Institute for Science and International Security

Report

Post-Attack Assessment of the First 12 Days of Israeli Strikes on Iranian Nuclear Facilities

June 24, 2025

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Israel's historic Operation Rising Lion has targeted many Iranian nuclear sites, causing massive damage to its nuclear program and setting it back significantly. After 12 days of military operations, a survey of the resulting damage is appropriate. The Institute has obtained high-resolution commercial satellite imagery of the principal nuclear sites, including the Natanz Nuclear Complex, Fordow site, the Esfahan (Isfahan) Nuclear Complex, Lavisan 2 (also known has the Mojdeh Site, the former location of the SPND HQ and other facilities), the new SPND HQ, TABA/TESA Karaj Centrifuge Manufacturing Site, the IR-40 Arak Heavy Water Reactor and Heavy Water (D_20) Production Plant, and Sanjarian (a former AMAD site that had recently shown signs of reactivation). The imagery shows various levels of damage and/or destruction at each site. This analysis is enriched by reporting from the International Atomic Energy Agency and the IDF, and by information in the Institute's archive on Iran.

The attacks can be divided into two basic categories, those against Iran's ability to make weapon-grade uranium (or plutonium) and those aimed at making the nuclear weapon itself utilizing weapon-grade uranium.

Overall, Israel's and U.S. attacks have effectively destroyed Iran's centrifuge enrichment program. It will be a long time before Iran comes anywhere near the capability it had before the attack. That being said, there are residuals such as stocks of 60 percent, 20 percent, and 3-5 percent enriched uranium and the centrifuges manufactured but not yet installed at Natanz or Fordow. These non-destroyed parts pose a threat as they can be used in the future to produce weapon-grade uranium.

Complicating any effort to turn weapon-grade uranium into nuclear explosives have been extensive attacks against Iran's facilities and personnel to make the nuclear weapon itself. Its

infrastructure to build the nuclear weapon has been severely damaged. The time Iran would need to build even a non-missile deliverable nuclear weapon has increased significantly.

In particular, major setbacks include: the elimination of, or severe damage to, the majority of the centrifuges at the Natanz site, significant damage to the Fordow underground site, destruction and damage to several facilities at the Esfahan Nuclear Complex, including one used in the conversion of enriched uranium to uranium metal and another that converts natural uranium into uranium hexafluoride. Related, the attack on the IR-40 Arak Heavy Water Reactor has likely destroyed the reactor, eliminating a potential future source of plutonium that could be used in nuclear weapons. In addition, several sites involved in past and more recent nuclear weapon efforts have been destroyed. Not all nuclear sites have been attacked, and further damage assessments are needed for some of the sites, particularly underground sites.

Israeli intelligence would be expected to be hunting in Iran, even under the ceasefire, for non-destroyed residuals such as nuclear materials, centrifuges, and nuclear weapon manufacturing capabilities. Any U.S. agreement with Iran should address these residuals by negotiating an end to Iran's enrichment program, as President Trump has stated, in a verifiable manner. As part of that deal, Iran must also give up its enriched uranium stocks and destroy its remaining centrifuges. The IAEA can verify this. An agreement should also require Iran to dismantle its capabilities to make nuclear weapons. The IAEA can verify all this as well. Any agreement should be cast as a ceasefire agreement; violations can lead to prompt Israeli attacks and in rare cases U.S. response. The current cease-fire announced by President Trump on June 23 serves as an opportunity to start these negotiations while Iran is weakened and battered by Israeli and American strikes and the potential threat of future attacks if need be.

It should be noted that this report does not address the nuclear scientists killed during Israel's attack. Many of these scientists were affiliated with SPND (officially known as the Organization of Defensive Innovation and Research) and the centrifuge program. Nonetheless, their loss disrupted Iran's ability to build nuclear weapons in the short term.

Major Nuclear or Nuclear Weapon-Related Sites Investigated

Natanz Nuclear Complex

The Natanz complex was Iran's primary uranium enrichment site. Iran had installed over 18,400 centrifuges in an underground hall and about 700 centrifuges in an above ground pilot facility. It was built secretly but publicly revealed in late 2002. The underground halls can be characterized as the "workhorse" of Iran's enrichment program focused on producing less than

5 percent enriched uranium. The above ground pilot plant is Iran's principal centrifuge research and development facility and was also producing 60 percent enriched uranium.

On June 13, the Institute reported on the Israeli strikes to Natanz, highlighting the destruction of the Pilot Fuel Enrichment Plant (PFEP) and the onsite electrical infrastructure.[1] The loss of electrical power is likely to have caused damage to the centrifuges in the underground Fuel Enrichment Plant (FEP). A subsequent review of satellite imagery from June 14, 2025, showed two or three small explosive impact craters on the surface over the FEP halls (see Figure 1), leading to a reassessment that substantially more damage likely occurred in the initial attack to the underground enrichment plant. These small craters are consistent with a type of earth or cavity penetrator designed not to detonate on contact like regular weapons but instead to have a shaped-charge that detonates the effective blast forward and not backward. The weapon also tends to be narrower, unlike the MOP. However, because the damage is underground and unseen in satellite imagery, there were questions, even from Israeli officials, how effective the potentially up to three penetrators were. If centrifuges were physically damaged above and beyond uncontrolled shut-down due to the electrical cut-off, then one would have to say the penetrators were successful.

This assessment is in line with the next day's statement released by the IAEA Director General Rafael Mariano Grossi that "on the same day [of the attack], the main cascade hall appears to have been attacked using ground-penetrating munitions…the strikes on the underground cascade halls were seriously damaging."[2] The IAEA also added that "it is possible that uranium isotopes contained in uranium hexafluoride, uranyl fluoride and hydrogen fluoride are dispersed inside the facility," which would pose a significant hazardous danger to any personnel within the facility or visiting the site. Since the materials are contained, there is no immediate danger to the wider public posed by the attacks.

The site was attacked again early on June 22, 2025, this time by the United States. Satellite imagery shows at least one penetration hole located above the buried enrichment hall caused by a GBU-57 bunker buster (see Figure 2). It is reported by the U.S. Department of Defense that at least two GBU-57's (MOP) attacked the site, possibly in an attack where one followed the

[1] David Albright, Sarah Burkhard, Spencer Faragasso, and the Good ISIS Team, "Post-Attack Analysis of Israel's June 12/13 Military Attack on Iran's Nuclear Program," *Institute for Science and International Security*, June 13, 2025, https://isis-online.org/isis-reports/detail/post-attack-analysis-of-israels-june-12-13-military-attack-on-irans-nuclear.

[2] "IAEA Director General Grossi's Statement to UNSC on Situation in Iran," IAEA, June 20, 2025, https://www.iaea.org/newscenter/statements/iaea-director-general-grossis-statement-to-unsc-on-situation-in-iran-20-june-2025.

other through the same penetration hole in a "double tap" strike.[3] As a result, the site is likely destroyed and knocked out of operation. No damage was observed in satellite imagery of the complex being constructed underneath Mt. Kolang Gaz La.

Figure 1. An image of the Natanz Uranium Enrichment Complex from June 14, 2025, showing the craters caused by explosives dropped by Israel. In the image on the right, three small impact craters are visible.

[3] Matthew Olay, "Hegseth, Caine Laud Success of U.S. Strike on Iran Nuke Sites," United States Department of Defense, June 22, 2025, https://www.defense.gov/News/News-Stories/Article/Article/4222533/hegseth-caine-laud-success-of-us-strike-on-iran-nuke-sites/.

Figure 2. Above is an image of the Natanz Uranium Enrichment Complex from June 22, 2025, showing one large crater from one or two MOPs launched by the United States on June 22 (see a closeup below).

Fordow Enrichment Plant

Fordow enrichment site is a deeply buried uranium enrichment site associated with the production of highly enriched uranium (20 percent uranium 235 or greater), even weapon-grade uranium (greater than 90 percent uranium 235). It was started by the Amad Plan in the early 2000s as a secret place to produce weapon-grade uranium from less than five percent enriched uranium, which in turn was to be produced at the much larger Natanz enrichment plant. The codename of the project was Al Ghadhir.

After the shutdown of the Amad Plan in 2003, construction of this site continued. It was eventually discovered by Western intelligence several years later and revealed in 2009 by Western leaders. Iran promptly declared it as a civil facility dedicated to making low enriched uranium and allowed international inspection. Inspectors who soon after visited the site reported that the internal pipework, equipment, and uranium feed stations were in line with a site to make weapon-grade uranium. On the next visit by inspectors, all the pipework and other equipment associated with weapon-grade uranium production had been removed, with the Iranians giving the excuse that the ceiling needed to be repainted. Iranians were also chipping a larger slot in the rock wall to make room for a bigger uranium feed container consistent with producing low enriched uranium, which requires far larger amounts of uranium feed than that needed to make weapon-grade uranium.

Figure 3 shows an Amad Plan schematic of the layout of the Al Ghadir plant, focusing on the underground part and its orientation on the mountain. Iran has made some modifications of the site, but the tunnel entrances and ventilation shaft could be correlated with satellite imagery (more are available on our website).

In a striking attack in the early morning of June 22, the United States dropped twelve MOPs over the deeply buried enrichment halls. High-resolution satellite imagery taken post attack shows two groups of three penetration holes on the mountain above the enrichment halls (see Figure 4). This set of holes are at the location of the ventilation shaft of the underground complex and at the location of previously identified service-related structures that lay above the cascade hall, enabling easier pathways for the MOPS to the deeply buried halls (see Figure 5). As a result, the facility is likely severely damaged or destroyed.

These Institute generated graphics providing our best estimate of the likely relationship of the surface cratering from 12 GBU-57 MOP bunker buster bombs to the deeply buried underground gas centrifuge complex at Fordow. We were able to orient and scale plot plans captured by

Israel and made available publicly in previous Institute reporting as overlays on Google Earth together with historical imagery and the June 22, 2025, imagery that revealed the post attack cratering. It appears that the bombing was precisely targeted to concentrate on two likely points of vulnerability evident from both the available plot plans and the complex's features observed during construction on historical satellite imagery publicly available on Google Earth. The first point target is what can generally be termed as a ventilation "shaft" but is likely a more elaborate structure, which connects subsurface with a central hallway leading to the two main underground halls shown in the plot plan housing both equipment and centrifuges. The second point target is located on the other side of the mountain ridge. Our overlay indicates that the bombs precisely struck an unknown surface service structure located directly above the south end of the centrifuge cascade hall. This service structure was only visible for a short time in late 2009 during its installation, just prior to being earth covered to conceal its presence. Such point targeting not only completely destroyed that surface structure but was likely intended to focus at depth on the south end of centrifuge cascade hall, which, once breached, would use the hall's long side walls to channel the blast wave through the entire length of centrifuge cascade hall completely destroying all of the installed and otherwise operational centrifuges. Interestingly, the bomb blast waves that would have been generated down the two halls from these two points of attack run perpendicular to one another, further increasing the likelihood of maximum damage and destruction. Figures 5 and 6 show slides from the graphic slideshow and the slide show is available at: https://x.com/TheGoodISIS/status/1937547337917669404.

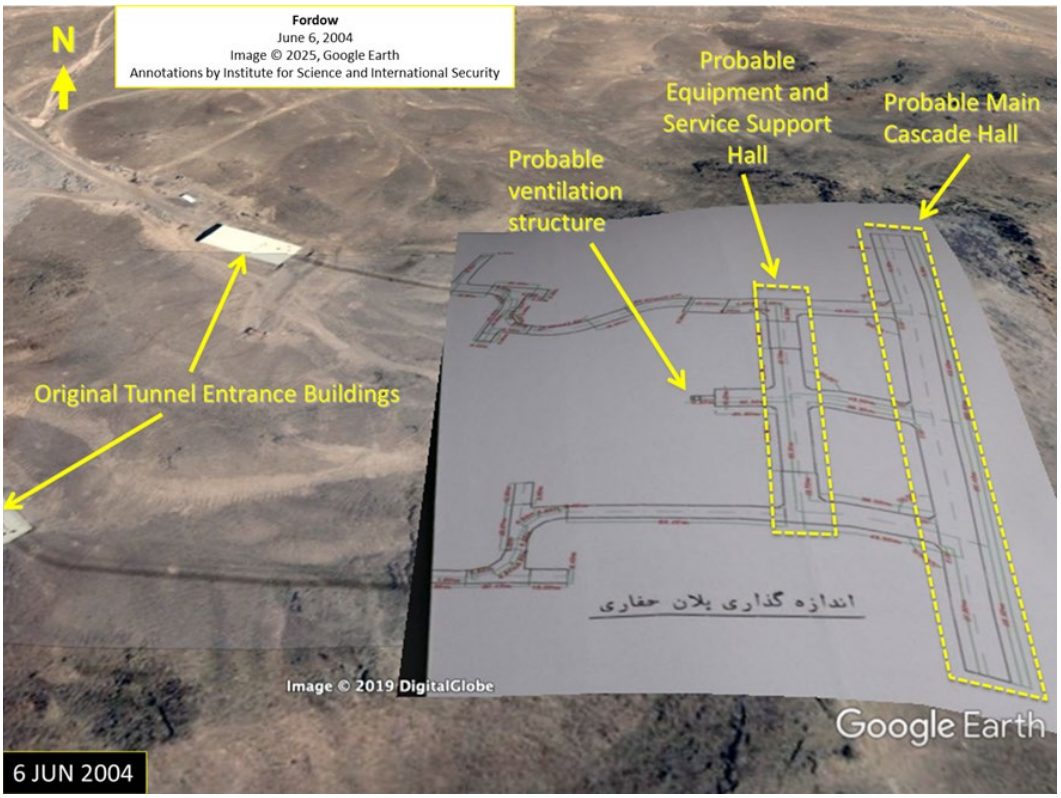
Reports from June 21, just a day prior to the attack, indicate that the Iranians backfilled the tunnel entrances with soil in preparation of a strike.[4] Backfilling the tunnels can serve multiple purposes, such as inhibiting attack from the surface, as well as containing any explosion or preventing the ejection of hazardous materials from the internal complex in the event of an attack.

Before the tunnels were filled, it is possible that the Iranians tried to move the enriched uranium kept at the site. Dismantling and transporting some of the installed centrifuges, or at least their rotor assemblies, may also have occurred, but this process is complex and time consuming and may have damaged centrifuges. A satellite image showing a convoy of trucks lined up outside one of the tunnel entrances has been interpreted as Iran moving such items out of the site. An intriguing alternative interpretation is that Iran believed Fordow was invulnerable and was bringing sensitive items to place inside Fordow for expected protection.

[4] https://x.com/osc_london/status/1936689276969750892?s=46.

In a follow up attack, Israel struck the site on the night of June 22/23 reportedly targeting access routes to the facility, in order to obstruct access to the Fordow site, but as yet we are unable to confirm from imagery available to us.[5]

[5] https://x.com/idf/status/1937102557677072385?s=51&t=VcSgitV4MfFs1Llu-CnjwA.



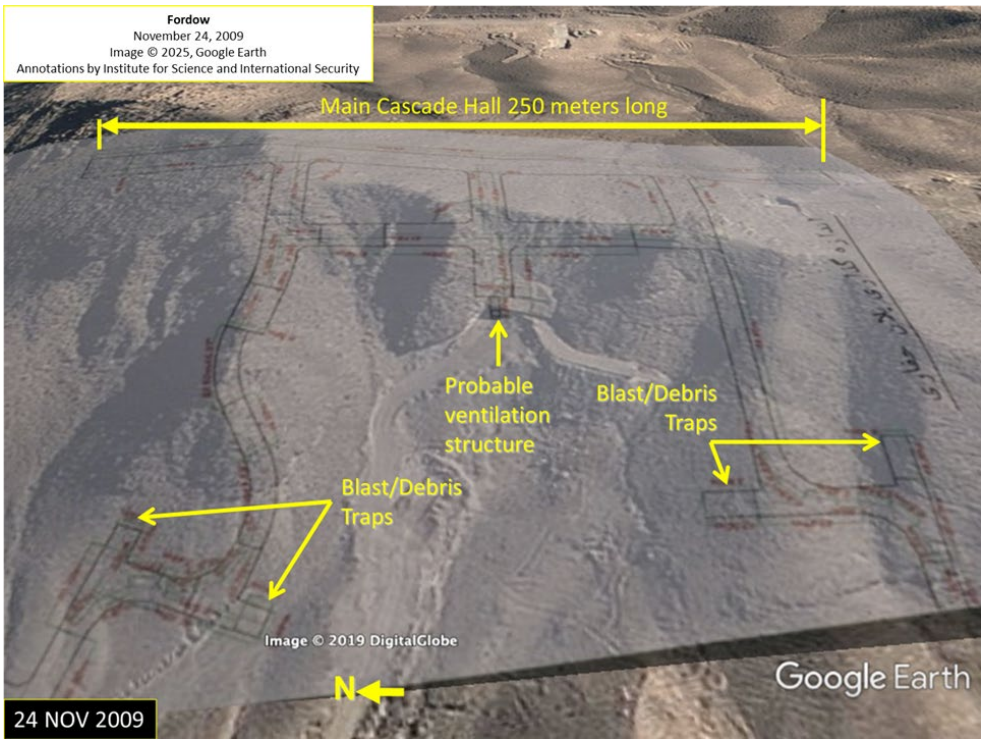


Figure 3. Schematics of the Al Ghadir Project, aka Fordow enrichment site, showing its underground structure, overlayed on satellite images of the mountain and old tunnel entrances.

Figure 4. Above is a commercial satellite image of the Fordow Fuel Enrichment Plant (FFEP) after the United States attacked the site on June 22, 2025. Below is a close-up of the impact craters.

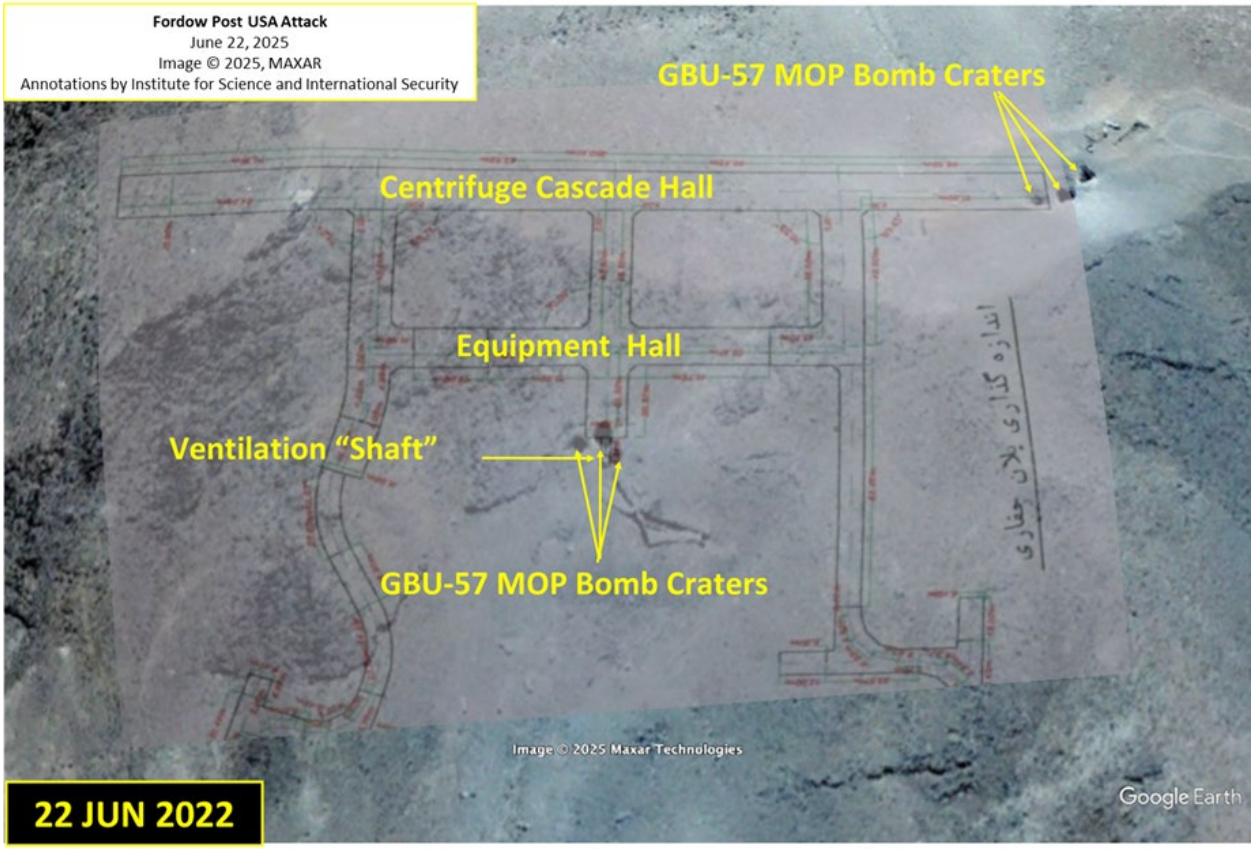


Figure 5. An overlay of the underground Fordow schematic with the MOP holes over the ventilation shaft and end of the centrifuge hall.

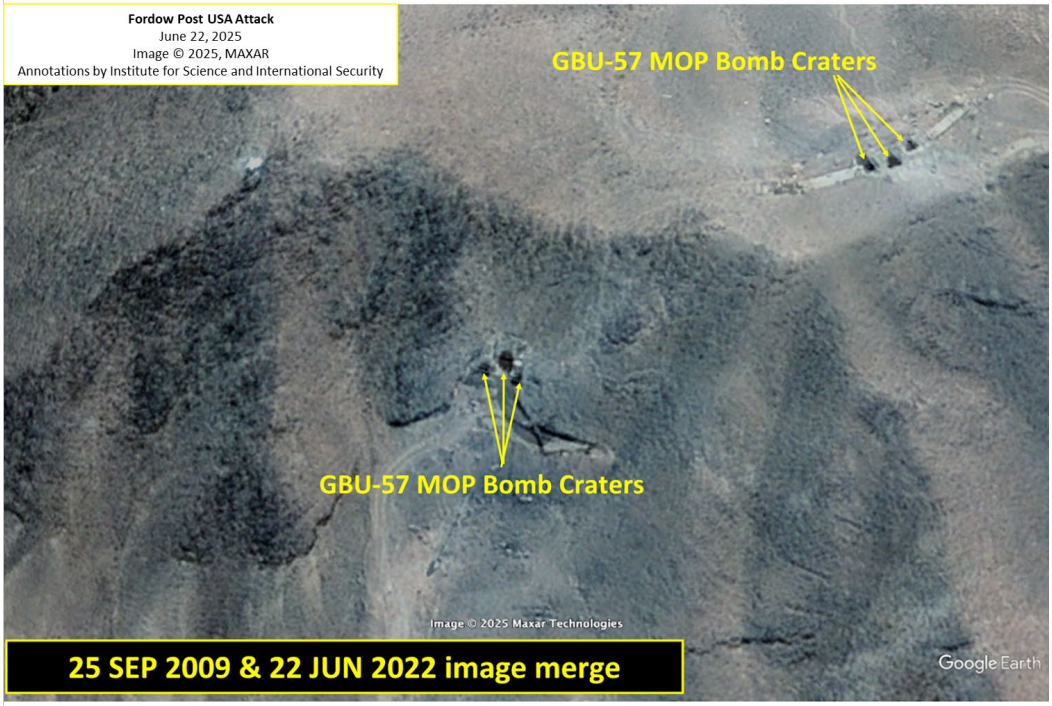


Figure 6. A 2009 image of construction associated with the ventilation shaft (top image). The bottom image is a composite image of the top image with the image showing the location of the MOP entry holes, showing a close fit between the three holes and the ventilation area and additional service-related structures on the surface.

Esfahan Nuclear Complex

The Esfahan Nuclear site is a large site including the Uranium Conversion Facility (UCF) and several other uranium conversion and fuel fabrication facilities, natural and enriched uranium stores, and uranium metal production facilities. It contains the most important parts of making uranium hexafluoride, various forms of uranium oxide, uranium metal, and reactor fuel. As part of fuel fabrication, Iran built a Zirconium Production Plant (ZPP) to make reactor cladding for its reactor fuel. There is also a tunnel complex to the north that is part of the nuclear site built in about 2005 and modifications visible are in 2020/2021. The tunnel complex was originally declared to the IAEA to hold sensitive materials and equipment in case of attack and be able to do small scale conversion work.

The Esfahan complex has been targeted three times, twice by Israel and once by the United States. Extensive damage has been done to the site.

The first attack was on June 14, 2025. Satellite imagery from the day of the strike shows damage to four buildings at the uranium conversion complex; the enriched uranium metal conversion plant was destroyed, a possible Shipping and Receiving Building was severely damaged, the Tehran Reactor Fuel Manufacturing Plant (FPFP) was partially damaged, and the Central Chemical Laboratory was also partially damaged (see Figure 7). No damage was seen to either the Zirconium Production Plant or the underground tunnel complex just north of the main complex. The underground tunnel complex was rumored to hold stockpiles of enriched uranium.

The enriched uranium metal conversion line, which converts uranium tetrafluoride into enriched uranium metal, is a key capability in making weapon-grade uranium cores of nuclear weapons. This line had been tested with 20 percent enriched uranium and could process any 90 percent enriched uranium. Destruction of this facility would cause a bottleneck in any effort by Iran to build nuclear weapons, requiring Iran to build a new clandestine one, if it wanted nuclear weapons, a risky and potentially time-consuming step.

The Tehran Reactor Fuel Manufacturing Plant (aka FPFP) can make natural uranium metal. This facility also stores(ed) 20 percent and 60 percent enriched uranium (EU). In August 2023, it stored 85 percent of Iran's then 20 percent EU and 83 percent of its then 60 percent EU (20 percent: 455 kg out of 536 kg; 60 percent: 101 kg out of 122 kg). It is unknown how much 20 percent and 60 percent enriched uranium was in the building when it was attacked. But the 20 percent stock could be no more than 275 kg, and it was likely less.

The possible Shipping and Receiving Building may have also contained stores of enriched uranium. The proper identification of the purpose of this building remains uncertain.

A second attack was carried out on the night of June 20/21. The IAEA reported on June 21, "six other buildings at the same site have now also been attacked: a natural and depleted uranium metal production facility which had not yet begun operations, a fuel rod production facility, a building with low-enriched uranium pellet production as well as a laboratory and nuclear material storage, another laboratory building, a workshop handling contaminated equipment and an office building with no nuclear material."

The IAEA added that the facilities targeted today "either contained no nuclear material or small quantities of natural or low enriched uranium, meaning any radioactive contamination is limited to the buildings that were damaged or destroyed." It added that it did not pose "any risk of off-site contamination."

The next night, on June 22, the United States attacked the site with Tomahawk cruise missiles launched from a submarine, damaging additional buildings and the associated tunnel complex (see Figure 8). Notably, the main uranium conversion facility that converts natural uranium into uranium hexafluoride was severely damaged. Uranium hexafluoride is the form of uranium entered into gas centrifuges. Tunnel entrances leading to an underground complex just north of the main Esfahan complex were also struck during the attack. All four tunnel entrances appear to have collapsed. The IAEA also assessed that "extensive damage" was done to the tunnel entrances. Similarly to the tunnel entrances leading into Fordow, satellite imagery from June 20 shows the Iranians preparing for the attack by backfilling the tunnels with soil (see Figure 9).

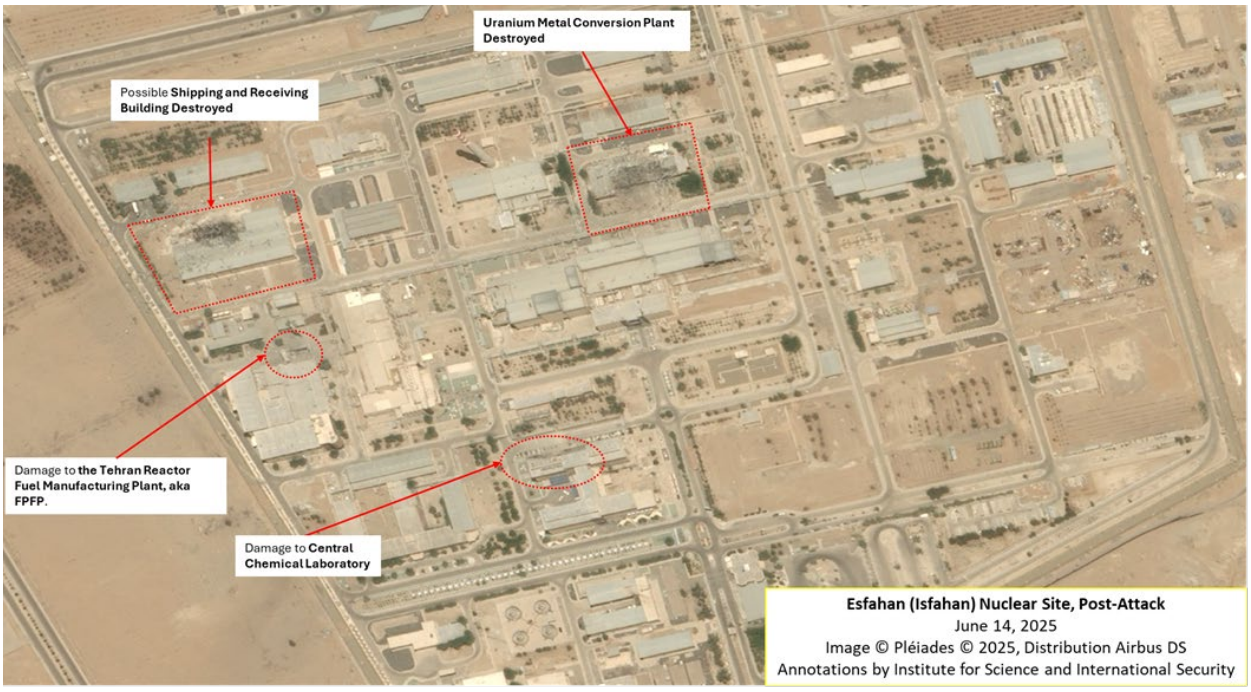


Figure 7. A high-resolution satellite image of the post-attack damage done to the Esfahan Nuclear Site on June 14, 2025.

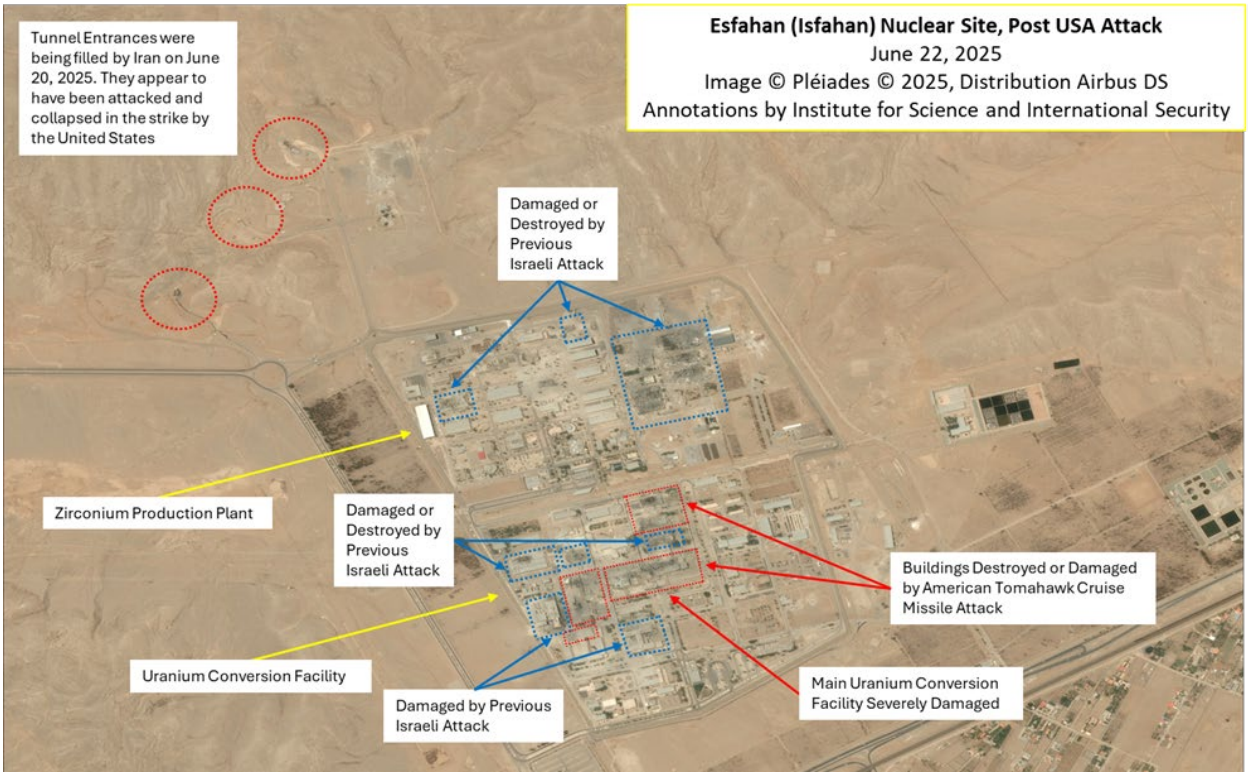


Figure 8. A high-resolution image of the damage after the U.S. attack in the early morning of June 22, 2025.

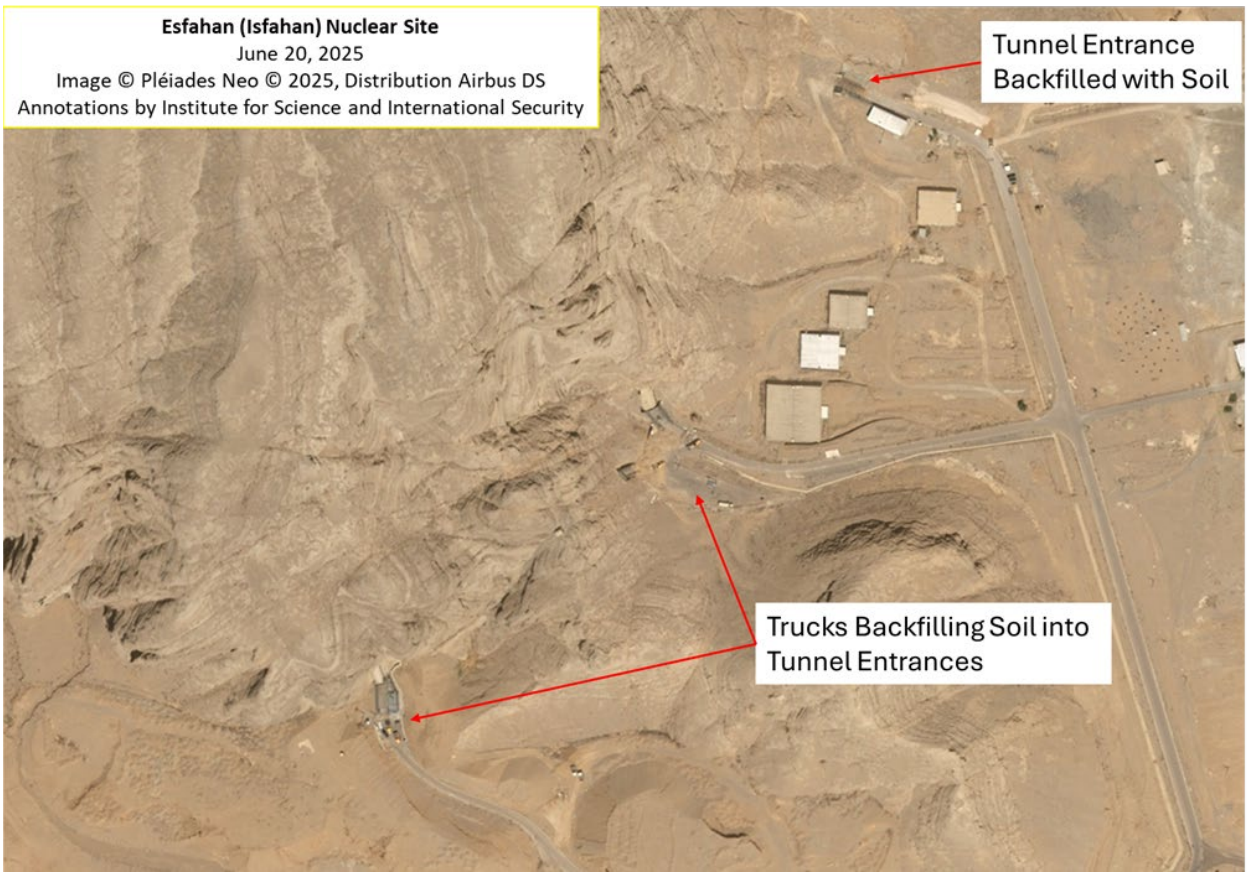


Figure 9. A satellite image taken on June 20 before the United States attacked the site. The image shows the Iranians backfilling the tunnel entrances.

TABA/TESA Karaj Centrifuge Manufacturing Site

The TABA/TESA Karaj Centrifuge Manufacturing site was an important Iranian nuclear facility that manufactured centrifuge components. The site was first attacked in a drone strike in June 2021 during a campaign by Israel to disrupt Iranian centrifuge manufacturing and assembly. Previously in July 2020, the Iran Centrifuge Assembly Center (ICAC) located at Natanz exploded as part of a sabotage operation carried out by Israel.[6] After the attack on Karaj, the IAEA reported in late January 2022 that the centrifuge manufacturing capabilities were moved from this site to an unspecified location at the Esfahan nuclear complex, which was bombed on the night of June 20/21 (see below).[7] The plant was repaired and was reported to be making the

[6] David Albright, Sarah Burkhard, and Frank Pabian, "Mysterious Fire and Explosion in the New Natanz Advanced Centrifuge Assembly Facility," *Institute for Science and International Security*, July 3, 2020, https://isis-online.org/isis-reports/mobile/fire-and-explosion-in-the-new-natanz-centrifuge-assembly.
[7] David Albright, Sarah Burkhard, and Spencer Faragasso, "Where are Iran's new centrifuge manufacturing capabilities?," *Institute for Science and International Security*, February 16, 2022, https://isis-online.org/isis-reports/detail/where-are-irans-new-centrifuge-manufacturing-capabilities/8.

non-rotating components of centrifuges. It was under IAEA surveillance under the Joint Comprehensive Plan of Action (JCPOA), although for several years the IAEA was not allowed to view surveillance video.

Satellite imagery from June 17, 2025, shows that nearly the entire complex was destroyed in airstrikes (see Figure 10). The two large manufacturing buildings, which were previously identified as fabricating gas centrifuge parts were completely demolished, spreading debris throughout the complex. The office building adjacent to the manufacturing buildings appears to also be damaged by the explosions. The building originally targeted in June 2021 is still standing, although it is also damaged by the explosion.

Figure 10. A post-attack satellite image of the Karaj Centrifuge Manufacturing site. The complex was nearly completely destroyed in the attack.

Centrifuge Manufacturing Site at the Tehran Research Center

The centrifuge manufacturing building at the Tehran Research Reactor site made and tested advanced centrifuge rotors. This site was also under IAEA monitoring and verification under the JCPOA. The location of this site could not be determined. It is not at the main research center site that houses the Tehran Research Reactor.

Esfahan Centrifuge Manufacturing Site

After the 2021 attack at TESA Karaj, Iran moved equipment to a centrifuge manufacturing workshop in Esfahan. It too was monitored by the IAEA.

On the night of June 20/21, this building was attacked. It was one of seven buildings at Esfahan attacked that night. We could not locate the specific building, but it may be one of the destroyed or damaged buildings in Figure 8, one of Esfahan images, or even in the nearby tunnel complex.

Lavisan 2 Campus (Mojdeh Site)

The "Lavisan 2" campus (also known as the Mojdeh Site), a site never visited by the IAEA and located near Malek Ashtar University, was viewed as a follow-on organization to the Amad Plan, which had been shut down in 2003 and followed by a smaller, more camouflaged nuclear weapons program initially headquartered in Lavisan 2, headed by the now deceased Mohsen Fakhrizadeh. This organization evolved, eventually being subsumed in about 2011 by the SPND, which took over the campus as its initial headquarters. This campus was also the location of the Modern Defense Readiness Test Center, the Institute of Applied Physics, and SPND's Shahid Karimi Group. Shahid Karimi Group was identified by the U.S. Treasury as an entity working on missiles and explosives projects connected to SPND.

The campus was targeted by Israel, destroying several buildings (see Figure 11). Satellite imagery from June 16, 2025, shows damage to several buildings, including the onsite security building and the building housing Shahid Karimi Group. An annex to the building housing the Institute of Applied Physics was completely destroyed. Debris is scattered throughout the campus.

Figure 11. A high-resolution satellite image of the Lavisan 2 campus post-attack, taken on June 16, 2025.

New SPND Headquarters

SPND moved to a different headquarters in 2013, just one and a half kilometers from its previous location at the Lavisan 2 campus. This building was never visited by the IAEA. According to a graphic released by Israel and videos posted on X, the building appears to have been targeted with airstrikes on June 15 and June 20, 2025 (see Figure 12).[8] A satellite image from June 18, 2025, shows the building still standing (see Figure 13). The video posted on X of the airstrike suggests a large amount of internal damage to the building and its surrounding complex with rubble visible at the rear of the building. We are also aware that on other satellite imagery obtained the day after the attack, several trucks were present in the parking area near the entrance to the headquarters, suggesting that materials such as documentation

[8] https://x.com/cheguwera/status/1934328559620768170

and related equipment were in the process of being removed from the still standing building. Interestingly, the building is located on a street that was formerly known as Sanyae(h) street, but following the killing in late 2020 of Mohsen Fakhrizadeh, the head of SPND and Iran's nuclear weapons efforts, the street was renamed "Fakhrizadeh Street".

Figure 12. Above is a graphic released by the Israeli Military highlighting the targeting of the new SPND HQ. Below is a screenshot of the video released by Israel of the SPND building when it was attacked.

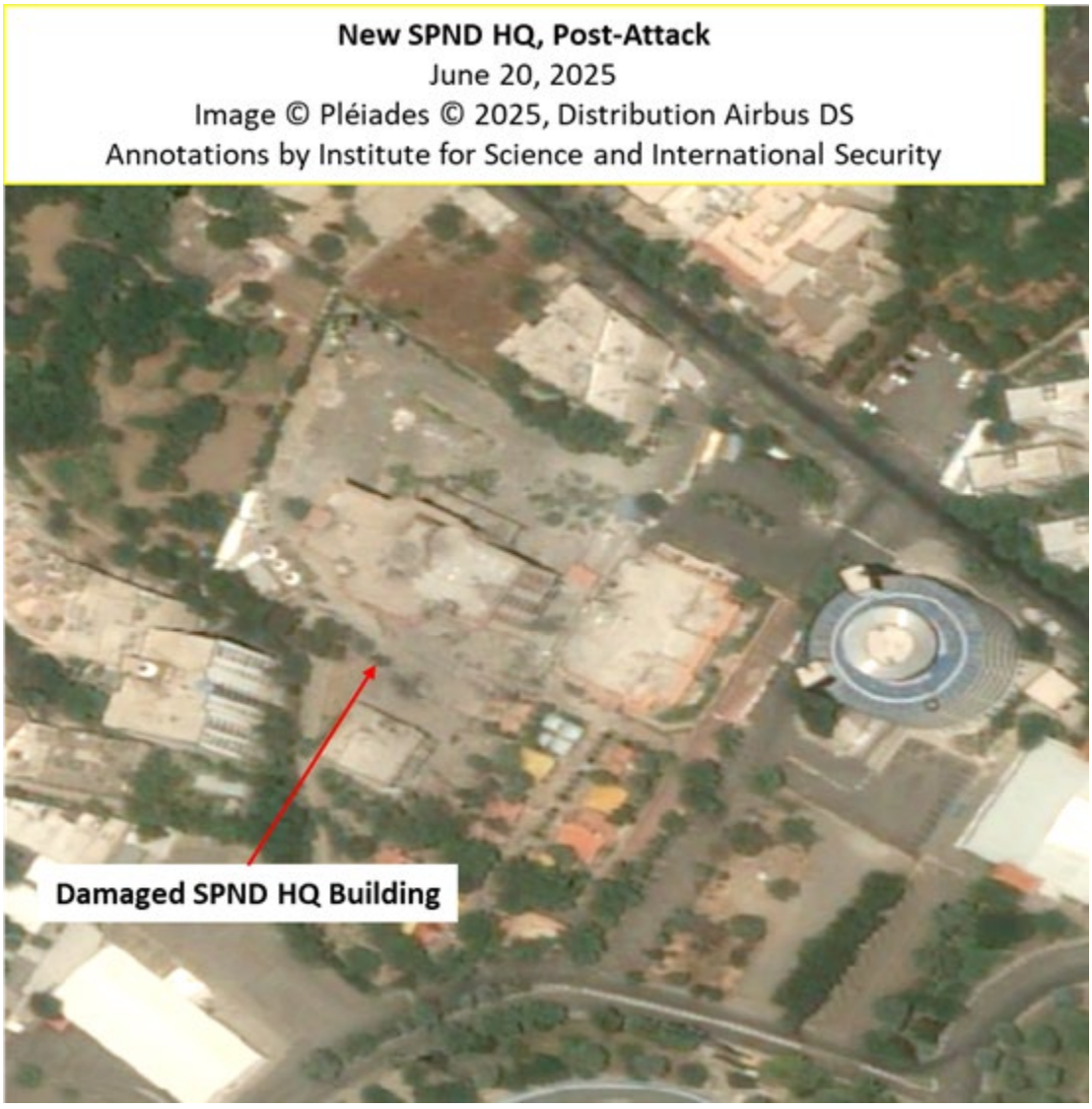


Figure 13. A satellite image of the new SPND HQ taken days after the Israeli airstrike on it.

Sanjarian

Sanjarian, a site never visited by the IAEA, was a key Amad testing and manufacturing facility, associated with the development and testing of the "shock wave generator" (a sophisticated multipoint initiation system (MPI)), exploding bridgewires, and diagnostic equipment for shock wave generator testing. It also produced the high purity plastic high explosive PETN used in the shock wave generator channels. The Institute previously reported on the site in September

2024, highlighting information obtained from officials that the site was active and being used by former Amad members associated with SPND (see Figure 14).[9]

Israel attacked the site twice. Satellite imagery from June 20, 2025, shows extensive damage (see Figure 15). Several buildings have been completely destroyed, including a former AMAD building that contained two chambers used to develop shockwave generators, nuclear weapons components, and diagnostic equipment.

Figure 14. A view of Sanjarian from May 2024 showing activity at the site.

[9] David Albright, Spencer Faragasso, and the Good ISIS Team, "Renewed Activity at the Sanjarian and Golab Dareh Amad Sites," *Institute for Science and International Security*, September 12, 2024, https://isis-online.org/isis-reports/detail/renewed-activity-at-the-sanjarian-and-golab-dareh-amad-sites/.

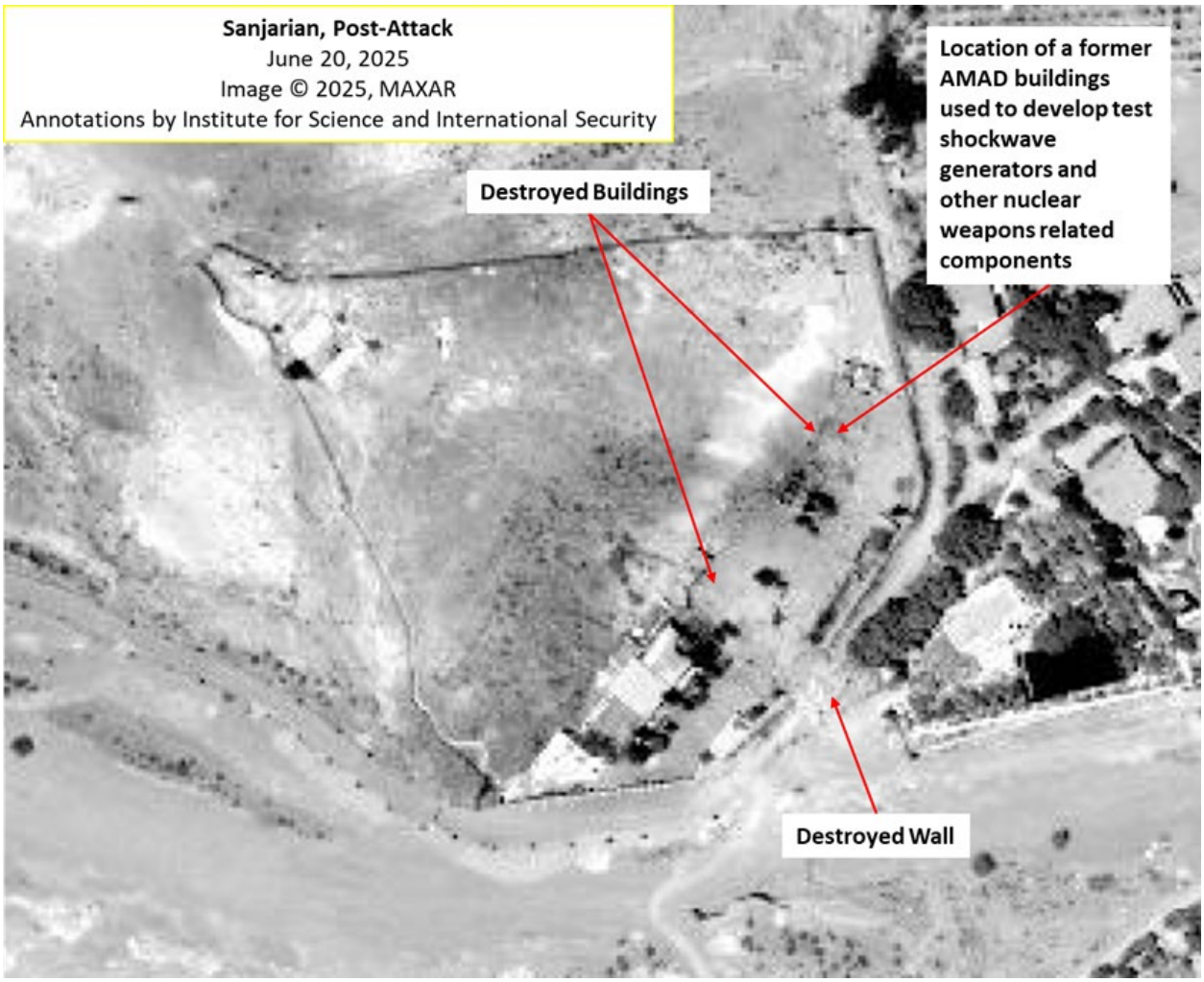


Figure 15. A satellite image of the Sanjarian site. Many buildings are completely destroyed.

Sites associated with plutonium production

IR-40 Arak Heavy Water Reactor and Heavy Water (D_20) Production Plant

The IR-40 Arak, aka Khondab, Heavy Water Reactor and Heavy Water Production Plant date to the early 2000s, although the reactor was never completed. Construction of the IR-40 began in 2004. The reactor was designed to produce 40 megawatts thermal (MWth) of power and use natural uranium oxide fuel produced at the Esfahan site.

The reactor core design was ideal for making substantial amounts of weapon-grade plutonium for nuclear weapons. As a result, the original core design was modified under the JCPOA to one using a specially designed enriched uranium fuel, producing far less plutonium and being far harder to chemically process to separate any plutonium. As part of this redesign, the JCPOA

required Iran to render a key part of the reactor that holds the nuclear fuel, called the calandria, unusable in future nuclear applications. The calandria is a metal lattice that holds specialized tubes that contain the fuel assemblies and allow heavy water to flow through them. This original calandria was designed to hold natural uranium fuel that could allow the reactor to be used to make weapon-grade plutonium, and the JCPOA developed an arrangement that would substitute this calandria with a new calandria with far fewer channels that would allow operation with enriched uranium fuel, but not enough for the reactor to function on natural uranium fuel. In 2016, IAEA inspectors announced the original calandria had been rendered unusable by filling it with concrete. However, Iran's then Atomic Energy Organization (AEOI) head, Ali Akbar Salehi stated in January 2019 that Iran had imported a second set of tubes for the IR-40 calandria, raising questions whether Iran had begun building a second calandria for the reactor that could hold natural uranium fuel, reestablishing a path to reconstitute its ability to produce weapon-grade plutonium at the Arak reactor.[10]

Satellite imagery from June 19, 2025, shows the containment dome of the IR-40 reactor breached, likely causing a large explosion on the inside of the reactor (see Figure 16, 17, and 18). The strike has rendered the reactor inoperable; however it is unclear if the reactor pool itself suffered compromising damage. Debris can be seen on the ground surrounding the reactor. The nearby Heavy Water Production Plant was also targeted. The final third stage of the heavy water production plant has been severely damaged in the airstrike, rendering the plant inoperable, at least temporarily. The remainder of the heavy water plant appears intact.

[10] David Albright and Andrea Stricker, "Parsing Iran's Claims about Quickly Reconstituting the IR-40: Are the Plutonium Pathway Restrictions Undermined?," *Institute for Science and International Security*, February 5, 2019, https://isis-online.org/isis-reports/detail/parsing-irans-claims-about-quickly-reconstituting-the-ir-40/.

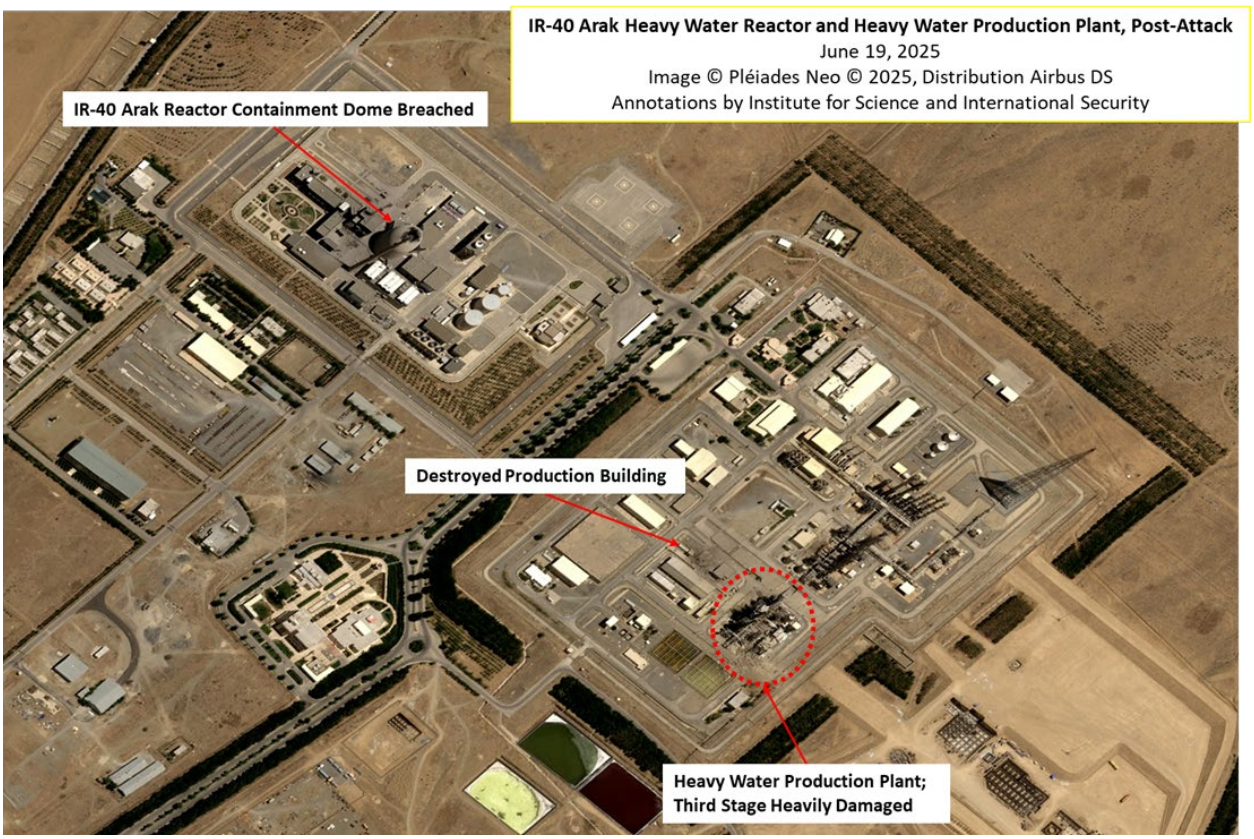


Figure 16. An overview satellite image from June 19, 2025, of the damage done to the IR-40 Arak Heavy Water Reactor Complex and Heavy Water Production Plant.

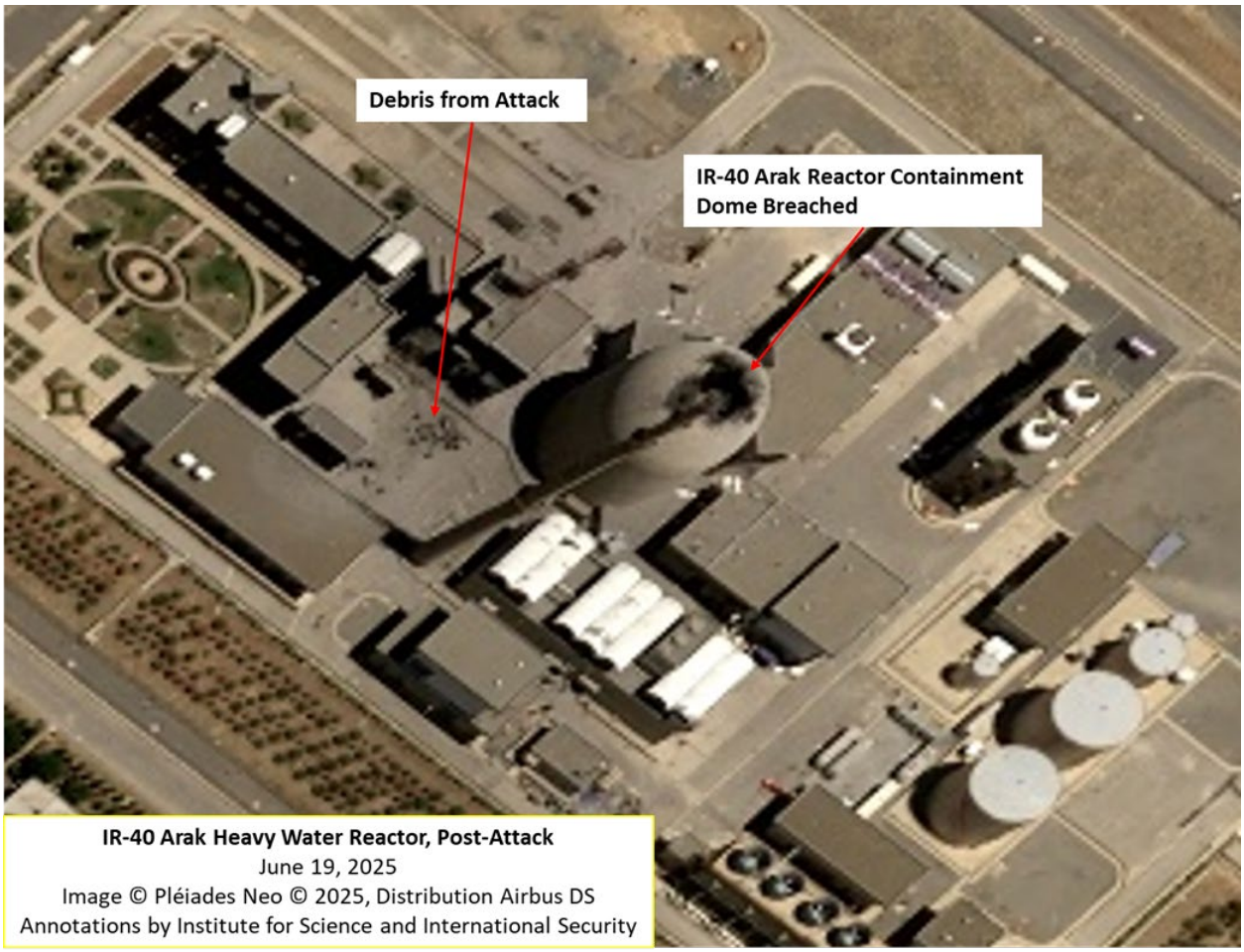


Figure 17. An overview satellite image from June 19, 2025, of the damage done to the IR-40 Arak Heavy Water Reactor containment dome.

Figure 18. Three satellite images from June 19, 2025, of the damage done to the IR-40 Arak Heavy Water Reactor and adjacent Heavy Water Production Plant.