Conflict, security of nuclear facilities in Middle East

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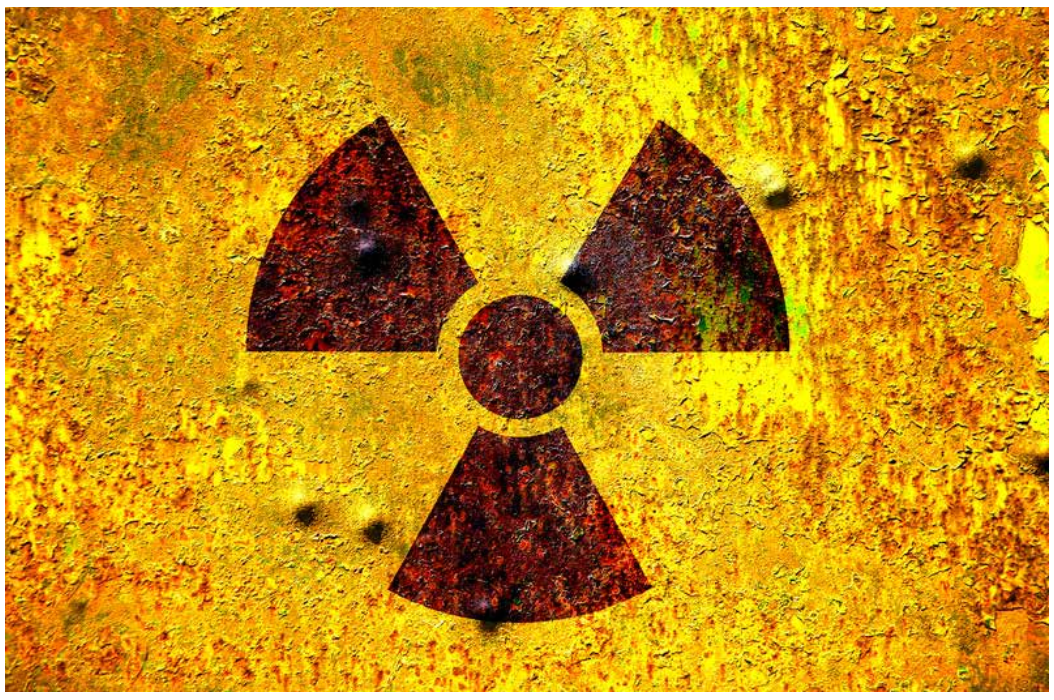
ANALYSIS

Nuclear power has always come with a high-risk tag. The attacks by Israel and the United States against the Iranian nuclear programme in 2025 and 2026 and the Russian capture of the Zaporizhzhia nuclear power plant (NPP) in Ukraine since 2022 have brought this risk into hyperfocus. Nuclear-security risks are very real, and the laws and norms meant to prevent them are under severe strain. For potential nuclear newcomers in the Persian Gulf, these risks might prove high enough to make them rethink their nuclear plans.

The case of the 2025–26 US/Israel–Iran conflicts is both familiar and novel. Both Israel and the US carried out "preventive" attacks against nuclear and "weapons-of-mass-destruction" facilities they regarded as potential proliferation risks in Iraq in 1981 and 1991 and in Syria in 2007. Yet the scale of the attacks on Iran's nuclear programme since 2025, coupled with the attacks on energy infrastructure in this recent conflict, may compound the perceived risk to NPPs, which run the highest risk of radiological emergencies.

Norms do not exist in a vacuum and nuclear facilities are not sacred. The norm against attacking them exists to prevent the catastrophic consequences of such an attack. While greatly strained, the norm against attacking NPPs specifically has held.

Persian Gulf states' nuclear-energy ambitions — which have materialised in the United Arab Emirates (UAE) and are in the planning stages in Saudi Arabia and Bahrain — are not merely prestige projects. They are intended to address real needs that underpin their economic and energy strategies. Persian Gulf states have shown keen interest in acquiring traditional reactors and small modular reactors (SMRs), both of which have vulnerabilities. Therefore, this situation warrants a sober assessment of the risks and possible mitigation measures associated with pursuing nuclear power in a conflict-prone environment.



The illustration shows bullet holes on a hazard symbol for radiation or radioactivity.
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Low probability, high consequence

Although the ongoing Russia–Ukraine and US/Israel–Iran wars have shed light on the security risks associated with NPPs, the objective of an attack on a nuclear facility and the nature of that facility are important considerations when attempting to identify the risks and possible mitigation measures. Typically, attacks against NPPs by states have been aimed at counter-proliferation, and those by non-state armed groups (NSAGs) at terrorising the population for political ends. Recent attacks on energy infrastructure may lead to a perception that NPPs can be legitimate targets.

By and large, Israeli and US attacks (in the past cyber, and more recently kinetic) against the Iranian nuclear programme have not targeted facilities at risk of a large-scale radiological release. This counter-proliferation logic of the US and Israel explains the facilities they have targeted, such as facilities for uranium enrichment and fuel fabrication.

Iran's only operational NPP, Bushehr, has been spared in 2025 and 2026, further suggesting that environmental concerns may have been a consideration. Despite reports of three attacks in the vicinity of Bushehr, neither the US nor Israel have said that they targeted the plant, and impacts near Bushehr may have been fragments from attacks on nearby military targets. Prior Israeli attacks on nuclear reactors — Osiraq in Iraq, al-Kibar in Syria and Arak in Iran — all occurred while the reactors were non-operational with no nuclear material on site. Compared to nuclear reactors used for electricity generation like Bushehr, these reactors were relatively small, with power outputs between one-twentieth and one-fiftieth of a modern commercial power reactor. Iraq had attacked Bushehr multiple times while under construction in the 1980s, however. It was then a safeguarded, light-water reactor to be fuelled with 3%-enriched uranium, but Iraq nevertheless considered it a proliferation risk.

Currently, there are no serious proliferation concerns associated with the Bushehr NPP. This is because of the reactors' configuration, which uses low-enriched uranium and is not optimised for plutonium production. Russia supplies the fuel for the plant and takes it back when spent, while providing much of the technical support to enable the functioning of the site, including hundreds of personnel. The site also remains under International Atomic Energy Agency (IAEA) safeguards.

Even if the probability of the Bushehr NPP being attacked is low, the consequences would be catastrophic for the Persian Gulf states, so the risk perception will always be acute. To address public concern, the Persian Gulf Cooperation Council (GCC)'s Emergency Management Centre was activated in 2025 to monitor radiation levels.

Iran's single attack affecting the Shimon Peres Negev Nuclear Research Center in March 2026, a site associated with Israel's nuclear-weapons programme, struck the two adjacent towns of Dimona and Arad. The heavily protected reactor was unharmed, and the attack served at best as a response to the attack on the Natanz uranium-enrichment facility.

The proliferation of NSAGs in the region also poses a threat to NPPs. A terror attack could be far more dangerous than one by a state actor, as a large-scale radiological release would likely be the main objective. In 2017, the Yemeni group Ansarullah (Houthis) claimed they had fired a cruise missile at the UAE's Barakah NPP while it was still under construction. However, Ansarullah provided no evidence for their claim; the UAE denied reports of an attack and no damage was reported at the facility.

More recently, a drone strike on May 17, 2026, caused a fire at a generator supplying electricity to the plant. The incident did not cause a radiological release and onsite emergency diesel generators were deployed to make up for the loss of power. Given the precision of UAV targeting, it can be assumed that the generator was the intended target. Such an attack could also impact the energy that the plant supplies to the grid without risking a radiological release. At the time of writing, no state or group has yet claimed the attack. The UAE has said that the drone originated from Iraqi territory, leading to speculation that the Iraqi Popular Mobilisation Units may be responsible. If the attack was indeed carried out by Iran or its backed groups, it is a dangerous escalation and demonstrates the extent of retaliation it is willing to carry out if further provoked. Any further attacks on either the Barakah or Bushehr power plants increase the risk of targeting errors that could have devastating consequences.

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While attacks by NSAGs on nuclear facilities have been planned and carried out, to date none have resulted in a nuclear accident. Plans for further such attacks and sabotage by NSAGs (e.g., al-Qaeda) have been documented, but these were likely abandoned in favour of targets that were less heavily guarded or did not require technical knowledge of the operation of a NPP to be carried out. Yet with NSAGs in the region acquiring more sophisticated missiles and uncrewed aerial systems, the complexity of carrying out such an attack is significantly lowered, and the potential for achieving objectives increased. Even if a direct attack using a ballistic missile did not breach the containment structure, spent-fuel pools outside the containment would be at significant risk. A loss of cooling or draining the water inside the pool could ignite the spent fuel and cause large amounts of radiological material to disperse into the atmosphere. Such an accident at the Barakah NPP could necessitate evacuating major cities, such as Dammam, Doha and Manama.

Mounting attacks on energy infrastructure in recent conflicts arguably compound the perceived risks to NPPs. While such attacks violate the law of armed conflict, assessing the objectives of such attacks can help determine whether this trend poses new risks to NPPs per se.

The stated objective of the American and Israeli attacks was to inflict economic damage by cutting off the stream of revenue to the Islamic Revolution's Guard Corps. Iran's retaliatory attacks against Persian Gulf states aimed to disrupt the energy market in hopes of pressuring the US to end its campaign. Attacking NPPs would not advance either goal.

However, attacks aimed at punishing or pressuring civilian populations may have more concerning implications for the safety and security of NPPs. Examples of attacks and threats of attack, which to date have targeted non-nuclear infrastructure, include Russian attacks on Ukrainian power substations and US President Donald Trump's threat against Iran's energy infrastructure. An attack on a NPP would not just cause the lights to