IAEA Investigations of Iran's Nuclear Activities

- **Fact Sheets & Briefs**

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The International Atomic Energy Agency (IAEA) first publicly outlined its concerns about Iranian activities related to the development of a nuclear weapon in an annex to its November 2011 quarterly report on Iran’s nuclear program. The report laid out 12 main areas for investigation, discussed in detail below. These issues became known as the possible military dimensions, or PMDs, of Iran’s nuclear program. The IAEA’s concerns about these activities pre-dated the public report, and little progress was made to resolve these issues until 2013.

In November 2013, Iran and the IAEA announced a Joint Framework for Cooperation in which Iran agreed to take several steps to address the IAEA’s concerns, including providing information and access to research reactors and production plants. The IAEA added additional steps in 2014. Before Iran completed all of the steps, the 2013 Framework for Cooperation was superseded by the 2015 Roadmap for the Clarification of Past and Present Outstanding Issues regarding Iran’s Nuclear Program, which required Iran to provide information on all the concerns the IAEA had identified in the 2011 report.

The 2015 Roadmap was announced concurrently with the nuclear deal concluded between Iran and the P5+1 (China, France, Germany, Russia, the United Kingdom, and the United States). Sanctions relief in the nuclear deal was contingent upon Iran cooperating with the agency’s investigation. The IAEA released its assessment to conclude the Roadmap process in December 2015.

**2015 Roadmap for the Clarification of Past and Present Outstanding Issues Regarding Iran’s Nuclear Program**

The July 14, 2015, Roadmap laid out a schedule for Iran to address the IAEA’s concerns and the agency to complete its investigation.

The IAEA announced on August 15, 2015, that Iran met the first deadline for providing documents and written explanations to the agency’s questions regarding the 12 main areas for investigation as outlined in the November 2011 annex. The agency submitted follow-up questions to Iran on September 9, and on September 20, IAEA Director General Yukiya Amano and Deputy Director General Tero Varjoranta traveled to Tehran to discuss the investigation and visit the Parchin site. They confirmed that environmental samples were taken at Parchin for analysis in IAEA labs. On October 15, 2015, the deadline for additional responses, the IAEA confirmed that Iran had responded to its follow-up questions and completed all activities under the roadmap.

The completed assessment, released on December 2, 2015, concluded that Iran had pursued a nuclear weapons program prior to 2003, including a coordinated “range of activities relevant to the development of a nuclear explosive device,” but did not divert nuclear material from its civilian nuclear program as part of its weaponization efforts.

The report found that although Tehran’s organized nuclear weapons program ended in 2003, some
activities continued through 2009. According to the assessment, the “activities did not advance beyond feasibility and scientific studies, and the acquisition of certain relevant technical competences and capabilities.” The agency said it found “no credible indications” that nuclear material was diverted to the weapons program or that any undeclared activities have taken place since 2009.

In several areas, like nuclear testing preparations and fuzing, arming, and firing a payload, the IAEA did not receive any new information. In other areas, such as Iran's work at a uranium mine, the IAEA assessed that Tehran’s activities were consistent with its declaration to the IAEA. However, the IAEA assessed that Iran’s program structure, computer modeling of a nuclear explosive device, and certain types of experiments with detonators were part of a nuclear weapons development program prior to 2003.

Mark Toner, a deputy spokesman at the U.S. Department of State, said on December 2 that the IAEA’s conclusion is “consistent with what the United States has long assessed with high confidence.”

Following a meeting on December 15, 2015, the 35-member IAEA Board of Governors voted unanimously to close the investigation into Iran's past weaponization work while continuing to report on Iran's implementation of the July 2015 nuclear deal with the P5+1.

Iran's ambassador to the IAEA Reza Najafi said that Iran "disagreed" with some of the agency's findings, arguing that the “scientific studies of dual-use technologies have always been for peaceful civilian or conventional military uses” rather than nuclear weapons work, he said.

The full text of the "road-map for the clarification of past and present outstanding issues regarding Iran's nuclear program" is available here. Highlights of the IAEA's findings in each of the 12 areas are below:

1. Program management structure: The IAEA assessed that, prior to 2003, Iran had an organized structure “suitable for the coordination of a range of activities relevant” to nuclear weapons design. The activities that continued beyond 2003 were not a coordinated program.

2. Procurement activities: The IAEA had “indications” that Tehran attempted to purchase items relevant to developing a nuclear weapon prior to 2007 and information that Iran purchased materials for its fuel cycle activities through companies not affiliated with the Atomic Energy Organization of Iran. Iran admitted to looking into procuring a high-speed camera for conventional purposes but said it ultimately did not do so.

3. Nuclear material acquisition: The IAEA assessed that the Gchine uranium mine, previously thought to be a potential source of uranium for undeclared nuclear activities between 2000-2003, would not have produced any substantial amounts of nuclear material before 2006. The IAEA found that the activities at the mine were consistent with Iran’s explanations and declarations. Overall, the IAEA assessed that “any quantity of nuclear material” that would have been available for the nuclear weapons development program “would have been within the uncertainties associated with nuclear material accountancy and related measurements.”

4. Nuclear components for an explosive device: The IAEA had evidence that Tehran had access to documentation on the conversion of uranium compounds to uranium metal, which is part of the weaponization process, and made progress on reducing a uranium compound into a metal form. Tehran denied that it conducted any metallurgical work for weapons purposes. The IAEA's final assessment found no indication of Iran conducting activities related to the uranium metal document.

5. Detonator development: The IAEA assessed that Iran’s work on explosive bridge wire detonators has “characteristics relevant to a nuclear explosive device.” The agency found that some of Iran’s explanations, that the detonators were developed as a safer alternative
because of explosive accidents, were “inconsistent” and “unrelated” to the IAEA’s timeframe for detonator development.

6. Initiation of high explosives and associated experiments: Iran admitted to the IAEA in August and September 2015 that it conducted work on certain types of explosives, but had a “technical requirement for the development” of multipoint initiation explosive technology for conventional weaponry. The IAEA noted that there are non-nuclear weapons applications for the development, but assessed that the work was “relevant to a nuclear explosive device.”

7. Hydrodynamic experiments: As part of its investigation over the past several months, IAEA officials were able to visit Parchin, a military site where the agency suspected that Tehran conducted hydrodynamic tests in an explosive chamber. Since the IAEA requested access in 2012, Iran conducted extensive construction and renovations. Tehran said in September 2015 discussions with the IAEA that one of the main buildings in question was used for storing chemicals for the production of explosives. An environmental sampling at the site found “chemically man-made particles of uranium” but did not indicate that it was used for long-term storage of chemicals as Iran claimed. The IAEA assessed that its satellite imagery analysis and environmental sampling “does not support Iran’s statements on the purpose of the building” and that Iran’s activities at the site impeded the agency’s investigation. The IAEA did not draw a definite assessment as to what occurred at Parchin.

8. Modeling and calculations: The IAEA assessed that Iran conducted modeling and calculations related to nuclear explosive configurations prior to 2004 and between 2005-2009. During the agency’s investigation between August-October 2015, Iran maintained that it was not in a position to discuss its work on hydrodynamic modeling because it was for conventional military purposes and not an IAEA concern. The IAEA noted in its report that there are conventional applications for such modeling and that the calculations derived from the modeling were incomplete and fragmented, but assessed overall that Iran conducted computer modeling of a nuclear explosive device between 2005-2009.

9. Neutron initiator: The IAEA’s evidence indicated that Iran continued work on neutron initiators after 2004, although the agency assessed prior to the July 2015 agreement with Iran that some of the indicators that Iran undertook work on generating neutrons through shock-compression were “weaker than previously considered.” Iran provided the IAEA with information about its neutron research and let the IAEA visit a research intuition in October 2015. Iran maintained that its research in the area was not related to “shock-driven neutron sources.”

10. Conducting a test: The IAEA noted it has not received any additional information regarding Tehran’s plans to conduct a nuclear test since its November 2011 report. The IAEA noted in the November 2011 report that Iran may have undertaken “preparatory experimentation” relevant to a nuclear weapons explosive device and obtained a document on the safety arrangements for explosive nuclear testing.

11. Integration into a missile delivery vehicle: The IAEA assessed that two of the workshops it identified in 2011 as producing components and mock-up parts for engineering of a Shahab-3 (Iran’s medium-range ballistic missile) re-entry vehicle for a nuclear warhead exist and that the capabilities are “consistent with those described” in documentation provided to the agency on Tehran’s work on a re-entry vehicle.

12. Fuzing, arming, and firing system: The IAEA report noted in the Final Assessment report that it had not received any new information since the November 2011 report on development of a prototype firing system for a Shahab-3 payload that would allow the missile’s payload to safely re-enter the atmosphere and then explode above a target or upon impact.

**2013 Joint Statement on Framework for Cooperation**

Prior to reaching the July 2015 roadmap, the IAEA and Iran had taken some steps to clarify the outstanding issues between 2013-2014.
Under the November 11, 2013 Framework for Cooperation, Iran and the IAEA committed to resolving the agency's concerns through a step-by-step process to address all of the outstanding issues. An annex to the framework laid out the first six actions that Iran pledged to take within three months (see details below).

On February 9, 2014, Iran and the IAEA announced a further seven actions that Iran would take by May 15, 2014 (see details below). Iran completed the initial two sets of actions within the time period specified, all of which fall into one of the 12 main areas of investigation. In June 2014, IAEA Director General Yukiya Amano said that the agency would not issue an assessment on any action until the investigation was completed and the agency could assess the information gathered as a system.

A May 20, 2014 meeting resulted in an agreement on an additional 5 actions to be taken by August 25, 2014 (see details below). Iran completed three of the five actions by the end of August 2014. Two remaining issues related to nuclear weapons development remained unresolved. Iran and the IAEA met several times throughout the spring, and in its May 29, 2015, quarterly report, the IAEA noted that Iran shared information on one of the outstanding issues related to nuclear weapons development. Before all of these actions were completed, this agreement was superseded by the July 2015 Roadmap.

The full text of the initial Framework for Cooperation and its accompanying annex is available here. The detailed steps taken under the original framework are laid out below.

Provide mutually agreed relevant information and managed access to the Gchine mine in Bandar Abbas.

**Iranian Actions to be completed by Feb. 11, 2014**

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<tr>
<th>Status</th>
<th>Description</th>
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<tbody>
<tr>
<td>Completed</td>
<td>Iran facilitated IAEA access to the Gchine uranium mine on January 29, 2014</td>
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<tr>
<td>Completed</td>
<td>The IAEA visited the Heavy Water Production Plant at the Arak site on December 8, 2013</td>
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<tr>
<td>Completed</td>
<td>In a February 9 joint statement, the IAEA and Iran announced that Iran completed the actions agreed to on November 11.</td>
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Provide information with regard to the identification of 16 sites designated for the construction of nuclear power plants.

Clarification of the announcement made by Iran regarding additional enrichment facilities.

Further clarification of the announcement made by Iran with respect to laser enrichment technology.

**Iranian Actions to be completed by May 15, 2014**

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<th>Status</th>
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<tr>
<td>Completed</td>
<td>An IAEA team was provided access to the Saghand mine in Yazd during their May 5-6 visit to Iran.</td>
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<tr>
<td>Completed</td>
<td>An IAEA team was provided access to the Ardakan concentration plant during their May 6 visit to Iran.</td>
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<tr>
<td>Completed</td>
<td>In its March 20 report on the Joint Plan of Action, the IAEA noted that Iran completed an updated DIQ for the IR-40 Heavy Water Reactor at Arak.</td>
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<tr>
<td>Completed</td>
<td>Iran and the IAEA agreed to the conclusion of a Safeguards agreement.</td>
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Approach for the IR 40 Reactor.

Providing mutually agreed relevant information and arranging for a technical visit to Lashkar Ab’ad Laser Centre.

Providing information on source material, which has not reached the composition and purity suitable for fuel fabrication or for being isotopically enriched, including imports of such material and on Iran’s extraction of uranium from phosphates.

Providing information and explanations for the Agency to assess Iran’s stated need or application for the development of Exploding Bridge Wire detonators.

**Iranian Actions to be completed by Aug. 25, 2014**

Exchanging information with the Agency with respect to the allegations related to the initiation of high explosives, including the conduct of large scale high explosives experimentation in Iran.

Providing mutually agreed relevant information and explanations related to studies made and/or papers published in Iran in relation to neutron transport and associated modeling and calculations and their alleged application to compressed materials.

Providing mutually agreed information and arranging a technical visit to a centrifuge research and development centre.

Providing mutually agreed information and managed access to centrifuge assembly workshops, centrifuge rotor production workshops, and storage facilities.

Concluding the safeguards approach for the IR-40 reactor.

**Status**

**Completed.** The agency was able to visit the center on March 12.

**Completed.** Iran provided this information to the IAEA in an April 29 letter.

**Completed.** Iran provided the IAEA with information on the detonators at a meeting on April 26 and in subsequent letters on April 30 and an additional May 20 meeting.

Providing mutually agreed relevant information and explanations related to studies made and/or papers published in Iran in relation to neutron transport and associated modeling and calculations and their alleged application to compressed materials.

Providing mutually agreed information and arranging a technical visit to a centrifuge research and development centre.

Providing mutually agreed information and managed access to centrifuge assembly workshops, centrifuge rotor production workshops, and storage facilities.

Concluding the safeguards approach for the IR-40 reactor.

Source URL: https://www.armscontrol.org/factsheets/iaea-investigations-irans-nuclear-activities