



## G7 Nuclear Safety and Security Group

June 2024

# 2024 NSSG REPORT

## INTRODUCTION

1. The Nuclear Safety and Security Group (NSSG), established at the Kananaskis Summit in 2002 and responsible to Leaders, through Sherpas, provides technically informed, strategic policy advice in the areas of nuclear safety and security in the peaceful use of nuclear energy in close cooperation with multilateral organizations avoiding duplication of tasks or responsibilities that are being addressed adequately by existing organizations or entities.
2. This report presents the outcomes identified by the NSSG during the 2024 Italian Presidency deemed relevant to its mandate.

## EVOLUTION OF THE NUCLEAR SAFETY AND SECURITY SITUATION IN UKRAINE

3. The NSSG reiterates its concern for the nuclear safety and security situation in Ukraine in general and for the continuous threats to the safety and security of the Zaporizhzhia nuclear power plant (ZNPP) posed by Russia's actions. The NSSG reiterates the importance of returning full control of the plant to the competent Ukrainian authorities and of Russia refraining from any further actions that could result in a nuclear incident at the plant. The Group is concerned about recurrent loss of external power supply, the lack of comprehensive preventative maintenance at the site which is expected to have long-term implications for nuclear safety, destroyed cooling water system, the placement of landmines, the recent Russian ban on Ukrainian staff, leaving doubts about the number and level of qualification of staff at the site. The NSSG stresses the importance of continuing to support the IAEA's Seven Indispensable Pillars and Five Principles for ensuring nuclear safety and security during armed conflict, including maintaining the physical integrity of the facilities as paramount.
4. The NSSG commends the IAEA for its efforts in supporting Ukraine to help ensure the safety and security of nuclear power plants and of nuclear and other radioactive facilities and materials, particularly at the sites; and recognizes the importance of the IAEA continuous presence at the sites and independence in carrying out its activities. In stressing widespread support for the IAEA in this fundamental role, the NSSG recognizes the significant ongoing contribution of the G7 in backing both Ukraine and the IAEA through multilateral and bilateral forms of support and material assistance; and encourages further improvements in communication and coordination among all concerned Parties.

5. In light of the ongoing critical situation at the Chernobyl site, in particular the delays in the dismantling of unstable parts of the Chernobyl Object Shelter and in the procurement of fundamental firefighting equipment in the Chernobyl Exclusion Zone, the NSSG continues to be highly concerned and recognizes the importance of the activities framed within the International Chernobyl Cooperation Account (ICCA) to support these and other nuclear safety and security issues in Ukraine.

## **PRIORITY TOPICS FOR NUCLEAR SAFETY AND SECURITY**

6. Armed conflicts as challenges to nuclear safety and security are being analyzed and will be further examined from different angles to draw lessons and understand whether specific action may be needed to minimize risks. In this regard, the NSSG takes note of the IAEA evaluation of Safety Standards and Security Guidance and its conclusion that they do not need to be modified to reflect specific conditions arising during armed conflicts. In addition, the NSSG welcomes the forthcoming IAEA TECDOC on challenges in the application of IAEA safety standards and nuclear security guidance during an armed conflict.
7. The NSSG notes the global declaration to triple global nuclear energy capacity by 2050 launched during COP28 and recognizes that for countries that opt to use it, nuclear energy will play a role in reducing dependence on fossil fuels, supporting the transition to net-zero and ensuring energy security, while other countries choose other energy sources to achieve these goals taking into account their assessment of associated risks and costs of nuclear energy. The NSSG also notes that advanced reactors and innovative technologies, such as advanced and small modular reactors (SMR), including microreactors, and new designs that are under development could bring in the future additional benefits such as improved safety and sustainability, reduced cost of production, reduced project risk, waste management improvement, better social acceptance, opportunities for industry by providing at the same time energy, high temperature heat, hydrogen. At the same time, the NSSG recognizes the importance of including safety, security and safeguards considerations in the design and deployment of SMRs and other advanced reactors, considering not only the plant design and operation, but also the specificity of their fuel cycle. The NSSG concurs on the need to continue the evaluation of potential security and safeguards risks related to remote deployment and fuel design; proliferation risks associated with innovative fuel designs; the increase in transport security complexity; intensive use of digital technologies, including remote control; siting, e.g. near urban areas or at remote sites where, particularly for microreactors, the reduction of human resources needed for operation has to be balanced against physical protection requirements; and provision of classified information to designers and/or vendors to allow nuclear Security by Design at an early stage. Similarly, potential security issues arising from international transport or transport through urban areas and floating NPPs deserve proper attention. The NSSG appreciates the IAEA efforts to keep abreast of these developments and expresses concern that the uncertainties on the IAEA nuclear security budget might hinder such efforts in the future. The NSSG welcomes initiatives to strengthen nuclear safety and security, such as sharing of national best practices enabling sectoral and cross-sectoral coordination, including through the recent European Industrial Alliance on SMRs, closer collaboration on licensing efforts among relevant authorities, and stronger cooperation on research and development projects among G7 members.
8. The NSSG recognizes the dual nature of Artificial Intelligence (AI) in the nuclear sector, and its potential impact on nuclear safety and security. Noting its positive contribution in improving and in speeding-up various processes, the NSSG expresses concerns about the possible misuse and malevolent use of this new technology that, coupled with advancements in cyber-technologies,

could pose unexpected risks in the near future. This implies the need to continue to analyze in depth the emerging challenges to safety and security that could give rise to threats not yet fully identified, explored, or understood, thus potentially requiring countermeasures that do not benefit from years of experience, like potential contamination of information and disruption of the chain of trust.

9. The NSSG reiterates the importance of safe, science-based and responsible approach to the discharge of Advanced Liquid Processing System (ALPS) treated water at TEPCO's Fukushima Daiichi Nuclear Power Station. The NSSG welcomes that the IAEA has found Japan's approach to be consistent with relevant international safety standards. Also, the NSSG supports the IAEA's ongoing independent and transparent reviews, as well as its monitoring and assessment, providing further confidence in the safety of the discharge of ALPS treated water into the sea.

#### **INTERNATIONAL INSTRUMENTS RELEVANT TO NUCLEAR SAFETY AND SECURITY**

10. Universalization and implementation of international instruments for safety and security remain a priority for the NSSG. The G7 members commit to continue outreach efforts and to coordinate them in order to increase and optimize universalization action for the Convention on Nuclear Safety (CNS), the Joint Convention (JC) on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment, the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT) and the Code of Conduct on the Safety and Security of Radioactive Sources and its Supplemental Guidance, the Convention on Early Notification of a Nuclear Accident, the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.
11. The NSSG welcomes the significant level of participation at the IAEA International Conference on Nuclear Security ICONS-2024 and highlights its importance as a high-level venue for strengthening the global nuclear security architecture, fostering international cooperation, and achieving meaningful advances to improve nuclear security. The NSSG regrets that, for the first time, a Ministerial Declaration was not adopted by consensus at ICONS-2024 and expresses its support to the Co-Presidents' statement. The NSSG also stresses that the lack of agreement does not diminish the value of the previous commitments to enhance global nuclear security.

#### **EDUCATION AND TRAINING OF THE NEXT GENERATION OF EXPERTS IN NUCLEAR SAFETY AND SECURITY**

12. Taking note of the current forecasts projecting a significant increase worldwide of the use of nuclear power, the NSSG emphasizes that such ambitious goals need to be accompanied by equivalent efforts in capacity building programs, targeted not only on industrial needs, but also on the education and training of the next generation of experts in nuclear safety and security, who will have the responsibility to implement and verify the highest safety and security standards for the new nuclear programs. The NSSG supports and encourages cooperation activities and collaborative efforts, also between regulators, at bilateral and multilateral levels, to strengthen capacity building for nuclear safety and security, including with embarking or expanding countries with due attention to the concepts of Diversity, Equity, Inclusion and Accessibility (DEIA).

## **SAFETY AND SECURITY ISSUES RELATED TO THE CURRENT FUEL SUPPLY SCENARIO**

13. The NSSG takes note of the current international efforts towards a diversification of the fuel supply chain, including the 2022 G7 Leaders commitment to further reduce reliance on civil nuclear and related goods from Russia and the G7 Climate, Energy, and Environmental Ministers decision in April 2023 to establish a working group to explore further cooperation, that have not only political and commercial implications, but also relevance for nuclear safety and security, from the possible environmental impacts of the extraction of raw materials to the licensing of new and alternative fuel assemblies, in terms of the necessary time required to meet regulatory requirements. In this regard, the NSSG encourages international dialogue and cooperation, also at regulatory level, to ensure that the highest safety and security standards are met in the diversification processes.
14. Within the respective mandates and avoiding duplication of efforts, the NSSG recognizes the importance of the mutual exchange of information and the potential synergies deriving from the new G7 Nuclear Energy Working Group (NEWG), set up in December 2023 under the Japanese Presidency, Co-chaired by the United States.

## **NUCLEAR AND RADIOLOGICAL EMERGENCY PREPAREDNESS AND RESPONSE**

15. The NSSG notes the recent initiatives to enhance coordination and increase harmonization in nuclear and radiological emergency preparedness and response (IAEA CONVEX series, OECD/NEA INEX-6, EC recent projects). In this regard the NSSG highlights the fundamental role of this last level of the Defense-in-Depth concept to minimize the consequences for human life and the environment of any nuclear or radiological accident, irrespective of the causes. The NSSG additionally supports actions finalized to strengthen cooperation and assistance, both in the preparedness and response phases, between neighboring countries and especially for accidents with possible cross-border consequences.