

## **When Nuclear Plants Become Military Targets: What Our War Games Show**

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I want to thank the organizers for this meeting to consider how we should view the military targeting of nuclear power plants in war.

Among analysts, the military assault of nuclear facilities is generally viewed in one of two ways. The first is to assume meltdowns, massive radiation releases, and evacuation catastrophes will ensue. The second emphasizes how, despite repeated attacks on reactors, no radiological release has yet occurred and stresses how much safety engineers have improved nuclear systems with melt-resistant fuels and inherently safer small modular designs.

But in wars, it's not safety engineers who call the shots. It's the military, and the military has made several assumptions. The most popular of these is that no one would attack nuclear plants, as the fallout could harm all parties. Another is if these plants must be attacked, it would only happen in an overt, total war in which the knock-on effects would pale in comparison against the much broader destruction of total war.

These assumptions conveniently excuse officials from serious planning. So, my center decided to test them with two simulations. One, set in Korea in 2026, gamed a war that initially was grey. Another, set in 2037, examined how a Russian reinvasion of Ukraine might play out.

In the Ukraine game, Moscow attacks and quickly escalates not with nuclear weapons, but by targeting Ukrainian and NATO nuclear power plants. Moscow's aims include: 1) Generating panic and radiological releases that will demonstrate its willingness to "go nuclear;" 2) Destabilizing much of Ukraine's electrical grid, which by 2037 includes a combination of large and small U.S. reactors; 3) Deterring NATO from supporting Ukraine.

These attacks generate significant radiological releases, which drift into NATO countries. Unprepared, nuclear experts give contradictory advice on how dangerous the radiation is and what should be done. NATO also splits over whether these strikes constitute a war crime under Protocol One of the Geneva Convention and should trigger collective action under Article 5. Washington says no. The rest of NATO says yes. This debate stalls NATO action.

Then, Ukraine and Poland announce they plan to strike Engels, a Russian strategic airbase. Frightened that this might escalate the war, NATO invokes Article 5, not to authorize a response, but to prevent Poland from striking Russia with Ukraine without NATO. This gambit succeeds in keeping Warsaw from working with Kyiv, but it fails to deter Ukraine from attacking Engels. This, and a NATO-led mission to remediate the leaking Ukrainian power reactor Russia hit, causes the United States, NATO, and Russia to escalate the war (all of them go on heightened nuclear alert).

This brings us to the second scenario—set in 2026 in East Asia.

In this game, China, hoping to keep America and its allies out of a fight over Taiwan, encourages Pyongyang to stage a diversion. Instead of using its own missiles, though, Pyongyang quietly mobilizes South Korean sympathizers to locally loft commercial drones against the Kori nuclear plant and its spent fuel pools.

The attack works. A radiological release forces millions to evacuate southern South Korea and western Japan. Panic ensues.

Fearing a Chinese invasion of Taiwan and eager to deter this, the United States boldly launches an immediate, unilateral strike against North Korea. Washington consciously fails to consult Seoul or Tokyo, alienating them both. South Korea wanted to coordinate a joint military response with the United States. Japan questions whether there was definitive proof the North was responsible. When Washington subsequently requests Seoul's and Tokyo's support to repel China's aggression against Taiwan, they refuse.

In both games, the message is clear: Reactors *are* attractive military targets both in overt and grey wars. Hitting them can strain alliances and change the direction of wars.

I can attest to the private concerns our government and our allies now have about these scenarios. None, however, has yet aired these concerns publicly.

Outside the government, some support expanding the India-Pakistan agreement not to strike nuclear facilities. Others propose tightening Protocol One. But it's unclear how much this might help. India, after all, might still target Pakistani nuclear sites and Russia currently claims its strikes against Ukraine's electrical system and nuclear facilities comply with Protocol One.

Things may get worse. America plans to export nuclear plants, including fast reactors and HALEU-fueled systems. Fast reactors, though, can produce super-weapons grade plutonium. HALEU sits at enrichment levels close to weapons-grade, and even traditional reactors can act as nuclear bomb "starter kits." These could be targeted in war.

With any bad luck, America's nuclear plants could be next. In the last 12 months alone, there were 26 reported drone overflights of U.S. power reactors. Meanwhile, radicals and "vandals" have attacked electrical substations across the country. Overseas, hybrid warfare against civilian infrastructure, including the electrical supply systems, is on the rise. These grey threats are likely to increase: China and Russia are developing intercontinental non-nuclear missiles alongside advanced cyber tools like Typhoon Volt, and the ability to launch drones locally. China is reported to have sold the United States electrical transformers grid equipment that can spy on America's electrical supply system, transmit information back to China, and that China can remotely direct to fail. All of these capabilities could be used against America's electrical network.

What, then, is to be done?

**First, hold more public panels like this clarifying how reactors are potential military targets,** not just possible accidents.

**Second, conduct more classified and unclassified war games** simulating different nuclear plant attacks at outside think tanks, within our government, with and without our allies participating.

**Third, conduct rigorous studies on the consequences of attacks** against current and proposed nuclear plants and the fuels they might use. In addition, serious analyses should be undertaken to assess what nuclear weapons proliferation threats the spread of small modular reactors of different types might be, especially of fast reactors and plants using HALEU.

**Fourth, assess the feasibility, costs, and benefits of securing these nuclear facilities** and materials with passive and active defenses – islanding, hardening and proliferating transformers and substations, missile defenses, hardening specific reactor nodes, etc. – and reconsider which are too close to bomb making to be safe to export.

**Fifth, create a Civil Infrastructure Defense (CID) program,** which would include nuclear plants. This would require sanitizing existing controlled unclassified information (CUI) and Critical Energy/Electric Infrastructure (CEEI) information.

**Sixth, the State Department, the Pentagon, and the National Nuclear Security Administration should repurpose America’s Cooperative Threat Reduction Program into a Nuclear Security Initiative** that would collaborate with friendly nuclear-powered states to improve the protection from and first response to strikes against nuclear plants.

**And finally, the Defense Department should develop strategies to deter attacks** against U.S. and allied electrical supply systems by putting hostile countries' electrical supply systems at risk. The strategies should emphasize temporary disablement.