Natanz Fuel Enrichment Complex to a non-nuclear scientific research or other facility;
 - f. Closing the Arak nuclear reactor;
 - g. Removing all hot cells and associated equipment from Iran;
 - h. Banning Iran from conducting post-irradiation examination of fuel from any research or power reactors;
 - i. Closing its uranium mines and mills and selling the bulk (to be defined) of its existing stocks of natural uranium;
 - j. Accepting an end to U.S. nuclear waivers associated with most of Iran's continued nuclear activities under the JCPOA, apart from those related to maintenance of the Tehran Research Reactor (TRR) and the Bushehr reactor;
 - k. Taking all these steps under IAEA supervision.

⁴ This list of conditions is similar in its scope and content to the one accepted by Taiwan in the late 1980s as part of ending its nuclear weapons program. See Albright and Stricker, *Taiwan's Former Nuclear Weapons Program* (Washington, DC: Institute for Science and International Security Press, 2018).

2. Iran would be allowed:
 - a. Maintenance and operation of the TRR for the production of medical isotopes;
 1. Arrangements would need to be made for continued fuel supply and decisions made over whether Iran would continue to make its own TRR fuel or import the fuel assemblies and shut down its domestic TRR fuel manufacturing facilities.
 - b. Continued operation of the Bushehr nuclear power plant for electricity production and continuance of the U.S. waiver related to its operation and assistance from Russia;
 - c. Continued import of: 1) nuclear power reactors and 2) small research reactors of no more than 50 megawatts-thermal, pursuant to unanimous state parties' approval. In both cases, spent fuel would be removed for storage and disposal outside Iran, unless the fuel is specially prepared to be adequately proliferation resistant as defined under the conditions specified in the JCPOA for new fuel for the modified Arak reactor.

Set 2 of options (alternative):

Extending Iran's breakout timelines indefinitely, or for at least another 20 years, and further reducing the nuclear threat from its ongoing programs. Through this approach, the current deal framework would be modified with supplementary provisions or replaced to extend and change certain provisions. Under the current deal, Iran's nuclear programs involving enrichment may in fact have a breakout timeline of only 7 months and not a guaranteed 12 months, as promised.⁵ Replacement provisions would lengthen the breakout timeline and extend the duration of this provision. New criteria would be ensuring a two-year breakout timeline and limiting advanced centrifuge work. The assessment of the breakout timeline would be based on known nuclear and manufacturing facilities and inventories of nuclear material and centrifuges (including major centrifuge components) and would be buttressed by sufficiently effective verification so as to ensure that there are no significant, unknown facilities.

1. The following conditions would supplement the 24-month breakout condition and would ideally endure indefinitely:
 - a. The number of enriching IR-1 centrifuges at Natanz would need to be adjusted downward to reflect the two-year breakout condition; likewise, the number of IR-1 centrifuges held in storage for replacement of broken centrifuges would be adjusted downward;
 - b. No installation of additional centrifuges, even if not enriching, that would lead to a breakout time of less than 24 months;
 - c. The destruction of excess centrifuges rather than their storage;
 - d. Enrichment limited to less than five percent uranium-235 in perpetuity;
 - e. A permanent limit of no more than 200 kilograms (kg) of low enriched uranium (LEU);
 - f. No stockpiling of unirradiated plutonium that exceeds 0.5 kilograms;

⁵ Currently, Iran's centrifuge program has a breakout timeline of 7-13 months, based on [Institute for Science and International Security calculations](#), and shortens as restrictions on centrifuges and enrichment sunset.

- g. No stockpiling of over five kilograms of unirradiated near 20 percent LEU, and any such fresh fuel in Iran would be scheduled in a timely manner for insertion into the TRR; any irradiated TRR fuel stored in Iran would need to have an irradiation level exceeding 100 rad per hour, or be sent abroad for storage and disposition. Hopefully, this would capture the old U.S.-supplied highly enriched uranium (HEU) fuel and other, older spent TRR fuel. If not, the irradiation level should be increased until it does. (An alternative condition is that after a period of adequate cooling, all spent TRR fuel would be sent out of Iran for storage and eventual disposition).
 - h. No manufacturing of any centrifuges, or major subcomponents including rotor tubes, bellows, bearings, end caps, piping, molecular pumps, motors, frequency converters, control systems, or outer casings, that if installed, would provide the capability to produce sufficient fissile material for a nuclear weapon or other nuclear explosive device in under 24 months;
 - i. Advanced centrifuge work limited to those centrifuges with less than 5 separative work units per year. Dismantlement and destruction would occur for Iran's advanced centrifuges that do not meet this criterion;
 - j. A ban on reprocessing and reprocessing-related activities or facilities;
 - k. A ban on additional heavy water reactors and the production of additional heavy water beyond existing stocks.
2. Unanimous agreement of the Joint Commission and a resolution by the UN Security Council would be needed to lift the indefinite 24-month breakout cap, or additional limitations, on Iranian enrichment and other nuclear programs. A vote should not occur prior to some fixed period (some suggest 20 years from the implementation date of a replacement agreement) and be subject to review of Iranian behavior with regard to ballistic missiles and in the region more broadly.
 3. Voiding of Iran's current long-term enrichment research and development plan as detailed in the JCPOA and submitted to the IAEA. A new plan should be developed consistent with a 24-month breakout criterion in conjunction with the Joint Commission, and it would endure indefinitely. Modifying or lifting restrictions in this plan would require P5+1 consensus. The new plan should ban Iranian development of centrifuges over five separative work units per year, such as, but not limited to, the IR-6, IR-7, and IR-8.
 4. Reactors of small and medium size, some of which can be as small as 50-100 megawatts-thermal, should be indefinitely banned for export to Iran or development by Iran. These reactors have significant potential to be misused to produce plutonium for nuclear weapons. In addition, any type of naval reactor, including land prototypes, would also be banned.
 5. Iran would be banned from domestically producing fuel for its power or research reactors with the possible exception of TRR fuel (see above). This would also mean that Iran could not enrich uranium for such use, or namely seek exemptions to the 200 kg cap as part of a domestic program to research, develop, and produce reactor fuel.
 6. Iran would be explicitly banned from receiving hot cells in violation of current JCPOA limits, eliminating the exemption that the Joint Commission provided to allow hot cells in violation of the limits. Such a ban would eliminate Iran's potential drive to obtain hot

cells for post-irradiation examination of fuel, which it could do as part of testing domestically-produced fuel or investigating other fuels. Iran has sought such types of hot cells since the JCPOA's Implementation Day, likely intending to seek exemptions from the Joint Commission for domestic fuel development or examination.

7. Iran would be banned from conducting post-irradiation examination of fuel domestically or abroad.
8. The new agreement would contain a menu of penalties short of full snapback for violations of the JCPOA or of associated UN Security Council resolutions, for which it may not make sense to impose a full snapback of sanctions.

V. Procurements

For sections V-VII, no alternative sets of options are provided because all provisions listed are urgently needed in a modified or new deal.

1. The JCPOA's procurement restrictions need to be strengthened, but can be built upon. A new agreement or modified deal should require Iran to report to the UN Security Council its requests to buy nuclear direct- or dual-use goods from abroad and obtain approval of the Procurement Working Group (PWG) or successor group for such imports, replacing the JCPOA's current approach of only requiring suppliers to request approval from the UNSC and the PWG. Iran would inform the PWG of the JCPOA, or an alternative body in a new deal, about requests to foreign suppliers for controlled or sensitive goods. Such requests would need to be reported whether or not they originate with the Atomic Energy Organization of Iran (AEOI). A request not reported would be considered Iran not meeting its commitments under the agreement.
2. The PWG or alternative body would remain in existence indefinitely, or until the Security Council decides to suspend or end its deliberations regarding Iran's nuclear-related imports.
3. A number of other reforms to the procurement conditions of the JCPOA are needed:
 - a. States should be required to report suspected illicit nuclear or nuclear-related procurements to the Secretary-General. The Secretary-General would disseminate reports on these issues to the Joint Commission or to alternative deal's governing body and the IAEA.
 - b. Any member of the PWG or the alternative body should be able to conduct end-use checks on nuclear-related or dual-use goods sent to Iran. The state must inform the UN Security Council and the IAEA about the outcome of such checks.
 - c. The period for Procurement Working Group or alternative body review of submitted proposals should be extended by several weeks.
4. Iran should be required to create and implement a strategic trade control system that meets international standards and would be subject to review by the Joint Commission or alternative deal governing body. According to the JCPOA, "Iran *intends* to apply nuclear export policies and practices in line with the internationally established standards for the

export of nuclear material, equipment and technology (emphasis added).”⁶ Iran has not committed to do so, and Iran could interpret this condition far differently than the United States. As part of creating a strategic trade control regime in Iran, it should commit not to conduct strategic commodity trafficking for its nuclear, arms, or ballistic missile programs, in essence for the first time agreeing not to violate the laws of supplier, transshipment, and other countries.⁷ Conducting illicit procurement is not in line with internationally-established standards for strategic trade control systems.

VI. Cooperation with North Korea and other states

1. Iran should be banned from any military, missile, or nuclear cooperation with North Korea or other states deemed to be proliferant states or state supporters of terrorism. [Note: For terrorism, the U.S. State Sponsor of Terrorism definition can be used.]

VII. Missiles and Conventional Arms Restrictions

1. Ballistic missile constraints need to be re-negotiated. A priority is including in a follow-on or replacement UN resolution the language in the pre-JCPOA UN Security Council resolutions on Iran, namely a ban on all Iranian activities related to *nuclear-capable* ballistic missiles. It is also important to add limitations on nuclear-capable cruise missiles. Paragraph 3 of Annex B of Resolution 2231 states that “Iran is *called upon* not to undertake any activity related to ballistic missiles *designed to be capable* of delivering nuclear weapons, including launches using such ballistic missile technology, until the date eight years after the JCPOA Adoption Day or until the date on which the IAEA submits a report confirming the broader conclusion, whichever is earlier.” In addition, pursuant to paragraph 4 of Annex B of Resolution 2231, if approved in advance on a case-by-case basis by the Security Council, all States may participate in and permit the transfer to Iran of items that could contribute to the development of nuclear weapon delivery systems. The requirement to submit such transfers to the Security Council for approval also applies until the date eight years after the JCPOA Adoption Day or until the date on which the IAEA submits a report confirming the Broader Conclusion, whichever is earlier. Depending on negotiations, a new or replacement UNSC resolution should include a ban on all longer-range Iranian ballistic and cruise missile activities and seek limits on shorter range systems capable of carrying nuclear weapons. In addition, the embargo on the transfer of missile-related goods to or from Iran should be made indefinite. UN Security Council approval must occur before ending the embargo and procurement ban;

⁶ JCPOA, Annex 1, par. 73: “Iran intends to apply nuclear export policies and practices in line with the internationally established standards for the export of nuclear material, equipment and technology. For 15 years, Iran will only engage, including through export of any enrichment or enrichment related equipment and technology, with any other country, or with any foreign entity in enrichment or enrichment related activities, including related research and development activities, following approval by the Joint Commission.”

⁷ Strategic commodity trafficking involves activities that violate suppliers’, transshippers’, or others’ national strategic trade controls laws, sanctions legislation, or financial laws. Iran has routinely flaunted these laws to acquire goods.

2. One of the more pressing deadlines in renegotiating or replacing the JCPOA and associated UN Security Council resolutions is the conventional arms embargo, which ends five years after the JCPOA Adoption Day, namely on October 18, 2020. A goal of a new agreement should be extending the arms embargo indefinitely, subject to a UN Security Council decision to lift the embargo.

VIII. Effective U.S. Oversight of Iranian compliance and Congressional Reporting⁸

Pursuant to any nuclear deal, the President should be required under U.S. law to prepare semi-annual reports (in an unclassified form, but possibly with a classified annex), and submit them to Congress, on Iran's nuclear program and the compliance of Iran with the nuclear agreement during the period covered by the report. The following list, which was developed as part of "fixing" the JCPOA and establishing effective U.S. oversight of its implementation prior to U.S. withdrawal, has been slightly modified to make it more general, although some of the JCPOA conditions were left intact, reflecting that this list could be applied to option 1 or 2 in section IV, Nuclear Limitations.

The reporting would cover:

1. Any action or failure to act by Iran that breached the agreement or is in noncompliance with the terms of the agreement.
2. Any delay by Iran of more than one week in providing inspectors access to facilities, people, and documents in Iran as required by an agreement.
3. Status of Iran's compliance with any nuclear deal and the IAEA's on-going determination of whether Iran's nuclear program is peaceful.
4. Any visits by the International Atomic Energy Agency to Iranian military sites and their purpose and outcome.
5. Any actions concerning Section T, Annex 1, in the JCPOA or in a new deal, including any approvals, denials, or discussions concerning multi-point explosive detonation systems suitable for a nuclear explosive device or explosive diagnostic systems (streak cameras, framing cameras and flash x-ray cameras) suitable for the development of a nuclear explosive device.
6. Status of efforts by the IAEA to verify Section T, Annex 1 of the JCPOA, or a successor agreement, including the specific steps taken that establish that allowed activities or equipment are in compliance with Section T and that any activities or equipment that received Joint Commission approval under the provisions of Section T are suitably monitored.

⁸ The content in this section includes modifications of sections in draft Iran Nuclear Agreement Review Act of 2015 (INARA) legislation.

7. Any procurement by Iran of direct or dual-use materials, equipment, or technology in violation of the agreement or which could otherwise significantly advance Iran's ability to obtain a nuclear weapon.
8. Any centrifuge research and development conducted by Iran that—
 - (i) is not in compliance with the agreement; or
 - (ii) may substantially reduce the breakout time of acquisition of a nuclear weapon or other nuclear explosive device by Iran, if deployed.
9. Any diversion by Iran of uranium, plutonium, direct or dual-use goods, or other materials for use in Iran's nuclear program in violation of the agreement.
10. Any covert nuclear activities undertaken by Iran, including any covert nuclear weapons-related or covert fissile material activities or research, development, and production.
11. An assessment of whether any Iranian financial institutions are engaged in money laundering or terrorist finance activities, including names of specific financial institutions if applicable.
12. Iran's advances in its ballistic missile program, including developments related to its intermediate-long-range and inter-continental ballistic missile programs.
13. Iran's advances in acquiring or developing, or otherwise exporting, advanced conventional arms, as currently defined by UNSC Resolution 2231.
14. An assessment of—
 - (i) whether Iran directly supported, financed, planned, or carried out an act of terrorism against the United States or a United States person anywhere in the world;
 - (ii) whether, and the extent to which, Iran supported acts of terrorism, including acts of terrorism against the United States or a United States person anywhere in the world;
 - (iii) all actions, including in international fora, being taken by the United States to stop, counter, and condemn acts by Iran to directly or indirectly carry out acts of terrorism against the United States and United States persons;
 - (iv) the impact on the national security of the United States and the safety of United States citizens as a result of any Iranian actions reported under this paragraph; and
 - (v) all of the sanctions relief provided to Iran, pursuant to an agreement, and a description of the relationship between each sanction waived, suspended, or deferred and Iran's nuclear weapon's program.
15. An assessment of whether violations of internationally recognized human rights in Iran have changed, increased, or decreased, as compared to the prior 180-day period.
16. Iran's total inventory of natural uranium, enriched uranium stocks, its enrichment level, and their chemical forms and how much is included in any enriched uranium caps and how much exempted from this cap under Joint Commission or successor entity's decisions.

17. The operation of Iran's enrichment plants, including the amount of enriched uranium produced, any other uranium enrichment, and the status of stable isotope production efforts.
18. The status of Iran's laser enrichment program, including progress on building or acquiring any lasers, or their major subcomponents, capable of enriching uranium regardless of declared use.
19. The amount of Iran's natural uranium production and imports; and any efforts by Iran to domestically produce or import uranium.
20. Heavy water production, including the total inventory of heavy water stored domestically in Iran and at off-shore locations under Iranian control.
21. The status and progress in Iran's centrifuge R&D, including the number and type of centrifuge rotor tubes, bellows, rotor assemblies, and other key centrifuge parts manufactured and stored; status of construction and operation of advanced centrifuge assembly facilities; the status of key equipment suitable to make centrifuge rotor tubes or bellows;
22. Locations and status of hot cells and any post-irradiation examination of Iranian irradiated fuel domestically or overseas.
23. Status of work on the modifications in the Arak reactor, including any controversies in such work.
24. Status and work on domestic fuel fabrication, including research and power reactor fuel.
25. Status and work on developing small and medium size reactors, including any activities to research or develop a naval propulsion reactor.
26. Any Iranian requests to foreign suppliers for sensitive nuclear or nuclear-related goods.
27. The number of proposals submitted to the Procurement Working Group, or its successor group, and the number approved, pending, and denied.
28. The number of end use checks on goods pursuant to the Procurement Working Group and the JCPOA, or successor group or deal, respectively, conducted by supplier states in Iran.
29. Iran's status in implementing a strategic trade control system that meets international standards.
30. Cases involving Iran's illicit trade for its nuclear, missile, or military programs.

31. Any disputes with Iran by the International Atomic Energy Agency or members of the P5+1 over interpretation or implementation of conditions of a nuclear deal, the Comprehensive Safeguards Agreement, associated Additional Protocol, or associated UN Security Council resolutions as well as any progress or problems in reaching a Broader Conclusion.