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Presentad at 63rd Pugwash Conferencie, Hiroshima, 1-5 November 2025

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Introduction

The 21st century is characterized by a renewed global arms race, marked by an accelerating competition over advanced military technologies and the expansion and modernization of nuclear stockpiles. Since the development and creation of the first nuclear weapon in the 1930s and 40s, its ultimate threat to humankind has been strongly underscored. The United States' deployment of atomic bombs on Hiroshima and Nagasaki on 6 and 9 August 1945 demonstrated the unprecedented scale of destruction, loss of human life, and the long-term health and environmental consequences inherent in the use of nuclear weapons. According to the Federation of Atomic Scientists' 2025 status report, there are roughly 12,331 nuclear warheads, with over 9,600 in active military nuclear stockpiles.[1] These are distributed among the nine countries in the world possessing nuclear weapons: China, France, India, Israel, North Korea, Pakistan, Russia, the United Kingdom, and the United States. The total nuclear warheads owned by the United States and Russia alone count for approximately 90% of all nuclear weapons in the world. This global accumulation of nuclear arsenals has not only intensified rivalries but also shifted the battlefield toward the infrastructure of nuclear development. Attacks on nuclear sites, including reactors and research facilities with the potential to produce fissile material, have since become an established instrument of military strategy. The ex-Director General of the International Atomic Energy Agency Hans Blix said that "any belligerent action against objects that could release radioactive material may stand as seriously condemned as an attack with nuclear weapons."[2] In the 1980s, the long-standing taboo of attacks on nuclear facilities was broken in the Middle East, marking a harrowing shift in international nuclear politics. Since Israel's attack on Iraq's Osirak nuclear power plant in 1980 and 1981, we have witnessed the failure of the international legal system to punish and prevent any future incidents, allowing for multiple armed attacks on nuclear facilities in the future, including in Syria, Ukraine, Iran, and Russia.

Breaking the Taboo and Israel's Begin Doctrine

The first evident switch we witnessed, before the taboo of attacks was broken, was Israel's Begin Doctrine. The core of this Israeli counter-proliferation policy conceives that "no regional enemy committed to destroying the Jewish state can be allowed to obtain weapons of mass destruction."[3] Named after the Prime Minister Menachem Begin, the doctrine serves as a preventative measure that aids Israel in ensuring that no potential enemies in the Middle East can obtain nuclear arms.[4] Begin argued that the lessons of the Holocaust required the Israeli government to act decisively before a threat materialized. Yet this doctrine stood in direct violation of the principles enshrined in the *United Nations Charter*, particularly *Article 2(4)*, which prohibits the use of force against the territorial integrity or political independence of any state, and *Article 51*, which allows for self-defense only "if an armed attack occurs."[5] The distinction between preemptive and preventive self-defense is central here: whereas preemptive self-defense addresses an imminent threat, preventive strikes (e.g., Operation Opera) seek to neutralize a potential future danger. The latter lacks legal recognition under customary international law. The Doctrine may have originated in the late 1970s, with the rise of Begin. Still, it has remained a core tenet of Israel's foreign policy to date, as we

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[1] Hans M. Kristensen, Matt Korda, Eliana Johns, Mackenzie Knight-Boyle, and Kate Kohn, "Status of World Nuclear Forces," *Federation of American Scientists (FAS)*, updated 2025, accessed 24 October 2025, https://fas.org/initiative/status-world-nuclear-forces/.

[2] Hans Blix to Ali Soltanieh, October 9, 2014. In *Bombardment of Bushehr Nuclear Power Plant*, Ali Asghar Soltanieh (2024, Tehran), 10.

[3] Jay Solomon, "What Happens When Everyone's Trying to Get Nukes?," The Washington Institute, December 4, 2019, accessed October 12, 2025, https://www.washingtoninstitute.org/policy-analysis/what-happens-when-everyones-trying-get-nukes.

[4] David Bastardo Martínez, "Israel's Iran Policy Endgame: How Begin Doctrine Shaped the Netanyahu Era," Geopolitical Monitor, July 10, 2025, https://www.geopoliticalmonitor.com/israels-iran-policy-endgame-how-begin-doctrine-shaped-the-netanyahu-era/.

[5] United Nations, "UN Charter | United Nations," June 26, 1945, accessed October 4, 2025, https://www.un.org/en/about-us/un-charter.

have witnessed in 2007 in Syria, and more recently in June 2025 in Iran. The following section will go into greater detail regarding the most prominent case of armed attacks against nuclear facilities.

Attack on Osirak 1981

The Israeli attack on Iraq's Osirak research facility in 1981 marked a turning point in modern warfare and nuclear history. Operation Opera, the first armed attack on a nuclear facility, set a controversial precedent for preventive warfare and nuclear deterrence. Iraq, under Saddam Hussein, was developing a nuclear program with French assistance, which the International Atomic Energy Agency (IAEA) deemed peaceful. U.S. intelligence in 1980 also found no evidence that Iraq sought nuclear explosives.[6] Nevertheless, Israel viewed the program as an existential threat. While Hussein ultimately aimed to develop nuclear arms, his goal was deterrence against Israel, not a preemptive strike. Fears of Israeli attacks culminated in Israel's June 7 strike on Tamuz I near Baghdad. It is important to note that the airstrike was not the first hostility Israel had committed against Iraq vis-à-vis its nuclear program. In 1979, Israel had sabotaged the delivery of materials intended for the research facility, and later in 1980, Israel assassinated the leading scientist who was working on the Iraqi nuclear program.[7] The operation, orchestrated by Prime Minister Begin under the Begin Doctrine and directed by IDF Chief of Staff Rafael Eitan, was justified by Israel as self-defense. Israel acquired new F-16 fighter-bombers from the U.S., which carried two 2,000-pound bombs each.[8] On June 7, eight F-16s flew secretly through Saudi airspace, destroying Osirak and other facilities at Tuwaitha in under two minutes, killing ten Iraqi soldiers and one French nuclear engineer.[9] Israel "justified the attack as an act of self-defense," while Iraq called on the United Nations Security Council (UNSC) to act.[10] The international response was overwhelmingly negative, including from the United States. On June 12th, the IAEA Board of Governors condemned the attack, and later that year, "the IAEA Conference both condemned the strike and suspended all technical assistance to Israel."[11] On June 19, the UNSC adopted Resolution 487, condemning Israel's strike as a violation of the UN Charter, reaffirming Iraq's right to peaceful nuclear technology, and urging Israel to avoid similar attacks and allow inspections. Even the U.S. supported the resolution, reflecting near-universal rejection of Israel's legal justification.[12] Operation Opera sparked debate over anticipatory self-defense. Israel argued the strike was justified under *Article 51*, claiming a duty to protect its citizens. Most states and scholars rejected this, noting that preventive attacks threaten collective security. The UK emphasized that *Article 51* only permits self-defense after an armed attack, making Israel's strike a violation of Iraq's sovereignty. The case underscores the limits of unilateral preventive action and reinforces the Security Council's central role in maintaining international peace, highlighting the tension between national security concerns and adherence to international law.

Attack on Bushehr 1984-1988

Following the 1979 Islamic Revolution, Iran inherited an incomplete nuclear program that had been initiated under the Shah with Western assistance. The most important facility was the Bushehr nuclear

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[6] Hal Brands and David Palkki, "Saddam, Israel, and the Bomb: Nuclear Alarmism Justified?," *International Security* 36, no. 1 (2011): 133–66, https://www.jstor.org/stable/41289691.

[7] "Israeli Attack on Iraq's Osirak 1981: Setback or Impetus for Nuclear Weapons?," National Security Archive, June 7, 2021, https://nsarchive.gwu.edu/briefing-book/iraq-nuclear-vault/2021-06-07/osirak-israels-strike-iraqs-nuclear-reactor-40-years-later.

[8] Samiran Mishra, "Baghdad 1981, Tehran 2025: Same Israeli Operation Delivers Same Message," NDTV, June 14, 2025, https://www.ndtv.com/world-news/israel-iran-nuclear-operation-opera-2-israel-hits-iran-as-it-did-saddam-husseins-iraq-in-1981-8665342.

[9] "Israeli Attack on Iraq's Osirak 1981: Setback or Impetus for Nuclear Weapons?"

[10] Patrick Sullivan. "Operation Opera Redux? Iran's Nuclear Program and the Preventive War Paradox," Modern War Institute -, April 16, 2025, https://mwi.westpoint.edu/operation-opera-redux-irans-nuclear-program-and-the-preventive-war-paradox/.

[11] "Israeli Attack on Iraq's Osirak 1981: Setback or Impetus for Nuclear Weapons?"

[12] Some scholars may wonder why the US never vetoed the resolution against Israel, but it quickly became evident that the US was supporting the Iraqi war against Iran, as the US's animosity toward Iran was much greater than its desire to support Israel.

power plant, which was initially being constructed with Germany's KWU (later Siemens) support but was left incomplete despite contractual obligations.[13] Viewing Iran's revolutionary regime as both ideologically threatening and militarily vulnerable, Saddam Hussein ordered airstrikes against Iranian infrastructure, including its nuclear installations, early in the conflict. This marked the second-earliest instances of sustained military assaults on nuclear facilities. These attacks occurred within the context of a lasting, intense regional rivalry and mutual existential suspicion, which culminated in the Iran-Iraq War of the 1980s. The first set of attacks received no outcry from the public and international bodies and remained overlooked until 1984. In 1984, the response to Iran's complaints remained insufficient and "did not elicit concrete action from the IAEA." Even when Iran warned of possible hazardous materials or radioactivity, following Iraq's attacks, the then IAEA Director General Hans Blix argued that "the nature and amount of nuclear material was not "a significant hazard to the public."[14] Four years into the Iran-Iraq war, in 1984, as the previous attacks were disregarded by the broader international public, the protection of nuclear facilities became one of Iran's top priorities. In June 1984, Iran invoked IAEA GC Resolution 407 and officially requested the IAEA's Board of Governors to meet regarding the armed attack on the Bushehr nuclear power plant in Iran. The meeting was supposed to address "the necessary measures against the aforementioned Iraqi violations."[15] However, Iraq argued that Iran's complaints were unfounded, as neither of the parties ever reported any military activity. And further claimed the Bushehr facilities were not operational at the time of the attacks, thus minimizing their legal significance.[16] The IAEA Director General argued, indirectly giving Iraq a pass, that "there [were] no sufficient grounds" for an emergency meeting.[17] Iran's permanent representative in Vienna at the time, Ambassador Ali Soltanieh, had even personally handed photographs of the site of the attack to the Agency. However, the evidence was deemed not enough to act. The IAEA Director General Hans Blix warned that assaults on nuclear facilities (whether operational or under construction) posed a grave risk to both civilian populations, as well as the environment, urging states to respect the protection afforded to them under international law.[18] The lack of a forceful international response, however, set a troubling precedent for future conflicts involving nuclear infrastructure. From a legal standpoint, Iraq's attacks on Iran's nuclear facilities reinforced the emerging tension between state security rationales and the prohibition on the use of force in international law. Additionally, the last attack against Iran's nuclear installations came after the final UNSC resolution, Resolution 598, on January 16th, 1987, which further violated international law norms. As a response to the lack of international response, Iran pushed for new legal safety nets after the war had ended. And on September 21st,1990, the IAEA General Conference adopted Resolution 533, on the "Measures to strengthen international co-operation in matters relating to nuclear safety and radiological protection."[19] Resolution 533 "strongly condemns any armed attack on and threat against nuclear facilities devoted to peaceful purposes," declaring any such actions a direct violation of the Charter of the United Nations, the IAEA Statute, and the sovereign equality of states.[20] This resolution is the only resolution that also deems

[13] The construction of the nuclear installation was later picked up and finished with the support of Russia.
[14] Ludovica Castelli and Olamide Samuel, "Justifying Attacks on Nuclear Facilities," *The Nonproliferation Review* 30, no. 1–3 (January 2, 2023): 83–105, https://doi.org/10.1080/10736700.2024.2301883.
[15] as cited Valeria Puga-Alvarez, "Exploring a Confidence-building Measure in the Middle East: Immunity of Nuclear Facilities Against Armed Attacks - Viimes," *Viimes.Org* (Vienna International Institute for Middle East Studies, 2024), https://viimes.org/publication/exploring-a-confidence-building-measure-in-the-middle-east-immunity-of-nuclear-facilities-against-armed-attacks/.
[16] Daniel J. Silva, "Iraqi Warplanes Twice Bombed an Unfinished Nuclear Power Plant... - UPI Archives," *UPI*, November 17, 1987, https://www.upi.com/Archives/1987/11/17/Iraqi-warplanes-twice-bombed-an-unfinished-nuclear-power-plant/3564564123600/.
[17] "Correspondence Between the President of the Atomic Energy Organization of Iran and the Director General," Attachment 2, page 1.
[18] Puga-Alvarez, "Exploring a Confidence-Building Measure in the Middle East: Immunity of Nuclear Facilities Against Armed Attacks – VIIMES," 16.
[19] International Atomic Energy Agency, *IAEA General Conference Resolution GC(XXXIV)/RES/533*, "Prohibition of Armed Attack or Threat of Attack Against Nuclear Installations, Whether Operational or Under Construction," adopted September 1990.
[20] International Atomic Energy Agency, *IAEA General Conference Resolution GC(XXXIV)/RES/533*, "Prohibition of Armed Attack or Threat of Attack Against Nuclear Installations, Whether Operational or Under Construction," adopted September 1990.

a threat of an attack as a violation; this language was proposed by the then Iranian representative Ali Soltanieh, who also championed Decision 53 in 2009, which explicitly stated that any such act "constitutes a violation of the principles of the United Nations Charter, international law and the Statute of the Agency."[21]

Attack on Al-Kibar 2007

The Begin Doctrine continued well past the mandate of PM Begin and its initial trial period in the late 20th century. The extent of its edict came to light when Israel continued operating with a preemption toward its neighboring countries, specifically in 2007, when it struck Syria's Al-Kibar facilities twenty-six years after striking Iraq's Osirak reactor[22]. Similar to the attack on Iraq in 1981, the attack on Syria was planned with utmost secrecy, keeping it far out of reach of the IAEA, as it did not know Israel's plan until it had happened.[23] The Israeli government believed that Syria was building a reactor so it could produce weapons of mass destruction (WMD) with the help of North Korea. Months before the attack in September 2007, the Israeli intelligence "focused on assessing progress at the complex and calculating when the reactor would begin operations."[24] On the night of September 6, 2007, IAF carried out a secret airstrike on the Al-Kibar site in Syria's Dair Alzour region. Codenamed "Operation Orchard," the mission involved several F-15 and F-16 fighter jets, like Operation Opera in 1981.[25] On September 9th, Syria officially filed a complaint with both the UNSC and the UN General Assembly (GA), claiming that Israel breached Syrian airspace and dropped munitions, describing the incident as "a flagrant violation by Israel of [Syrian] airspace," and "a pattern of Israeli actions in breach of international law."[26] For years following the attack on Al-Kibar, Israel remained silent about its responsibility. And accordingly, Syria remained steadfast about there never being a nuclear facility to begin with, as per international law, "the possession of a reactor itself is not a violation of non-proliferation norms, but the failure to declare" having one is.[27] A year following the attack, the US provided the IAEA Secretariat with information, but a lack of proof, that Israel had attacked a non-operational nuclear facility in Syria in 2007. Then IAEA's Director General, Mohamed ElBaradei, urged the US to provide proof and deemed "the unilateral use of force by Israel as undermining the due process of verification that is at the heart of the non-proliferation regime."[28] Even so, what followed, a "near total lack of international comment or criticism of Israel's action," came as an astonishment in comparison to the universal outcry and condemnation of Israel's preventive strike against Iraq in 1981. What became increasingly surprising was that this attack came 17 years after the adoption of *Resolution 533*, which aimed to serve as the new normative corpus for these situations. As was confirmed in 2011, the normalization of armed attacks against nuclear sites and the lack of consequences for aggressors led to becoming the new norm in the nuclear world. The then Director-General Yukiya Amano, with IAEA Resolution GOV/2011/41 dated June 9th, 2011, and with only 17 votes of the Board, following the US's proposal, reported Syria and

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[21] "Prohibition of Armed Attack or Threat of Attack Against Nuclear Installations, During Operation or Under Construction," by IAEA General Conference, *IAEA.Org*, September 2009, https://www.iaea.org/sites/default/files/gc/gc53dec-13_en.pdf.
[22] Garwood-Gowers, "Israel's Airstrike on Syria's Al-Kibar Facility: A Test Case for the Doctrine of Pre-emptive Self-Defence?," Journal of Conflict and Security Law 16, no. 2 (July 1, 2011): 263–91, https://doi.org/10.1093/jcsl/krr011.
[23] Barbara Opall-Rome, "Declassified: How an Israeli Operation Derailed Syria's Nuclear Weapons Drive," *Defense News*, August 18, 2022, https://www.defensenews.com/global/mideast-africa/2018/03/20/just-declassified-how-an-israeli-operation-derailed-syrias-nuclear-weapons-drive/.
[24] Opall-Rome, "Declassified: How an Israeli Operation Derailed Syria's Nuclear Weapons Drive."
[25] Opall-Rome, "Declassified: How an Israeli Operation Derailed Syria's Nuclear Weapons Drive," 18.
[26] Garwood-Gowers, "Israel's Airstrike on Syria's Al-Kibar Facility: A Test Case for the Doctrine of Pre-Emptive Self-Defence?," 266-267.
[27] Puga-Alvarez, "Exploring a Confidence-Building Measure in the Middle East: Immunity of Nuclear Facilities Against Armed Attacks – VIIMES," 29.
[28] "Statement by IAEA Director General Mohamed ElBaradei," International Atomic Energy Agency, April 24, 2008, https://www.iaea.org/newscenter/pressreleases/statement-iaea-director-general-mohamed-elbaradei.

sent the file to the United Nations Security Council."[29] This led the narrative to shift toward a discussion about nuclear proliferation in unstable regions, rather than about the inherent violation of multiple international laws. It had become too late, and the dangerous precedent of Israel's nuclear monopoly in the region had already been set.

The 2010 Stuxnet cyberattack against Iran's nuclear program

In addition to military attacks against nuclear facilities, it is essential to note that the rapid digitalization and integration of artificial intelligence into military tactics have made nuclear installations increasingly vulnerable to cyberattacks. In 2010, Israel and the US carried out one of the most widely recognized cyberattacks in history. The Stuxnet computer worm against Iran's nuclear installations is believed to have destroyed 984 centrifuges at the Natanz uranium enrichment facility. The New York Times reported that Stuxnet's authors may have learned about vulnerabilities in Siemens controllers due to a partnership between the company and the Idaho National Laboratory. The worm was programmed to disrupt only systems with the configuration at the Natanz centrifuge cascade, where it caused major damage. This underscores that the worm was specifically designed to attack Iran's nuclear program. The Stuxnet attack indicates that cyberattacks have evolved from the work of amateurs and criminals into a large-scale state endeavor aimed at gathering intelligence, controlling information networks, or causing physical damage to nuclear sites.[30] This trend of cyberattacks as an instrument of foreign policy poses another major threat to nuclear facilities. It further prompted legal scholars to consider incorporating cyberattacks into existing legal frameworks, given their potential to trigger severe nuclear accidents.

Attack on Zaporizhzhia 2022

Ukraine is the sight of the disastrous Chornobyl nuclear accident in 1986 and contemporarily holds the largest nuclear power plant in Europe. Russia's invasion of Ukraine in February 2022 immediately raised the alarm about the security of the country's nuclear infrastructure. When Russian troops occupied the Chornobyl reactor complex and surrounding areas, Ukraine and its allies feared radioactive release and military action against its four active nuclear sites. On 3 March 2022, Russian forces attacked and seized control of the Zaporizhzhia nuclear power plant, and the facility has been a site of conflict ever since. The initial attack set fire to an auxiliary building, which caused the UN Security Council to hold an emergency meeting where world leaders described the situation as a "dire threat to the world". [31] Consequently, the IAEA Board of Governors adopted resolution GOV/2022/17, deploring the invasion and demanding that Ukraine be allowed to maintain full operational control over its nuclear installations, echoing a UN General Assembly resolution adopted on 3 March 2022. The IAEA Board of Governors adopted three additional resolutions on the matter, GOV/2022/58 in September 2022, GOV/2022/71 in November 2022, and GOV/2024/18 in March 2024.[32] By deploying troops, heavy weapons, and military resources, Russia has maintained control of the plant and uses it as a shield and base for attacks on Ukrainian towns. There have been several strikes on and in the perimeter of the plant, underscoring the immense threat of nuclear accidents. Due to the acute danger, UN Secretary-General António Guterres has called for a demilitarized

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[29] UN Secretary-General, IAEA Director General, and IAEA Board of Governors, "Letter Dated 16 June 2011 From the Secretary-General Addressed to the President of the Security Council," United Nations Digital Library System, June 21, 2011, https://digitallibrary.un.org/record/705795?ln=fr&v=pdf.

[30] Brent Kesler, "The Vulnerability of Nuclear Facilities to Cyber Attack," *Strategic Insights* 10, no. 1 (Spring 2011), Calhoun: The NPS Institutional Archive, Naval Postgraduate School, Monterey, CA, https://hdl.handle.net/10945/25465.

[31] George M. Moore, "How International Law Applies to Attacks on Nuclear and Associated Facilities in Ukraine," *Bulletin of the Atomic Scientists*, 6 March 2022, https://thebulletin.org/2022/03/how-international-law-applies-to-attacks-on-nuclear-and-associated-facilities-in-ukraine/.

[32] International Atomic Energy Agency, *"Timeline of the IAEA's response activities to the situation in Ukraine,"* accessed October 28, 2025, https://www.iaea.org/interactive/timeline/169792.

zone around the facility, and the G7 foreign ministers have demanded Russia's immediate withdrawal.[33] IAEA has gained access to the Zaporizhzhia plant in September 2022 and has maintained an assisting presence to monitor nuclear safety and security at the location since. It is essential to note that Ukraine relies on nuclear power for half of its energy, and Russia and Ukraine have continuously accused each other of attacks on the Russian-occupied Zaporizhzhia plant. On 23 September 2025, Zaporizhzhia lost its offsite power for the 10th time in three and a half years of war due to military activity.[34] Multiple states, the UN, and the IAEA have repeatedly condemned the war, particularly the Russian occupation and utilization of Ukraine's nuclear infrastructure. While IAEA and UN General Assembly resolutions have been adopted, they remain legally non-binding. The current surge of armed conflicts and a spread of impunity raise serious concerns on how to halt military operations effectively and safeguard nuclear facilities from shelling. Since the attack on Zaporizhzhia in 2022, the danger of a nuclear accident has become a tangible concern again. Despite the range of compliance mechanisms, from the UN Charter to IAEA resolutions and international humanitarian law, ensuring effective enforcement remains a persistent challenge.[35]

Attack on Iran's Nuclear Program 2025

On 13 June 2025, Israel launched a 12-day war on Iran with assistance from the United States, targeting more than 100 nuclear installations and military sites with over 200 Israeli fighter jets.[36] Furthermore, the unprecedented attacks included the bombing of civilian infrastructure, oil and gas sites, residential buildings, hospitals, Iran's state news broadcaster and a prison among many more targets.[37] Reports estimate that the attacks killed more than 1,190 people and led to over 4,500 injured. The casualties include hundreds of civilians, military officials, and senior nuclear scientists, many of them female nuclear scientists, killed alongside their families and children. On the night of 21-22 June 2025, the United States officially joined Israel's attacks by launching military strikes themselves against nuclear facilities in Fordow, Natanz, and Isfahan. The United States used seven bat-winged B-2 stealth bombers in its largest operational strike ever by B-2 bombers, which dropped 14 bunker busting GBU-57 Massive Ordnance Penetrators, each weighing 30,000 pounds. It marked the second-longest B-2 operation ever flown, second only to US military attacks on the Middle East post-9/11, 2001. Moreover, a US submarine launched over two dozen Tomahawk land attack cruise missiles, and fighter jets were employed as decoys in this unprecedented military attack on Iran. According to the Pentagon, the operation consisted of over 125 US military aircraft, indicating the vast scale and intensity of the attacks.[38]

Israel launched the attacks on Iran two days before a scheduled sixth round of nuclear negotiation talks between the United States and Iran and one day after the IAEA Board of Governors adopted resolution GOV/2025/38, an E3-initiatied (France, Germany, UK) resolution determining a breach of Iran's non-proliferation obligations.[39] Tehran called the resolution a Western-led mission to contain the nuclear

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[33] Tom Dannenbaum, "The Escalating Military Use of the Zaporizhzhia Nuclear Power Plant," *Lieber Institute for Law and Land Warfare Blog* (United States Military Academy at West Point), 22 August 2022, https://lieber.westpoint.edu/escalating-military-use-zaporizhzhia-nuclear-plant/.

[34] UN News, "Ukraine: IAEA engaging to get power restored at Zaporizhzhia Nuclear Power Plant", United Nations, 1 October 2025, https://news.un.org/en/story/2025/10/1166016.

[35] Kurando, Maria (2023) "Nuclear Security in Conflict Zones: The Dangerous Case of Zaporizhzhia," International Journal of Nuclear Security: Vol. 8: No. 2, Article 10. https://doi.org/10.7290/ijns372553

[36] Alia Chughtai, "Visualising 12 Days of the Israel–Iran Conflict," *Al Jazeera*, June 26, 2025, https://www.aljazeera.com/news/2025/6/26/visualising-12-days-of-the-israel-iran-conflict.

[37] Claire Mills and John Curtis, *Israel-Iran 2025: Developments in Iran's Nuclear Programme and Military Action*, Research Briefing No. CBP-10284 (London: House of Commons Library, 24 June 2025), https://researchbriefings.files.parliament.uk/documents/CBP-10284/CBP-10284.pdf

[38] Idrees Ali and Phil Stewart, "U.S. Bombing of Iran Started with a Fake-Out," *Reuters*, June 22, 2025, https://www.reuters.com/business/aerospace-defense/us-bombing-iran-started-with-fake-out-2025-06-22/.

[39] International Atomic Energy Agency, Resolution GOV/2025/38, "NPT Safeguards Agreement with the Islamic Republic of Iran", 12 June 2025. https://www.iaea.org/sites/default/files/25/06/gov2025-38.pdf

program, and scholars argue that the resolution enabled Israel to frame its attacks as "preemptive self-defense".[40]

Despite the large-scale attack by Israel and the United States on Iran targeting its IAEA-verified nuclear facilities with constant IAEA presence and surveillance, the agency failed to issue a formal condemnation of the unprecedented attack, which led to further accusations of the agency's double standards.[41] Scholars report that Iran has continuously demonstrated a willingness to negotiate and considered creative alternatives such as a multinational consortium for uranium enrichment. It is noteworthy that Iran showed a willingness to allow US inspectors to join the monitoring teams from the IAEA, and that the government was eagerly working towards a deal in good faith.[42] In announcing the operation, Israel's PM Netanyahu claimed that "Iran was closer than ever to obtaining a nuclear weapon". However, there is a broad consensus that this claim is unfounded, and no evidence has been provided to support it. On 25 March 2025, US Director of National Intelligence Tulsi Gabbard testified that Iran "is not building a nuclear weapon", and there had been no indication that this US assessment has changed since.[43] The Israel-US attacks on Iran in June 2025 marked a watershed moment of armed attacks on nuclear facilities, causing severe damage to Iran's nuclear sites in a severe breach of international law. These latest strikes on nuclear installations follow a list of cases emboldening aggressors to conduct such a wide-scale war on nuclear facilities. The 1981 attack on Osirak, the employed Begin doctrine, and the failure to hold Israel and others accountable have catalyzed a series of such attacks, ultimately leading up to the large-scale Israel-US attack on Iran in 2025.

Attacks on Russian nuclear power plants 2025

Ukraine has been ramping up retaliatory strikes on Russia's oil and energy infrastructure, heightening the risk of military action on and in the perimeter of Russian nuclear sites. In August 2025, Ukraine has launched at least 95 drones on Russia and hit the Kursk Nuclear Power Plant. The drone attack has reportedly caused a fire and damage to an auxiliary transformer and led to a 50% reduction in the operating capacity at one of the reactors.[44] In October 2025, Russia notified the IAEA that a drone hit the cooling tower of its Novovoronezh nuclear power plant in central Russia. IAEA took notice of the attacks on Russian sites and stressed that every nuclear facility should be protected at all times.[45] These developments underscore the vulnerability and weaponization of nuclear facilities in armed conflict and signal a serious deterioration of international security.

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[40] Banafsheh Keynoush, "The Perils of Nuclear Talks After the US-Israel War on Iran," *Middle East Policy* (October 2025): 36-50, https://doi.org/10.1111/mepo.70011.

[41] Mark Fitzpatrick, "Attacking Iran and Tempting Fate," *Survival* 67, no. 4 (2025): 7–24, https://doi.org/10.1080/00396338.2025.2534278.

[42] Claire Mills and John Curtis, *Israel-Iran 2025: Developments in Iran's Nuclear Programme and Military Action*, Research Briefing No. CBP-10284 (London: House of Commons Library, 24 June 2025), https://researchbriefings.files.parliament.uk/documents/CBP-10284/CBP-10284.pdf

[43] Mark Fitzpatrick, "Attacking Iran and Tempting Fate," *Survival* 67, no. 4 (2025): 7–24, https://doi.org/10.1080/00396338.2025.2534278.

[44] Reuters. "Ukraine Drone Hits Russian Nuclear Plant, Sparks Huge Fire at Novatek's Ust-Luga." *Reuters*, August 24, 2025. https://www.reuters.com/world/europe/ukraine-drone-hits-russian-nuclear-plant-sparks-huge-fire-novateks-ust-luga-2025-08-24/.

[45] "IAEA Says No Danger after Drone Hits Russian Nuclear Plant," *Channel News Asia*, October 8, 2025, https://www.channelnewsasia.com/world/iaea-says-no-danger-after-drone-hits-russian-nuclear-plant-5388696.

Conclusion

The historical evolution of armed attacks on nuclear facilities, from Osirak in 1981 to Iran in 2025, reveals a dangerous precedent and the failure of the international legal order to protect and enforce norms. Israel's Operation Opera introduced the normalization of airstrikes and preventative self-defense, which remains illegal under Article 51 of the UN Charter. Each case further proves the erosion of the political and legal framework that prohibits armed attacks against nuclear sites.

This age of impunity and the growing risks of nuclear accidents cast serious doubt on the existing legal framework. From the UN Charter, most notably Article 2(4) and Article 51, the role of the IAEA, and the protections provided by international humanitarian law, particularly Article 56 of the Additional Protocol I to the Geneva Conventions and Article 15 of Additional Protocol II to the Geneva Conventions, these codified legal instruments have failed to shield the world from military attacks on nuclear facilities.
Furthermore, the military attacks on nuclear sites in recent years, most notably in the Ukraine-Russia war and Iran, have cast serious doubt on the neutrality and integrity of the IAEA's work. While the agency has adopted several resolutions on the protection of Ukraine's nuclear power plants and strongly condemned Russia's attacks, it has failed to adopt any resolutions in the protection of Iran's nuclear power plants. IAEA refrained from condemning the attack, despite the vast destruction and high civilian death toll. In addition, the UN Security Council failed to condemn the attack and has not adopted a resolution related to the US-Israel attack in June 2025. The historical timeline of the cases above showcases a decisive difference in the responses of the IAEA and the international community, depending on the belligerents. This is especially significant given the differing NPT statuses of the actors involved: Iran is a non-nuclear-weapon state party, Israel is a non-member to the Treaty, and the United States is one of the Treaty's depository states.

Recommendations

1. **Codify Legal Protection Under International Humanitarian Law (IHL):**

The international community should explicitly recognize nuclear facilities as "installations containing dangerous forces" under Article 56 of Additional Protocol I (1977) to the Geneva Conventions.[46] This would make intentional attacks on safeguarded nuclear installations prosecutable as war crimes under the Rome Statute of the ICC (Articles 8(2)(b)(ii) and (iv)), providing a concrete legal deterrent.

2. **Strengthen the IAEA's Enforcement Mandate:**

The IAEA should adopt a new supplementary protocol authorizing the Agency to investigate and publicly attribute responsibility for attacks on safeguarded nuclear facilities. This could include cooperation with the UN Security Council to recommend sanctions or refer cases to the International Criminal Court.

3. **Establish a UN Mechanism for Nuclear Infrastructure Protection:**

A permanent joint UN-IAEA body on Nuclear Security in Armed Conflict should be established to monitor, verify, and report violations. This body could operate under Chapter VII authority to enforce compliance, drawing on precedents such as UNMOVIC or OPCW inspections.

4. **Develop a Regional Confidence-Building Framework:**

This recommendation was originally proposed after the Iran–Iraq War and reflected in IAEA Resolution 533. Therefore, this idea should be revisited to build a comprehensive confidence-building measures framework in the Middle East. States would create a hub for discussions, which would help guide and create a regional treaty, ensuring the immunity of nuclear facilities from armed attack.

5. **Address Cyber Threats to Nuclear Infrastructure:**

Given the rising prevalence of digital operations targeting nuclear infrastructure, states should negotiate a binding protocol through the IAEA or the Tallinn Manual process, recognizing that cyberattacks causing

[46] "IHL Treaties - Additional Protocol (I) to the Geneva Conventions, 1977 - Article 56," 1987, https://ihl-databases.icrc.org/en/ihl-treaties/api-1977/article-56.

physical destruction or radiation risk qualify as “armed attacks” under international law, triggering the right of self-defense and accountability mechanisms.

6. **Enhance Transparency and Early Warning Systems:**

The IAEA’s Incident and Emergency Centre (IEC) should be upgraded into a real-time nuclear conflict early warning system, integrating satellite data, military movement monitoring, and AI-assisted threat detection to notify the UN Security Council of imminent attacks.

7. **Reinforce State Accountability and Reparations:**

The UN General Assembly, in coordination with the IAEA, should create a Nuclear Facility Reparations Fund, modeled after the UN Compensation Commission (post-1991 Gulf War), to provide redress for states and civilian populations affected by attacks on nuclear sites.

8. **Create an International Convention for Negotiation**

Promptly create an international convention on negotiation on the prohibition of attack or threat of attack against nuclear facilities, in the CD in Geneva.

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