



The IAEA's Iran NPT Safeguards Report - March 2022

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March 8, 2022

“These activities and the nuclear material used therein [...] were not declared by Iran to the Agency as required under the Safeguards Agreement.”

-International Atomic Energy Agency (IAEA) Director General Rafael M. Grossi

This analysis summarizes and assesses information in the latest IAEA's periodic safeguards report, *NPT (Nuclear Non-Proliferation Treaty) Safeguards Agreement with the Islamic Republic of Iran*, the most recent of which was issued on March 5, 2022. The analysis also provides background information on the former Iranian nuclear weapon sites under IAEA investigation.

In an important conclusion, the IAEA reports that Iran violated its safeguards agreement by possessing and processing uranium metal at Lavizan-Shian, a site known as Location 2 in previous IAEA NPT compliance reports (see below). The IAEA report also states that inspectors have no additional questions and this issue “could be considered as no longer outstanding at this stage.” However, this statement should not be misinterpreted as permanently letting Iran off the hook over Lavizan and undeclared uranium metal; the fundamental finding is that there was a safeguards violation at Lavizan-Shian. The lack of additional IAEA follow-up likely reflects the difficulty of dealing with Iranian non-cooperation and dissembling actions about its past and possibly on-going nuclear weapons program. More than likely, this issue or an equivalent one will come up again.

This report also includes a joint statement between the IAEA and Iran's Atomic Energy Organization (AEOI) aimed at resolving outstanding issues related to three additional Iranian sites where the IAEA found man-made uranium particles and over which the agency has faced Iranian stonewalling since the investigation began in 2019. In a marked difference from the workplan leading up to the implementation of the Joint Comprehensive Plan of Action (JCPOA), this statement does not commit the IAEA to “close” its investigation or satisfy itself with a series of joint meetings and false Iranian statements or declarations.

Given that the IAEA has already said that Iran violated its safeguards commitments at Lavizan-Shian, it is likely that Iran is continuing with its fiction that it never had a nuclear weapons program—hardly an optimistic start to a difficult joint process.

Missing from this report is a timetable for the IAEA to reach a broader conclusion or verify that Iran's nuclear declaration is complete. As such, the joint statement represents a step, even a minimal step, toward a determination over whether Iran's nuclear program is peaceful. In any nuclear deal, sanctions should not be reduced unless Iran cooperates with the IAEA and fully addresses its concerns. In other words, if Iran continues its deception during the implementation period of a new nuclear deal, a practice it followed during the implementation period of the JCPOA, sanctions should not be reduced.

IAEA/Atomic Energy Organization of Iran (AEOI) Joint Statement

On March 5, following a visit by IAEA Director General Rafael Grossi to Tehran, the IAEA and the AEOI released a Joint Statement to "accelerate and strengthen their cooperation and dialogue aimed at the resolution of [outstanding] issues."¹ The agreement aims to resolve by the June 2022 Board of Governors meeting the IAEA's remaining questions about three undeclared Iranian sites where it found man-made uranium in 2019 and 2020. Tehran has stonewalled the IAEA's probe and has not faced censure from the IAEA Board of Governors for doing so since June 2020.

The board is meeting this week from March 7 to 11. At the same time, Iran, the United States, France, United Kingdom, Germany, Russia, and China, or P5+1, are reportedly near the conclusion of a new nuclear deal, a modification of the JCPOA, which entails lifting many sanctions on Iran. With details on the new deal publicly unavailable, it is not known whether the implementation of the new deal depends on the resolution of the safeguards issues, but it should.

The timeline set by Grossi suggests that needed information will be available in time for the United States and its partners to review the IAEA's conclusion before the end of an implementation period. A deadline for Iran to respond with "written explanations including supporting documents to the questions raised by the IAEA" is set for March 20, 2022. This deadline should provide a first important indication on whether Iran is cooperating or not. According to the Joint Statement, the IAEA will review the material and, within two weeks, "submit to the AEOI any questions on received information." Within one week after the IAEA has submitted its questions, the IAEA and AEOI will meet in Tehran to address the questions and will hold separate meetings on each site. The director general will report his conclusion by the June 2022 Board of Governors meeting.

While Grossi has not directly stated that there can only be a nuclear deal if the safeguards issues are resolved, during a recent press conference he stated, "if clarification of very important safeguards issues were to fail," it would be "difficult to imagine that you can have a

¹ "Joint Statement by HE Mr. Mohammad Eslami, Vice-President and President of the Atomic Energy Organization of Iran, and HE Mr. Rafael Grossi, Director General of the International Atomic Energy Agency," March 5, 2022, <https://www.iaea.org/newscenter/pressreleases/joint-statement-by-he-mr-mohammad-eslami-vice-president-and-president-of-the-atomic-energy-organization-of-iran-and-he-mr-rafael-grossi-director-general-of-the-international-atomic-energy-agency>.

cooperative relationship as if nothing had happened.”² Further, Grossi should be credited for his constant pushback on a possible political resolution of the safeguards issues. He stated, for example, “The safeguards issues will not be resolved politically because I will not go for that.”³

Lastly, as written, the joint statement denies Iran the opportunity to simply “check the boxes” of a scheme without honest cooperation. As Grossi put it, “There is no artificial deadline, there is no predefined outcome, there is no predefined name for what I am going to do.”⁴

Four Locations of Concern⁵

Location 1: Turqz-Abad warehouse

The agency reports no new information or interactions with Iran regarding Location 1, and therefore the safeguards issues relating to the location remain unresolved.

Location 1 is an open-air warehouse in Tehran’s Turqz-Abad district which held cargo containers and other items that purportedly contained nuclear-related equipment and material.⁶ In 2018, the IAEA observed activities consistent with sanitization of the site. Commercial satellite imagery confirms this activity and documents Iran’s earlier, speedy removal of all shipping containers and scraping of the grounds.⁷ The IAEA requested access to the site and took environmental samples in February 2019, nevertheless detecting processed natural uranium particles, potentially produced through undeclared uranium conversion activities. Through additional analysis traces of isotopically altered uranium particles were detected as well, including “low enriched uranium with a detectable presence of U-236, and of slightly depleted uranium.”

The September 2021 IAEA report also included more detail about the containers once present at the site, stating that there were indications the “containers that had been stored at this location had contained nuclear material and/or equipment that had been heavily contaminated by nuclear material. The Agency also assesses[d] that while some of the containers at Location 1

² “Press Conference with IAEA Director General Rafael Mariano Grossi,” March 5, 2022, <https://www.youtube.com/watch?v=HI7tH5ZR5LM>.

³ “Press Conference with IAEA Director General Rafael Mariano Grossi,” March 5, 2022.

⁴ “Press Conference with IAEA Director General Rafael Mariano Grossi,” March 5, 2022.

⁵ For fuller descriptions of these four locations and their relationship to today, see David Albright with Sarah Burkhard and the Good ISIS Team, *Iran’s Perilous Pursuit of Nuclear Weapons* (Washington, D.C.: Institute for Science and International Security Press, 2021).

⁶ John Irish and Arshad Mohammed, “Netanyahu, in U.N. Speech, Claims Secret Iranian Nuclear Site,” *Reuters*, September 27, 2018, <https://www.reuters.com/article/us-un-assembly-israel-iran/netanyahu-in-un-speech-claims-secret-iranian-nuclear-site-idUSKCN1M72FZ>.

⁷ David Albright, Sarah Burkhard, Olli Heinonen, and Frank Pabian, “Presence of Undeclared Natural Uranium at the Turqz-Abad Nuclear Weaponization Storage Location,” *Institute for Science and International Security*, November 20, 2019, <https://isis-online.org/isis-reports/detail/presence-of-undeclared-natural-uranium-at-the-turqz-abad-nuclear-weaponiza>.

were dismantled, others were removed from the location intact in 2018 and moved to an unknown location.” This finding is confirmed by available commercial satellite imagery.

Location 2: Lavizan-Shian

The IAEA newly reports that the use and processing of uranium metal and related activities at Lavizan-Shian were undeclared and constituted a violation of Iran’s safeguards agreement. The report states, “activities and the nuclear material used therein at Location 2 were not declared by Iran to the Agency as required under the Safeguards Agreement.” Specifically, the IAEA assesses that “in 2003 at Location 2, at least one natural uranium metal disc, out of ten such discs available (totalling approximately 10 kg), underwent drilling to produce metallic flakes. These flakes were subsequently subjected to chemical processing on at least two occasions at the same location.”

While the IAEA has been unable to find the uranium metal, and has apparently stopped looking for it, at least for the time being, the safeguards violation seems certain. The IAEA added that it has “no additional questions on the issue related to Location 2” at this time. Its conclusion from a recent inventory verification at the Jabr Ibn Hayan Multipurpose Laboratory (JHL) at the Tehran Nuclear Research Center, is that “it could not exclude that the disc had been melted, re-cast, and may now be part of the declared nuclear material inventory.” The IAEA reported that “this issue could be considered as no longer outstanding *at this stage*.” [emphasis added]

This statement should not be seen as giving Iran a pass on the activities at Lavizan-Shian, more as an indication of it giving up trying to determine the fate of the discs in question, likely a result of on-going Iranian non-cooperation. The operative conclusion is that Iran’s use and processing of this disc violated its safeguards obligation under its comprehensive safeguards agreement (CSA).

What was Lavizan-Shian? Lavizan-Shian was a former headquarters of Iran’s nuclear weapons program and a key site during the Amad Plan, Tehran’s crash nuclear weapons program to build five nuclear weapons in the early 2000s.⁸ Iran razed the site in 2003 and 2004 as the IAEA’s investigation into its covert nuclear program intensified (see figure 1).⁹

⁸ *Iran’s Perilous Pursuit of Nuclear Weapons*.

⁹ David Albright, Paul Brannan, and Andrea Stricker, “The Physics Research Center and Iran’s Parallel Military Nuclear Program,” *Institute for Science and International Security*, February 23, 2012, https://isis-online.org/uploads/isis-reports/documents/PHRC_report_23February2012.pdf. See also: *Iran’s Perilous Pursuit of Nuclear Weapons*.

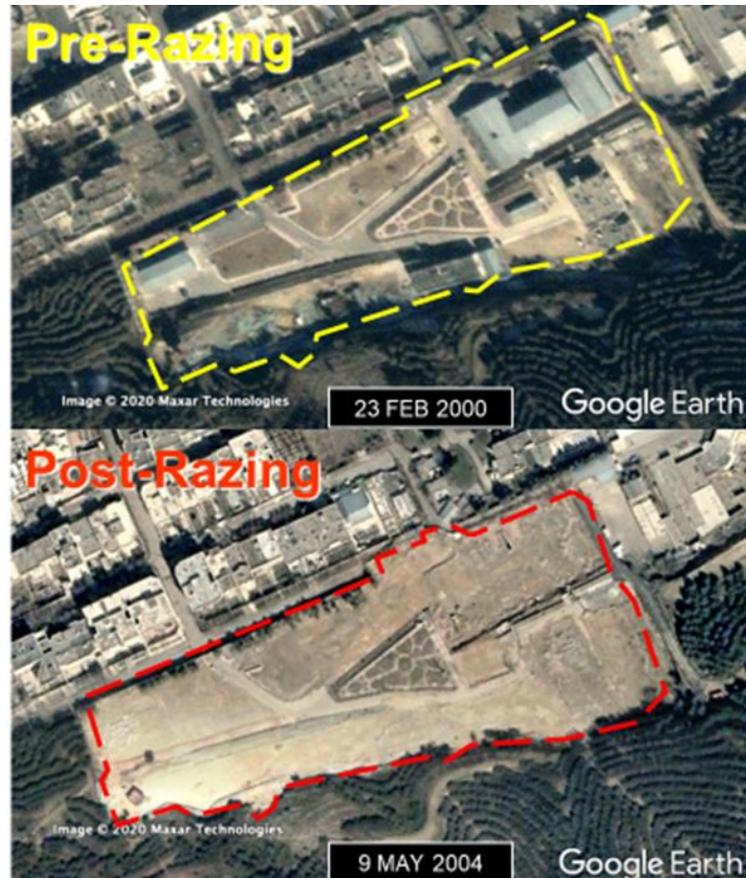


Figure 1. Before and after pictures from 2000 (above) and 2004 (below) show the extent of razing and sanitization that took place at Lavizan-Shian.

The metal disc at Lavizan was apparently part of Iran’s nuclear weapons-related work, detailed in Iran’s Nuclear Archive. Among the files was information about Iran’s work on producing uranium deuteride (UD_3) for a neutron initiator used in nuclear weapons. The information detailed procedures Tehran used to make uranium deuteride, including drilling into a piece of uranium metal.¹⁰ The IAEA’s assessment of the metal flakes undergoing chemical processing stops short of specifying the achieved or intended chemical product, but is consistent with the production of uranium deuteride.

Further, in reference to this site, the IAEA stated in its June 5, 2020 report that the uranium metal disc had “indications of it undergoing drilling and hydriding.”¹¹ The statement about “drilling and hydriding” more directly refers to the production of uranium deuteride.¹²

¹⁰ “Neutron Source: Iran’s Uranium Deuteride Neutron Initiator,” *Institute for Science and International Security*, May 13, 2019, <https://isis-online.org/isis-reports/detail/neutron-source-irans-uranium-deuteride-neutron-initiator-1/>.

¹¹ IAEA Director General, Verification and Monitoring in the Islamic Republic of Iran in Light of United Nations Security Council resolution 2231 (2015), GOV/2020/26, June 5, 2020, https://isis-online.org/uploads/iaea-reports/documents/IAEA_Iran_Quarterly_Safeguards_Report_June_2020_.pdf.

¹² “Neutron Source: Iran’s Uranium Deuteride Neutron Initiator.”

The production of UD_3 typically involves producing uranium metal chips or shavings from a solid uranium metal piece and combining them under controlled temperatures and pressures with deuterium gas. Iran's Nuclear Archive contains an image of equipment in a glove box producing the uranium metal flakes (see figure 2); other documents in the archive describe a step-by-step effort to produce UD_3 , including practicing its synthesis with surrogate materials. The testing of a UD_3 neutron initiator is also extensively discussed in the Nuclear Archive, incidentally helping explain the IAEA's detection in 2015 of uranium from environmental sampling done at the Parchin high explosive chamber in 2015, despite Iran's extensive sanitization.¹³

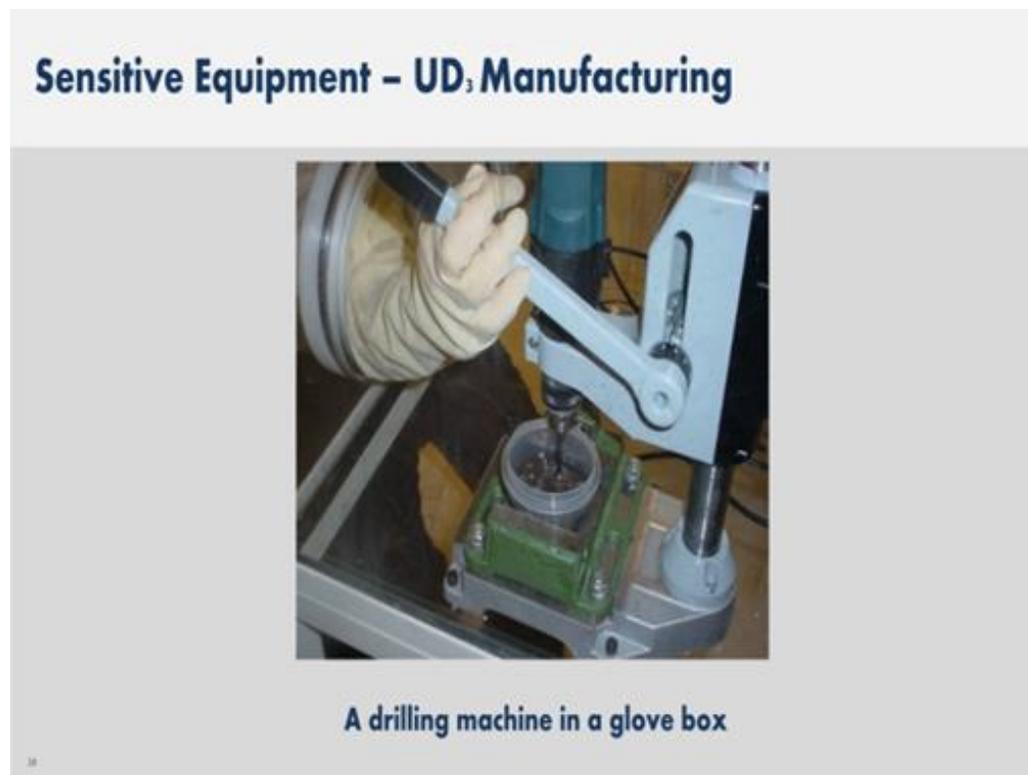


Figure 2. A photo from Iran's Nuclear Archive, obtained by the media and shared with the Institute, shows a glove box containing a drilling machine, with what appears to be a black object that is likely the uranium metal disc at issue at Lavizan-Shian.

Under the Amad Plan, the production of uranium deuteride had a codename, Project 3.20. When the Amad Plan was downsized and reconstituted as a smaller, more disguised effort in late 2003 and early 2004, Project 3.20 was to be closed, but a few of the project staff needed to make the "Source," a codeword for the uranium deuteride neutron initiator, were slated to continue their activities.¹⁴

¹³ David Albright, Sarah Burkhard, Olli Heinonen, and Frank Pabian, "New Information about the Parchin Site: What the Atomic Archive Reveals About Iran's Past Nuclear Weapons Related High Explosive Work at the Parchin High Explosive Test Site," *Institute for Science and International Security*, October 23, 2018, <http://isis-online.org/isis-reports/detail/new-information-about-the-parchin-site>.

¹⁴ Memorandum, Statement of Mohsen Fakhri-zadeh, October 25, 2003. From Nuclear Archive. See *Iran's Perilous Pursuit of Nuclear Weapons*.

Evidence of post-2003 Iranian work on UD₃ and neutron initiators includes an Iranian document that surfaced in 2009. The document, dated to 2007, discusses that although work on neutron sources made progress in the past, it was reduced in scale, leading to a decision to increase that work starting in about 2007, including continuing ongoing work on the production and testing of a UD₃ initiator.¹⁵

The IAEA should further explain the safeguards violations at Lavizan, and what it means for the IAEA's ability to determine if the nature of Iran's nuclear program is peaceful. Additional follow-up questions include what happened to the equipment used for the making and chemically processing of uranium metal flakes and the status and purpose of neutron initiator activities conducted after 2003.

Location 3: Tehran Plant

The agency reports no new information regarding Location 3, and therefore the safeguards issues relating to the location remain unresolved.

Location 3 is identified in Iran's nuclear archive as the Tehran Plant, a secret former pilot uranium conversion plant under the Amad Plan.¹⁶ The IAEA corroborated archive evidence that Iran may have used the site for "possible use or storage of nuclear material and/or conducting of nuclear-related activities, including research and development activities related to the nuclear fuel cycle. This location may have been used for the processing and conversion of uranium ore, including fluorination, in 2003," the IAEA added. Iran demolished the site in 2004.

The IAEA originally asked for access to the site in January 2020, but Iran refused until August 2020. The IAEA took environmental samples, indicating the presence of undeclared man-made uranium particles.

In its September 2021 report, the IAEA reported additional information, including that Iran removed containers from the site in 2004 and that "there are indications, supported by the results of the environmental samples analysis, that containers moved from Location 3 were subsequently also present at Location 1 [Turquz-Abad]." It further reported that the results of the samples from Location 3 "would not explain all of the particles identified by the analytical results of the environmental samples taken at Location 1." This finding is in line with

¹⁵ "New Document Reopens Question on Whether Iran's Nuclear Weaponization Work Continued Past 2003," *Institute for Science and International Security*, December 14, 2009, <https://isis-online.org/isis-reports/detail/new-document-reopens-question-on-whether-irans-nuclear-weaponization-work-c/8>; Farsi and English versions of the document are available at: <http://isis-online.org/isis-reports/detail/farsi-and-english-versions-of-document-on-neutron-initiator/>.

¹⁶ *Iran's Perilous Pursuit of Nuclear Weapons*, Chapters 8 and 12; and David Albright, Sarah Burkhard, and Frank Pabian, "The Amad Plan Pilot Uranium Conversion Site, Which Iran Denies Ever Existed," *Institute for Science and International Security*, November 9, 2020, <https://isis-online.org/isis-reports/detail/the-amad-plan-pilot-uranium-conversion-site/8>.

assessments that Location 1 was a storage location for a wide variety of equipment related to Iran's undeclared nuclear activities.

Location 4: Marivan Site

The IAEA reports no new information regarding Location 4, and therefore the safeguards issues relating to the location remain unresolved. Location 4 is the formerly secret Marivan site, near Abadeh, another Amad Plan facility identified in the Nuclear Archive.¹⁷ The IAEA noted in its previous reports that Location 4 “consists of two proximate areas where the Agency found indications that Iran had, in 2003, planned to use and store nuclear material.” In one area, “where outdoor, conventional explosive testing may have taken place,” the agency found “indications relating to the testing of shielding in preparation for the use of neutron detectors in that same area.” In the second area, from July 2019 onwards, “the Agency observed via commercial satellite imagery, activities consistent with efforts to sanitize the area, including the demolition of buildings.”

The IAEA attempted to engage Iran regarding Location 4 in September 2021, providing Iran with “graphics based on commercially available satellite imagery that illustrated the activities identified by the Agency as inconsistent with Iran’s statement that there had been no activity at this location between 1994 and 2018.” In a reply, Iran stated, “‘only the mining activities, which were main activities at this location, have been stopped during the said period’ and that the activities observed at the location had involved guards ‘to secure the properties at location.’”

According to the September 2021 IAEA report on Iran, the IAEA stated it would contact another member state to seek “clarification and confirmation” in response to information provided by Iran that “included a reference to activities conducted at Location 4 in the past by an organization from another Member State.” The member state responded that “the information provided by Iran had contained ‘no information indicating a link’ between the cooperation provided by the aforementioned organization in Iran, mentioned in the supporting documentation provided by Iran, ‘and the anthropogenic uranium particles found by the Agency.’”

Along with the Tehran site, the IAEA sought access to Marivan in January 2020, but Iran refused. Iran finally granted access in August 2020, and the IAEA took environmental samples that revealed the presence of uranium particles. A recent Institute assessment of satellite imagery of the site found that Iran appears to have conducted further demolition activities following the IAEA’s visit, possibly to stymie future verification activities.¹⁸

¹⁷ David Albright, Sarah Burkhard, and Frank Pabian, “Abadeh is Marivan: A Key, Former Secret Nuclear Weapons Development Test Site,” *Institute for Science and International Security*, November 18, 2020, <https://isis-online.org/isis-reports/detail/abadeh-is-marivan-irans-former-secret-nuclear-weapons-development-test-site>

¹⁸ David Albright and Sarah Burkhard, “More Demolition at the Marivan Former Nuclear Weapons Development Site,” *Institute for Science and International Security*, March 1, 2022, <https://isis-online.org/isis-reports/detail/more-demolition-at-the-marivan-former-nuclear-weapons-development-site>.

The IAEA reported in its September 2021 report that in addition to explaining the presence of uranium, Iran must also provide answers regarding “the source of the neutrons that the neutron detectors were to measure” at Location 4. Iran has only provided unsubstantiated information about activities at Location 4, which the IAEA has dismissed.

The likely source of the neutrons was likely to have been a neutron initiator placed at the center of a nuclear weapons high explosive system lacking its fissile material. When the system is detonated, the inward compression from the high explosive would squeeze the surrogate core with the neutron initiator at its center, creating fusion of the deuterium, resulting in a spurt of neutrons. If the core contained fissile material, or weapon-grade uranium in the Iranian design, the neutrons would have started the chain reaction and the nuclear explosion. This type of test is done near the end of a nuclear weapons development program and is often called a “cold test.”

Modified Code 3.1

The IAEA reports no new progress on Iran’s pledge to work toward a solution over its unilateral decision to stop implementing Modified Code 3.1 of the subsidiary arrangements to its CSA. Iran informed the IAEA in February 2021 that it had stopped the implementation of Modified Code 3.1, which entails notifying the IAEA as soon as a decision is taken to build a new nuclear facility.

The IAEA again reminded Iran that modified Code 3.1 is a legal obligation that “cannot be modified unilaterally and that there is no mechanism in the Safeguards Agreement for the suspension of implementation of provisions agreed to in the Subsidiary Arrangements.” The IAEA reports that “Iran has informed the Agency that it does not have a plan to construct a new nuclear facility in the near future and also informed the Agency of its readiness to work with the Agency to find a mutually acceptable solution to address the issue.”

Iran’s Harassment of Inspectors

The IAEA also reports that during this reporting period, “there have been no instances of inappropriate action by Iranian security personnel,” which in the past involved Iran physically harassing or attempting to intimidate agency inspectors upon entry to nuclear facilities. Nonetheless, Iran has not replied to an IAEA letter from November 2021 advising it that these security procedures violated the “Agreement on the Privileges and Immunities of the IAEA, to which Iran is a party, and that their implementation prevents Agency inspectors from effectively discharging their functions as provided for under the Safeguards Agreement.”