

Iran's Nuclear Steps and the New IAEA Chief

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Brief Analysis

The steady weakening by Tehran of its international nuclear commitments will be the most immediate challenge for the next head of the world's nuclear watchdog.

On October 29, board members of the International Atomic Energy Agency (IAEA), meeting in Vienna, made their choice for the next director-general, replacing Yukiya Amano of Japan, who died in July after a long illness. The winning candidate, who still has to be approved by the full membership, is Rafael Mariano Grossi of Argentina, who secured the necessary two-thirds majority in the third ballot. His competition was acting director-general Cornel Feruta of Romania. Both are very experienced in nuclear diplomacy, but the *Wall Street Journal* reported Feruta had wanted to continue the deliberate, careful approach of Amano, while Grossi prefers to shake up the agency, including a “firm but fair” approach to Iran.

Tehran's Plans

The challenge of Iran is both technical and diplomatic. The IAEA is charged with monitoring the country's adherence to the 2015 Joint Comprehensive Plan of Action (JCPOA), by which the Islamic Republic agreed with the United States, Russia, China, Britain, France, and Germany to an arrangement that “will ensure that Iran's

nuclear program will be exclusively peaceful.” But, citing the JCPOA’s inadequacies, the Trump administration withdrew in May 2018. Then, earlier this year, Israel announced that it had discovered and stolen part of Iran’s archive indicating that its nuclear weapons ambitions, to which Tehran had never admitted, were much larger and more advanced than previously appreciated.

Since May 2019, Tehran has announced a series of steps to reduce its JCPOA commitments, claiming justification because of U.S. hostility, growing sanctions, particularly on its oil exports, and the lifting of nuclear-related waivers. Iran has promised to continue reducing its commitments at sixty-day intervals if sanctions are not eased:

- On May 8, Iran announced it would no longer be committed to a 300-kilogram cap on its stockpile of uranium hexafluoride (UF₆) enriched to 3.67 percent in the crucial isotope U-235. (Normal uranium contains 0.7 percent of U-235. UF₆, or “hex,” is—as a gas—the feedstock for centrifuges, although it is a solid at room temperature.)
- On July 7, Iran started to enrich uranium beyond 3.67 percent to 4.5 percent. (Enrichment to more than 90 percent is needed for a nuclear weapon.)
- On September 6, Iran’s president, Hassan Rouhani, announced that his country was canceling its commitment to a timetable for resumption of unrestricted nuclear research and development. Shortly afterward, it began installing more advanced centrifuges than allowed under the JCPOA, potentially shortening the time to produce enough high-enriched uranium (HEU) needed for a nuclear weapon. (The usual figure given for the amount of such nuclear explosive material needed is 25 kilograms—about 55 pounds—and roughly the size of a grapefruit.)
- The next, fourth, step is expected to be announced in the first week of November.

Parallel to these changes, leading Iranian officials have been suggesting loudly the steps that could come next. These include increasing the number of centrifuges in operation beyond the JCPOA limit of 5,060, by reopening for nuclear use the deep-in-a-mountain Fordow enrichment facility, which under the JCPOA was to be repurposed for nonnuclear research. Comments have also touched on the Arak heavy-water reactor, which is of concern because its original design is favorable to the production of plutonium, another potential nuclear explosive. President Rouhani said in October that work was being done on two previously undisclosed centrifuge designs, the IR-7 and IR-9. The enrichment process can be shortened using higher-speed and taller centrifuges, but this requires them to be made of tougher material, such as high-strength special steel or carbon fiber.

Of probable greatest concern to the incoming IAEA director-general will have been speculative Iranian commentary that the fourth step may include reducing access to the international agency by cutting Iran’s implementation of safeguard agreements to which it has previously committed. These currently allow the IAEA to inspect Iran, as well as other countries, using a combination of visiting specialists and remote-controlled monitors, and to report on all its nuclear work, in particular the production of enriched uranium.

Apprehensions over Iran’s enriched uranium stockpiles were heightened by a comment from Supreme Leader Ali Khamenei on October 9, when, according to the BBC, he said on a video clip published on his official Twitter account: “Developing and storing [nuclear bombs] is wrong because using them is haram [forbidden by Islamic law].” Experts on proliferation, who have indicated Iranian officials should be monitored as much for what they don’t as what they do say, noted that this phrasing does not restrict accumulating nuclear explosive material.

Procurement Worries

Illicit procurement remains of particular concern for the international community. Since 2015, each quarterly IAEA report on Iran has noted the country’s compliance with its obligations, but in July 2019 three Iranians were charged in New York with trying to illegally export “many tons” of carbon fiber, a material that can be used in missile nose cones as well as some types of enrichment centrifuges. One of the Iranians, extradited from Germany, is in detention; the other two are at large. In 2018, the United States and the United Arab Emirates separately reported

instances of the export to Iran of “dual-use items” that have a potential nuclear purpose. The U.S.-reported shipment included carbon fiber.

Little mentioned is the possible role of foreign experts in helping Iran acquire—and use—material and equipment. Both Pakistan, from which Iran received enrichment technology in the past, and Iraq at the end of Saddam Hussein’s rule, benefited considerably from foreign assistance by individuals and, in Pakistan’s case, also China. The IAEA is neither a spy organization nor a police force. While maintaining full access inside Iran for inspectors is important, a crucial role remains for customs and the intelligence agents overseas.

Also of interest, traces of uranium were found recently at a carpet-cleaning facility in Iran, which had not been declared to the IAEA as being nuclear-related. In September, while in Tehran for meetings, acting IAEA head Feruta pushed Iran to improve its cooperation with his organization. “Time is of the essence,” he said at a news conference, adding that he thought “this was a message very well understood.” Details of the issue in question were deemed confidential, but a “very general description” was given later to diplomats attached to the IAEA. An agency spokesman also told journalists that Iran was making modifications to groups of centrifuges, known as cascades, of a size and type scrapped under the JCPOA. Specifically, the modifications involved 164 machine cascades of the IR-2m and IR-4 centrifuge types. Such cascades are used for enriching from 0.7 percent U-235 to 3 percent, and from 3 percent to 20 percent. This higher 20 percent figure is worrisome because getting from this level to bomb-grade material is theoretically comparatively easy.

Seeking Clarity on a Complex Topic

The technical nature of the discussion probably plays to Iran’s advantage because announced changes to Iranian commitments, joined by speculation about next steps, produce headlines without context. Some perspective follows here:

- 5,000 kilograms of natural uranium is needed to produce the 25 kilograms of 90-percent-enriched uranium required for one atomic bomb of the comparatively old-fashioned weapon design Iran is assumed to have.
- About 5,000 centrifuges of Iran’s IR-1 type would take about a year—the so-called breakout time—to produce the amount of HEU needed for a bomb. About 1,000 centrifuges of its IR-2m model would be needed for the same result—although for technical reasons, the IR-1 cannot produce HEU, and Iran may not be able to make the IR-2m work properly, either. Further, more “advanced” designs may not work efficiently or may take years to develop.

Yet there is little room for complacency. Iran’s continuing centrifuge use and research allow it to build experience and knowledge. And the nuclear archive taken by Israel shows that Iran had done considerable work on designing an implosion weapon, in which an HEU core is squeezed into a critical mass, creating an explosive chain reaction of the size that devastated the Japanese cities of Hiroshima and Nagasaki in 1945.

Put simply, any further departure by Iran from the JCPOA terms should be viewed with great concern, especially because of Tehran’s recent dangerous behavior, albeit denied, in the Gulf area, including the placing of limpet mines on tankers starting in May and particularly the drone attacks on Saudi Arabia’s Abqaiq oil-processing facility in September. This is the wider diplomatic environment that awaits the incoming IAEA director-general and his reported firmer approach to the Iran issue.

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