



Ukraine invasion — explained

Ukraine's top nuclear plant lost power for the sixth time. Is disaster imminent?

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By Emily Olson



Ukraine's Zaporizhzhia Nuclear Power Plant, pictured here in October, has operated with emergency power sources six times since Russia's offensive started.

Carl Court/Getty Images

Russia unleashed a barrage of missiles on Ukrainian cities late Wednesday night, killing at least six people and taking out critical infrastructure across 10 regions, local authorities said.

The attack knocked out power across parts of Ukraine, including at the Zaporizhzhia Nuclear Power Station. Ukrainian grid operator Ukrenergo said the facility was connected back to the power grid by midday Thursday.

But this isn't the first time the Russian-occupied plant has been forced to run on emergency generators. Experts say that after six emergency shutdowns at Zaporizhzhia, the plant is still teetering on the brink of a nuclear catastrophe.

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Here's a breakdown of where things stand.

First, a quick refresher on why Zaporizhzhia is so important

Zaporizhzhia is located in southern Ukraine and serves as Europe's largest nuclear power plant. Running at full capacity, the plant is capable of producing 6,000 megawatts of electricity.



UKRAINE INVASION — EXPLAINED

Here's why the risk of a nuclear accident in Ukraine has 'significantly increased'

Russian forces captured Zaporizhzhia a year ago this month, but a war-weary, under-staffed Ukrainian team continues to man its controls.

Shelling has damaged the plant at least six times since then, temporarily cutting off the four high-voltage power lines that connect Zaporizhzhia to Ukraine's energy grid.

The power lines are essential to the plant's safety and cooling systems — the longer the plant goes without power, the higher the chance of a possible nuclear meltdown.



UKRAINE INVASION — EXPLAINED

Russia is draining a massive Ukrainian reservoir, endangering a nuclear plant

The plant does have the ability to generate its own electricity, but, as a former Zaporizhzhia engineer told NPR's Geoff Brumfield, that's not a sustainable long-term solution. Oftentimes the plant will switch to diesel-powered emergency generators, but those too have limitations based on fuel quantity.

And on top of all this: Kremlin troops appear to be slowly draining the reservoir that is the source of water that's pumped through the plant's core to keep temperatures down.

So the specter of a possible nuclear meltdown hangs over every minute of the war.

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The latest shutdown came as negotiations over the plant hit a dead end

Ukraine's Energy Minister Herman Galushchenko said Wednesday night's attacks on Zaporizhzhia came at a notable inflection point.

Galushchenko says he's been trying to negotiate with Russian leaders in order to de-militarize the plant, and in a nationally televised address this weekend, he told Ukrainians those talks had reached a dead end.



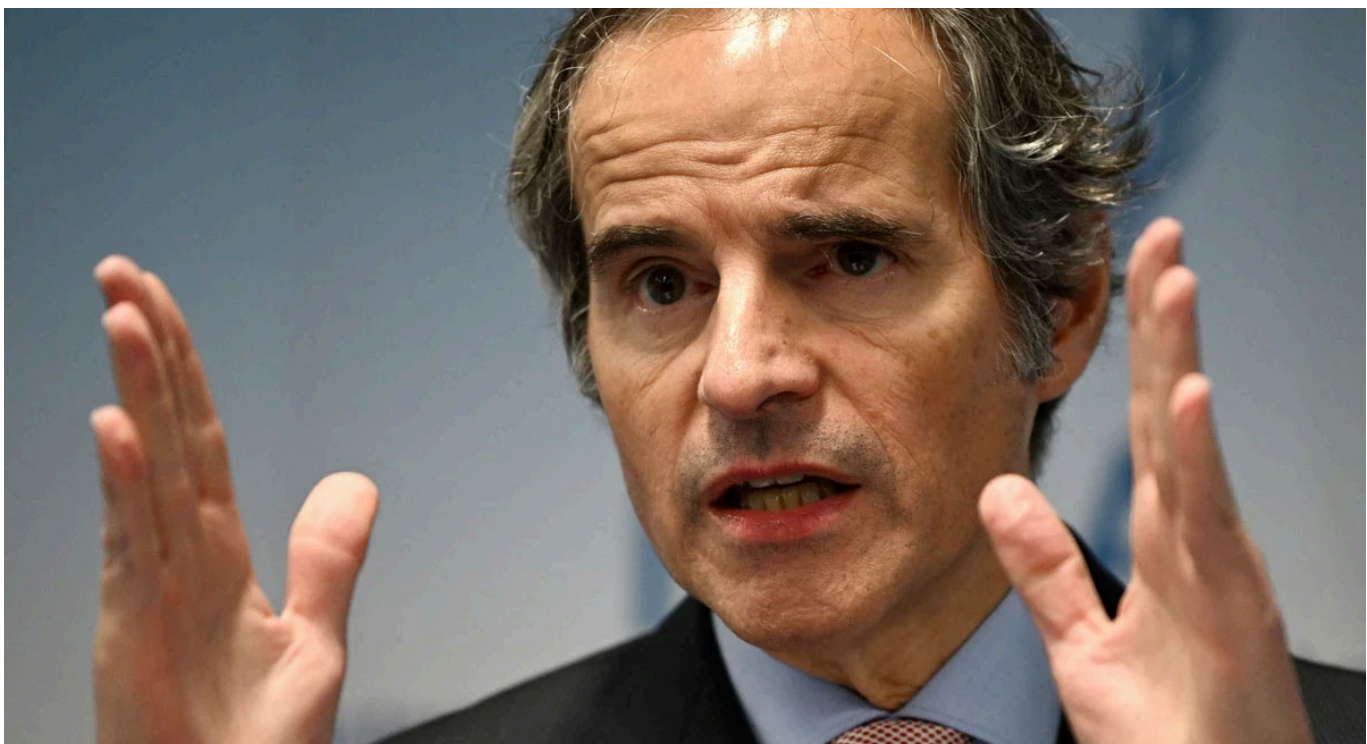
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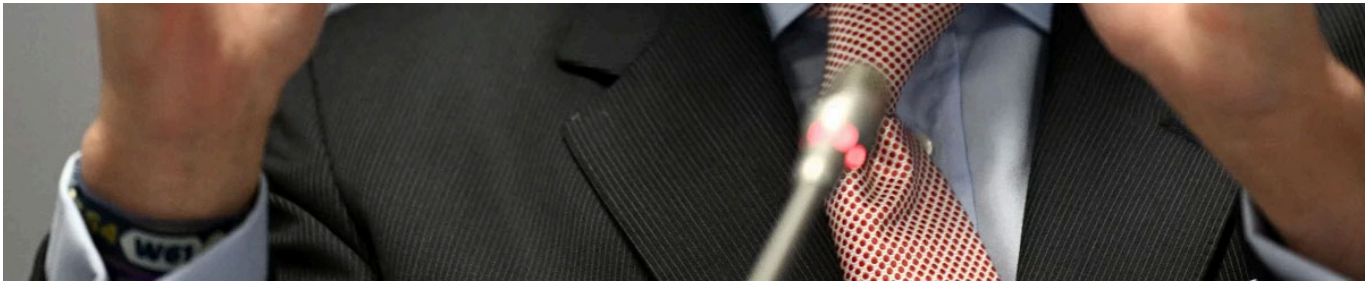
How Freaked Out Should We Be About Ukraine's Nuclear Plant?

"The situation was brought to a standstill. Our position, which we voice at all international platforms, is that any negotiations on ZNPP should be based on: first, demilitarization of the plant," he said. "But in response to this, we received [Russian President Vladimir] Putin's null and void decree that ZNPP is 'federal' property."

He said he believes the Kremlin's ultimate goal is to leave Zaporizhzhia "inoperable" after de-occupation, diminishing Ukraine's status as a European energy hub.

U.N. watchdog sends an urgent warning: "One day our luck will run out"





IAEA Director General Rafael Grossi, pictured here at a press conference earlier this week, says the world is "rolling the dice" on allowing Ukraine's Zaporizhzhia power plant to undergo repeated damage.

Thomas Kronsteiner/Getty Images

Russia has said that it's trying to connect Zaporizhzhia to its own power grid. But Ukrainian officials are reportedly skeptical that such a connection would even be possible given that it would require a high-voltage power line from the plant to Russia.

Rafael Grossi, the director-general of the United Nations' nuclear watchdog agency, said he was "astonished at the complacency" of the U.N. as Zaporizhzhia was forced to operate in emergency mode for a sixth time.

"What are we doing to prevent this happening?" he told the International Atomic Energy Agency's board in an urgent update. "Each time we are rolling a dice. And if we allow this to continue time after time then one day our luck will run out."

Grossi has long said that safeguarding Ukraine's nuclear sites should be the IAEA's "top priority." The agency has sent teams into Ukraine to actively monitor Zaporizhzhia and last month released a 52-page report outlining potential safeguards.

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The top recommendation is the creation of a safe zone around Zaporizhzhia, an idea that Kremlin leaders agreed to discuss with the IAEA last month.

Worst case scenario: Could Zaporizhzhia be the next Chernobyl?

If all negotiating attempts fail, a disaster at Zaporizhzhia would be major, but likely not as damaging as the 1986 disaster at Chernobyl or 2011 breakdown at Fukushima.



UKRAINE INVASION — EXPLAINED

What it's like for Ukrainians working at a nuclear plant under Russian occupation

Steven Nesbit, a nuclear engineer and member of the American Nuclear Society's rapid response taskforce, told NPR there are two main reasons.

First, some of the reactors at Zaporizhzhia have been shut down for a while, helping to cool down the fuel.

Second, Zaporizhzhia's reactors are more modern in design, surrounded by three- to four-foot walls of reinforced concrete that could help hold in radioactive material.

But, understandably, Nesbit and other nuclear experts say it's not worth testing out those theories.

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