

# The State of Ukraine's Zaporizhzhya Nuclear Power Plant

A COMPILATION OF FACTS FROM CREDIBLE SOURCES



The U.S. Department of Energy  
National Security Administration (DOE/NNSA)  
DOE/NNSA Ukraine Task Force  
Fact Sheet | March 4, 2024

## BACKGROUND

Russian personnel have occupied and controlled Ukraine's Zaporizhzhya Nuclear Power Plant (ZNPP) since Russian forces seized the site on March 4, 2022.

The Department of Energy / National Nuclear Security Administration's (DOE/NNSA) Ukraine Task Force has been monitoring the conditions at ZNPP using a variety of credible sources and conducting its own analysis.

The facts DOE/NNSA has collected on the state of ZNPP do not support the narrative Russia has presented.

## SUFFICIENCY OF TECHNICAL STAFFING

- A major safety concern at ZNPP is the availability of experienced technical personnel. The plant is being operated by an inadequate and insufficiently trained cadre of workers, who have not been licensed by the State Nuclear Regulatory Inspectorate of Ukraine (SNRIU), the regulator that is familiar with the ZNPP safety systems. **This is a dangerous and unsustainable posture to maintain a nuclear power plant.**
- Russia's announcement that from February 1, 2024, Ukrainians who have not signed employment contracts with Rosatom and accepted Russian citizenship will not be given access to ZNPP makes the staffing situation even more dire.<sup>1</sup> Some 120 personnel unwilling to sign Russian contracts reportedly were removed from ZNPP rosters in the latest winnowing of staff.<sup>2</sup> For key positions such as reactor operators, **even the loss of a small number of experienced, appropriately licensed professionals can have a large impact on safety.**
- Russian operators informed the International Atomic Energy Agency (IAEA) that the staff at ZNPP are sufficient for shutdown operations and maintenance. However, **the total number is less than one third of pre-war staffing**, and thousands of skilled workers with decades of experience at the plant are no longer available. Previous reports of control rooms being operated with as few as a single individual suggest acute staffing shortages have occurred. An abnormal condition such as the failure of key equipment or a fire would require prompt and informed actions suitable for the design of the plant.
- Russia insists the Russian staff are technically qualified to operate ZNPP. However, **these personnel are only qualified and experienced for Russian RBMK and Russian VVER reactors and are inexperienced in operating Ukrainian VVER variants**, which have evolved differently

than Russian designs since Ukraine's independence in 1991, particularly the safety systems. Learning to operate such different reactors requires lengthy study with qualified instructors and representative simulators, which Russia has not been able to meaningfully provide. The same lack of familiarity and training on these designs applies to the Russian regulator, which has no legitimate authority over ZNPP and has not had time to learn the systems.

## ARDUOUS WORKPLACE CONDITIONS



**Treatment** — Since Russia's seizure of ZNPP, Ukrainian operators have worked under extraordinarily challenging conditions. Russia's brutal actions include repeated unjust detentions of key managers and application of many other forms of pressure on the plant's personnel.



**Stress** — The stress of nearby combat and oversight by armed military and security personnel has significantly diminished the safety culture at the site.



**Conditions** — The conditions for workers at ZNPP clearly violate the IAEA's seven indispensable pillars for ensuring nuclear safety and security in an armed conflict, namely that "the operating staff must be able to fulfill their safety and security duties and have the capacity to make decisions free of undue pressure."

<sup>1</sup> IAEA Update 209, "IAEA Director General Statement on Situation in Ukraine," February 1, 2024.

<sup>2</sup> "No optimism from IAEA inspectors regarding Russia-captured nuclear plant - Ukraine official," UKRINFORM, February 10, 2024.

## RELIABILITY OF OFF-SITE POWER

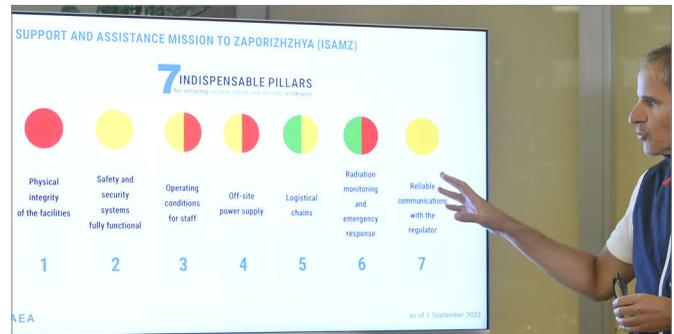
- 1 Access to a secure, reliable off-site power supply for all nuclear sites is one of the IAEA's seven indispensable pillars. All of Ukraine's nuclear power plants had multiple sources of off-site power before Russia's full-scale invasion, as is the global norm. Now **five of the seven power lines at ZNPP have been continuously down for more than a year.**
- 2 The **loss of off-site power to ZNPP could lead to a nuclear accident**, potentially including a release of radiation, even when the reactors are in hot or cold shutdown modes.
- 3 In its latest communique to the IAEA, Russia claims the 750kV and 330kV power lines at ZNPP are sufficient for the plant's shutdown condition, dismissing the eight separate losses of off-site power at ZNPP since Russia's seizure of the plant, most recently in December 2023, as well as multiple partial power losses.<sup>3</sup> These occurrences clearly demonstrate **the inadequacy of the power supply** at the site and the likelihood of further power losses.

## ADEQUACY OF COOLING WATER

- The destruction of the Kakhovka Dam in June 2023 eliminated a large and readily available water supply — the ultimate heat sink for ZNPP — turning the reliability of water that the plant relies into a significant concern and increasing overall risk to ZNPP.
- Although the Russian operators of ZNPP have dug 11 wells to provide cooling water, and this supply may be adequate for the short term, these few wells have not been assessed for long-term use and are a poor substitute for the Kakhovka reservoir.
- These wells cannot support reactor operation. As IAEA Director General Rafael Grossi pointedly observed, "this is not a sustainable solution."<sup>4</sup>



IAEA expert mission team tour of Zaporizhzhya Nuclear Power Plant.  
Photo Credit: Fredrik Dahl / IAEA



IAEA Director General Grossi's press conference on 2 September 2022.  
Photo credit: IAEA

## MILITARIZATION OF ZNPP

### Military Equipment and Mines

Russia's placement of military equipment and explosive mines around ZNPP has **jeopardized the safety and security** of the plant, the lives of Ukrainian staff who operate the plant, and the security of the surrounding area.

### Explosions

Multiple mines have exploded around ZNPP, some set off by animals, contributing to a dangerous atmosphere at the site and threatening ZNPP operational equipment.

### Lack of Physical Integrity

Russia has characterized its mining of the perimeter of ZNPP as a necessary security precaution.<sup>5</sup> However, the militarization of the site in this fashion clearly violates the IAEA's seven indispensable pillars, which note that **the physical integrity of nuclear facilities must be maintained, and the operating staff must be able to fulfill their safety and security duties and have the capacity to make decisions free of undue pressure.**

## IAEA ACCESS

- 1 **Lack of Cooperation** — In spite of Russia's claims of cooperation with the IAEA at the site, **IAEA personnel are still being delayed or denied access to critical locations around ZNPP**, which must be inspected closely and continuously for the IAEA to credibly discharge its safety and security missions at the site.
- 2 **Access Delayed or Denied** — Russia has delayed, sometimes for weeks or months, or outright denied IAEA staff access to certain ZNPP locations on the grounds that doing so is necessary for their safety.<sup>6</sup> **If ZNPP staff have access to these critical areas, then IAEA personnel should, too.** If ZNPP staff do not have open access, there is reason to believe the plant is unsafe.

<sup>3</sup> IAEA Information Circular 1177, "Communication from the Permanent Mission of the Russian Federation to the Agency," February 5, 2024.

<sup>4</sup> IAEA Update 210, "IAEA Director General Statement on Situation in Ukraine," February 8, 2024.

<sup>5</sup> IAEA Information Circular 1175, "Communication from the Permanent Mission of the Russian Federation to the Agency," January 31, 2024.

<sup>6</sup> "UN Access At Ukraine Nuclear Plant Curbed For Safety: Russia," Agence France Presse, January 5, 2024.