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Nuclear Safety, Security and Safeguards in Ukraine

Report by the Director General

Summary

- In response to the request by Member States (IAEA Board of Governors resolution GOV/2022/17), this report provides a summary of the situation in Ukraine regarding nuclear safety, security and safeguards of nuclear facilities and activities involving radioactive sources in Ukraine. It is based on information made available to the Agency since the beginning of the occupation by the Russian Federation in Ukraine and includes actions taken by the Agency in response to Ukraine's request for assistance in re-establishing, as appropriate, a sound nuclear safety and security regime at its nuclear facilities and in activities involving radioactive sources. This report covers the period from 24 February to 5 September 2022.
- This report also summarizes relevant aspects of the implementation of safeguards in Ukraine under the Agreement Between Ukraine and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons and the Protocol Additional thereto under the current circumstances.

Recommended Action

- It is recommended that the Board of Governors take note of this report.

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A. Introduction

1. On 3 March, the Board of Governors adopted a resolution on the safety, security and safeguards implications of the situation in Ukraine, which “[d]eplore[d] the Russian Federation’s actions in Ukraine” and expressed “grave concern that the Russian Federation’s aggression is impeding the Agency from fully and safely conducting safeguards verification activities”.¹
2. In April 2022, the Director General issued a first Summary Report on Nuclear Safety, Security and Safeguards in Ukraine², in which he provided an overview of the situation in Ukraine covering the period 24 February to 28 April and including initial findings of IAEA expert missions led by the Director General to Ukraine in March and April 2022.
3. At the Board of Governors meeting in June 2022, the Director General presented an oral report on the nuclear safety, security and safeguards implications of the situation in Ukraine as well as on the Agency mission to Ukraine’s Chernobyl NPP (ChNPP) site and Exclusion Zone carried out from 30 May to 4 June. The Director General informed the Board about the establishment of a comprehensive programme of assistance including remote technical assistance, on-the-ground technical assistance, delivery of equipment and the Agency’s readiness to rapidly deploy assistance if needed. He also underlined a detailed list of Ukraine’s needs that had been shared with Member States.
4. On 11 August, the Director General briefed the United Nations Security Council about the nuclear safety and security situation at Ukraine’s Zaporizhzhya NPP (ZNPP) site and the Agency’s efforts to agree and lead an expert mission to the site. The Director General also provided details on how the shelling at the ZNPP site that occurred on 6 and 7 August 2022 had compromised virtually all of the seven indispensable nuclear safety and security pillars (“Seven Pillars”, see Section B.1), including those related to the ZNPP’s physical integrity, the functioning of its safety and security systems, its staff and its external power supply.
5. On 6 September, the Director General issued a second Summary Report on Nuclear Safety, Security and Safeguards in Ukraine³, covering the period 28 April to 5 September 2022. The second Summary Report, which is annexed to this report, focused mainly on the events at the ZNPP site and the preliminary nuclear safety and security findings from the IAEA Support and Assistance Mission to Zaporizhzhya (ISAMZ) led by the Director General from 29 August to 3 September and findings from the second IAEA mission to the ChNPP site and Exclusion Zone.

¹ IAEA Board of Governors resolution GOV/2022/17, adopted on 3 March 2022.

² Available at <https://www.iaea.org/sites/default/files/22/04/ukraine-report.pdf>

³ Available at https://www.iaea.org/sites/default/files/22/09/ukraine-2ndsummaryreport_sept2022.pdf

6. On 6 September, in a United Nations Security Council meeting on threats to international peace and security, the Director General informed the Security Council about the findings and recommendations from the ISAMZ that are included in the second Summary Report. The Director General stressed the need for a protection zone to be established around the ZNPP, and that the shelling at and around the plant must stop. Additionally, the Director General highlighted the importance of a continued IAEA presence at the ZNPP site, with IAEA staff on the ground at the site providing first-hand, neutral, impartial and technical information on the site's status in relation to nuclear safety and security.

7. This report has been produced in response to resolution GOV/2022/17, in which the Board of Governors requested the Director General to “continue to closely monitor the situation [in Ukraine], with a special focus on the safety and security of Ukraine’s nuclear facilities and report to the Board on these elements, as required”. This report reflects the information provided in the two Summary Reports and covers the period from 24 February to 5 September 2022.

B. Nuclear Safety and Security of Nuclear Facilities in Ukraine

B.1. The Seven Indispensable Pillars for Ensuring Nuclear Safety and Security During an Armed Conflict

8. On 2 March, at a meeting of the Board of Governors, and subsequently in a press release issued on 4 March, the Director General outlined seven indispensable pillars for ensuring nuclear safety and security during an armed conflict (“Seven Pillars”) in relation to the situation in Ukraine. The Seven Pillars are:

1. The physical integrity of the facilities — whether it is the reactors, fuel ponds or radioactive waste stores — must be maintained;
2. All safety and security systems and equipment must be fully functional at all times;
3. The operating staff must be able to fulfil their safety and security duties and have the capacity to make decisions free of undue pressure;
4. There must be secure off-site power supply from the grid for all nuclear sites;
5. There must be uninterrupted logistical supply chains and transportation to and from the sites;
6. There must be effective on-site and off-site radiation monitoring systems and emergency preparedness and response measures; and
7. There must be reliable communications with the regulator and others.

9. The Seven Pillars derive from the IAEA safety standards and nuclear security guidance and apply to these unprecedented circumstances in which military forces are near or on the site of a nuclear facility, in particular of an operational NPP.⁴ The Director General has regularly expressed grave concern when these Seven Pillars have been compromised at the sites of nuclear facilities in Ukraine. The Director

⁴ More details on the Seven Pillars are provided in Section B of the second Summary Report, presented in the Annex.

General has also continuously stressed the Agency's readiness to assist in ensuring that the Seven Pillars are maintained in Ukraine.

B.2. IAEA Missions to Ukraine

10. Since the start of the military conflict in Ukraine, the Agency has implemented four support and assistance missions to Ukraine. The primary objectives of those support and assistance missions were to assess the current nuclear safety, security and safeguards situation at nuclear facilities and activities involving radioactive sources in Ukraine, to agree on the scope of the technical support and assistance to Ukraine for nuclear safety and security, to initiate the implementation of the Agency's assistance aimed at reducing the risk of a major nuclear accident, as well as to help stabilize the current nuclear safety and security situation.

11. The first mission, to the South Ukraine nuclear power plant (SUNPP), which was led by the Director General and comprised a team of IAEA technical experts, took place from 29 to 31 March 2022 to initiate the implementation of the IAEA's assistance aimed at reducing the risk of a major nuclear accident.

12. The second mission to Ukraine took place from 25 to 28 April at the ChNPP site and comprised a high-level delegation and a team of IAEA technical experts, led by the Director General. This mission allowed the Agency to carry out an assessment in the field to enable it to have a better understanding of the nuclear safety and security issues in relation to nuclear facilities in Ukraine. It also enabled the Agency to make first-hand observations on the ground, with initial radiation measurements carried out at the ChNPP site for a comprehensive assessment of potential radiation exposures. Moreover, some priority equipment requested by Ukraine was delivered including radiation monitoring equipment and personal protective equipment.

13. The third mission was conducted to the ChNPP site and its Exclusion Zone from 30 May to 4 June 2022. It comprised IAEA experts in radiation protection and safety of radioactive waste and spent fuel management, nuclear security and emergency preparedness and response. The objective of this mission was to assess in more detail the current nuclear safety and security situation at the facilities on the ChNPP site and in the Exclusion Zone.

14. The fourth mission, the IAEA Support and Assistance Mission to Zaporizhzhya (ISAMZ), took place from 29 August to 3 September 2022. It was led by the Director General and comprised a high-level delegation and technical team to help stabilize the nuclear safety and security situation at the ZNPP site.

15. The Agency has now established a continued presence at the ZNPP site to help stabilize the situation. Maintaining this presence enables the Agency to monitor closely the situation at the site, and to receive direct, fast and reliable information.

B.3. Overview of the Situation at Nuclear Facilities in Ukraine

16. The IAEA has been monitoring the nuclear safety and security situation of Ukraine's nuclear facilities, including the ZNPP, the ChNPP, the Khmelnytsky nuclear power plant (KhNPP), Rivne nuclear power plant (RNPP) and SUNPP as well as other facilities and activities involving radioactive sources. A summary of the current status at these facilities and activities and of the missions held by the Agency to the ZNPP and the ChNPP sites is presented below.

B.3.1. Zaporizhzhya NPP

17. The ZNPP is Ukraine's largest NPP and consists of six VVER-1000 reactors operated by Energoatom, the National Nuclear Energy Generating Company of Ukraine. On 4 March 2022, Ukraine

informed the Agency that Russian forces had taken control of the ZNPP site. As of 24 August, two reactor units were in operation to meet Ukraine's power needs, while the remaining units were under maintenance or in cold shutdown status.

18. On 3 September, the operating power of the two operational reactor units was reduced. Subsequently, one of the reactor units was shut down and the other reactor unit remained in operation.

19. Since the start of the conflict, a considerable number of events at the ZNPP site have significantly compromised the Seven Pillars.⁵ The main concerns for each of the Seven Pillars are summarized as follows:

- **Physical integrity:** While the ongoing shelling has not triggered a nuclear emergency, it continues to represent a constant threat to nuclear safety and security with potential impact on critical safety functions that may lead to radiological consequences with great safety significance.
- **Safety and security systems and equipment:** Maintaining all safety systems for the ZNPP in normal operation and the physical protection system operational is a result of the efforts made by the operating personnel. However, these efforts are being taken under very challenging circumstances with military personnel and equipment as well as representatives of Russian State Atomic Energy Corporation "Rosatom" being present on the site.
- **Operating staff:** Ukrainian staff operating the plant, which is under Russian military occupation, are under constant high stress and pressure, especially with the limited staff available. This is not sustainable and could lead to increased human error with implications for nuclear safety. A sufficient number of operating staff must be able to carry out their important duties without threats or pressure undermining not only their own safety but also that of the facility itself, and any support required to ensure the health of the staff and their families must be provided. ISAMZ being on site can identify and help address these matters in line with applicable standards.
- **Off-site power supply:** On several occasions, the ZNPP lost, fully or partially, the off-site power supply as a result of military activities in the area. Off-site power is essential for the continued safe operation of the plant.
- **Logistical supply chain:** Maintaining functional and effective logistical supply chains supports the operability of critical nuclear safety and security systems and ensures any damage to them is repaired in a timely manner to avoid any unwarranted consequences on-site or off-site.
- **On-site and off-site radiation monitoring system and emergency preparedness and response:** Ensuring preparedness to respond effectively on-site and off-site to any nuclear or radiological emergency is of paramount importance under the ongoing circumstances that constantly threaten the safety and security of the plant.
- **Communications:** Since the start of the conflict, a lack of communication means and channels has been witnessed. This critical shortcoming only serves to exacerbate current challenges in maintaining the safe and secure operation of the plant with adequate regulatory oversight and in ensuring an effective response locally, regionally, nationally and internationally to any nuclear safety or security event.

⁵ The main events and their impact on the Seven Pillars are elaborated in paragraphs 21 to 82 of the second Summary Report, included in the Annex to this report.

20. In light of the impact the ongoing situation has on the Seven Pillars, in relation to the ZNPP in particular, the second Summary Report, included in the Annex, set out recommendations to help re-establish sound nuclear safety and security measures at the site. These recommendations are provided below as related to each pillar:

- **Recommendation 1 (Physical integrity)** states “The IAEA recommends that shelling on site and in its vicinity should be stopped immediately to avoid any further damage to the plant and associated facilities, for the safety of the operating staff and to maintain the physical integrity to support safe and secure operation. This requires agreement by all relevant parties to the establishment of a nuclear safety and security protection zone around the ZNPP.”
- **Recommendation 2 (Safety and security systems and equipment)** states “The IAEA recommends that the physical protection system should be operated as designed and licensed, and that the continued functioning of safety and security systems and operability of the systems and equipment at ZNPP be ensured. This requires the removal of vehicles from areas that could interfere with the operation of safety and security systems and equipment.”
- **Recommendation 3 (Operating staff)** states “The IAEA recommends that an appropriate work environment, including family support, for operating staff should be re-established. Furthermore, as the operator has the prime responsibility for nuclear safety and security, it should be able to fulfil its mission with clear lines of responsibilities and authorities.”
- **Recommendation 4 (Off-site power supply)** states “The IAEA recommends that the off-site power supply line redundancy as designed should be re-established and available at any time, and that all military activities that may affect the power supply systems end (see Recommendation 1).”
- **Recommendation 5 (Logistical supply chain)** states “The IAEA recommends that all concerned parties should commit and contribute to ensuring effective supply chains for continued nuclear safety and security of the plant under all conditions including safe transportation corridors, taking advantage of the IAEA assistance and support programme as appropriate.”
- **Recommendation 6 (On-site and off-site radiation monitoring systems and emergency preparedness and response)** states “The IAEA recommends that (1) the emergency response functions should be drilled and exercised, and the emergency response facilities to support these functions be re-established, and (2) preparedness should be re-established through regular training, clear decision-making chains and readily available communication means and logistical support. ISAMZ can provide assistance in preparation and support for such training.”
- **Recommendation 7 (Communications)** states “The IAEA recommends that reliable and redundant communication means and channels, including internet and/or satellite connectivity, should be ensured with all external organizations necessary for the safe and secure operation of the facility.”

21. The ultimate objective for the establishment of the nuclear safety and security protection zone, as set out in Recommendation 1, is to prevent a nuclear accident from happening.

22. Based on the current understanding of the nuclear safety and security situation at the ZNPP site, two essential factors have been identified to enable this objective to be met:

- Shelling at or from the plant and in its vicinity should be halted.
- Restoration and maintenance of redundant off-site power supplies for the plant should be established.

B.3.2. Chornobyl NPP site

23. The ChNPP site consists of six reactor units (Units 1 to 4 have been permanently shut down since the accident in 1986, and Units 5 and 6 were never commissioned), including Unit 4, which was partially destroyed in the 1986 accident and is now covered with a shelter facility known as the New Safe Confinement (NSC). There are also two spent fuel interim storage facilities (ISF-1 and ISF-2) and a variety of waste management facilities on the ChNPP site. Further waste management facilities exist within the wider Chornobyl Exclusion Zone, including numerous radioactive waste disposal facilities.

24. A Central Spent Fuel Storage Facility (CSFSF) has been constructed in the Chornobyl Exclusion Zone. Once commissioned, the CSFSF is expected to receive and store spent fuel from reactors at the KhNPP, RNPP and SUNPP.

25. The status of the ChNPP site and the Exclusion Zone with reference to the Seven Pillars are as follows⁶:

- **Physical integrity:** During the occupation, damage to the infrastructure occurred that necessitated further assessment of the impact on nuclear safety and security, including the physical integrity of the facilities at the ChNPP site and the Exclusion Zone prior to their returning to normal operation with priority given on demining the area. The Agency witnessed repairs to some structures and facilities during its second mission to the site, but work still needs to be done.
- **Safety and security systems and equipment:** Experts observed the extent of the damage to the physical protection systems and made an initial assessment of the scope of assistance required to restore optimal physical protection. The Central Analytical Laboratory in Chornobyl town had been looted and the safety and security of its calibration sources and the condition of environmental samples that were stored there could not be confirmed during the most recent IAEA mission. However, based on the information provided, the Agency assessed that the incident did not pose a significant radiological risk.
- **Operating staff:** During the period of Russian presence, Ukrainian staff continued to manage day-to-day operations at the ChNPP site. For nearly four weeks, staff were not able to rotate and return to their homes, and were subject to constant high stress and pressure while operating the nuclear facilities. Activities at other Exclusion Zone facilities were halted during the period of Russian presence. Actions were taken by local authorities to deliver interim habitable accommodation for facility staff and transportation to and from the site.
- **Off-site power supply:** On 9 March, the ChNPP site lost all off-site electrical power. Diesel generators were used to power systems that are important to the safety of the facilities, including ISF-1, ISF-2 and the NSC. Despite the difficult situation outside the site, the off-site electric power lines were restored and the power supply to the ChNPP has been stable since 14 March. The disconnection from the grid did not have a critical impact on essential safety functions at the site. However, the operator was not able to maintain some functions such as radiation monitoring, ventilation systems, and normal lighting. At the time of the May IAEA mission, no issues were identified with off-site power supply.
- **Logistical supply chain:** Ukraine has reported that the Chornobyl Exclusion Zone is gradually recovering from the Russian military actions. The road to the exclusion zone is being repaired in places, power lines are being overhauled, voice communication is already in place

⁶ The main events and their impact on the Seven Pillars, including the findings from the most recent IAEA mission to the ChNPP site and the Exclusion Zone, as well as the results from the dose assessment based on measurements and sample analysis performed after the first mission to this site, are elaborated in paragraphs 83 to 110 of the second Summary Report, presented in the Annex.

around the ChNPP, and mobile telephone networks are operational. For proper collection and treatment of solid and liquid radioactive waste at the ChNPP site, a serious issue was identified in relation to accessibility to cement, canisters and containers (cement and metallic) as the only factory/supplier was located in Slavutyeh whose connection with Chornobyl is impacted by the situation.

- **On-site and off-site radiation monitoring system and emergency preparedness and response:** Radiation monitoring data from the ChNPP site, regularly provided to the International Radiation Monitoring Information System (IRMIS), were restored on 6 June. Based on the available radiation monitoring data, the Agency assessed radiation levels as low and within the operational range measured in the Exclusion Zone before the start of the conflict, and such levels were therefore not considered a hazard to the public or workers in the area.
- **Communications:** The State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) continued to receive information about the situation at the ChNPP site through senior off-site managers of the plant. Ukraine has now been gradually restoring regulatory control of nuclear and radiation safety at the ChNPP site and Exclusion Zone facilities and activities. However, the general situation in the area around the ChNPP site and the Exclusion Zone remains difficult due to destroyed bridges and reported demining activities.

26. To address the needs related to the safety of nuclear facilities, radiation protection, safety of waste management and emergency preparedness and response matters for facilities and activities at the ChNPP site and the Exclusion Zone, the Agency is working in close cooperation with the Ukrainian counterparts on how best to address these needs.⁷

27. The Agency performed a dose assessment of potential doses that may have been received by personnel occupying the Chornobyl Exclusion Zone from 24 February until 31 March. The results show that main contributor to potential doses is external exposure due to ground depositions of caesium -137 with doses due to inhalation and inadvertent ingestion contributing insignificantly to this dose. The estimated additional total annual effective doses are low and no health effects would be expected to be observed in the personnel occupying the area that can be attributed to radiation exposure at this level of doses.⁸

B.3.3 Other facilities

28. Despite the unprecedented circumstances, the other three operating NPPs in Ukraine (KhNPP, RNPP and SUNPP), as well as the State Specialized Enterprise “Radon” facilities, specialized in the management of radioactive waste arising from medicine and industry, have continued operating safely and securely since the beginning of the conflict.

29. The subcritical neutron source installation at the Kharkiv Institute of Physics and Technology (KIPT), which is used for research and development and radioisotope production for medical and industrial applications, was shelled on several occasions. The impact of the damage on the facility’s physical protection system still needs to be assessed by the Agency, but the shelling did not give rise to any radiological consequences and did not result in loss of confinement of radioactive material.

B.4. IAEA Technical Support and Assistance for Nuclear Safety and Security

30. Upon Ukraine’s request for assistance, the Agency drew up and agreed with Ukrainian officials a concrete and detailed technical plan for nuclear safety and security assistance to Ukraine’s nuclear

⁷ Further details are given in paragraphs 136 to 138 of the second Summary Report, included in the Annex.

⁸ Further details are given in paragraphs 89 to 98 of the second Summary Report, included in the Annex.

facilities and activities involving radioactive sources. The technical support and assistance for nuclear safety and security, explained below, are focused on four areas: remote assistance, delivery of equipment, in-person assistance, and deploying rapid assistance.⁹

31. Remote assistance concerns the provision of external based support in relation to safety and security assessments of nuclear facilities, including radioactive waste management facilities, as well as activities with radioactive sources. It encompasses on-going efforts, for example, to address the immediate needs for support in inventory verification with regard to radioactive sources and for ensuring regulatory control is restored where needed.

32. In-person assistance covers various aspects of nuclear safety and security in Ukraine. It encompasses the four IAEA support and assistance missions that took place to Ukraine (see Section B.2) as well as the continued presence of IAEA experts at the ZNPP site.

33. Delivery of equipment concerns the provision of equipment, upon request, needed for the safe and secure operation of nuclear facilities, including radioactive waste management facilities and facilities with radioactive sources.

34. The Agency marked an important milestone by delivering the first shipments of technical assistance, which were organized mainly through the IAEA's Response and Assistance Network (RANET). After overcoming significant difficulties, including logistical challenges, a large batch of vital radiation protection and monitoring equipment as well as personal protective equipment and other items offered by several Member States was delivered to Ukraine, to help the Ukrainian authorities mitigate the possible consequences of a potential nuclear accident or a radiological emergency.

35. To date, twelve Member States registered in RANET have offered to provide specialized equipment to Ukraine, in response to a comprehensive request from Ukraine for equipment for the safe and secure operation of its nuclear facilities.

36. Furthermore, eleven Member States and international organizations have offered extrabudgetary contributions to support IAEA efforts in providing technical support and assistance to Ukraine in nuclear safety, security and safeguards.

37. It is expected that more safety- and security-related equipment will be transported to Ukraine in the coming months, either from in-kind contributions or procured by the Agency.

38. Deploying rapid assistance concerns the provision of assistance in case of an emergency at a nuclear facility or related to radioactive sources. No nuclear or radiological emergency involving nuclear facilities or activities involving radioactive sources was declared during the reporting period and deployment of rapid assistance was not requested.

39. The Agency will continue its efforts to provide the assistance needed to ensure nuclear safety and security in Ukraine and to coordinate with Ukraine counterparts, IAEA Member States and international organizations to ensure efficient coordination and to avoid duplication.

⁹ A detailed summary of the technical support and assistance to Ukraine in the area of nuclear safety and security is provided in paragraphs 118 to 143 of the second Summary Report, included in the Annex.

C. Implementation of Safeguards in Ukraine

40. Ukraine acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) as a non-nuclear-weapon State in December 1994 and subsequently concluded a comprehensive safeguards agreement (CSA) with the Agency, which entered into force in January 1998.¹⁰ Ukraine concluded an additional protocol to its CSA, which entered into force in January 2006.¹¹

41. The IAEA implements safeguards at 35 nuclear facilities and more than a dozen locations outside facilities (LOFs) in Ukraine. The safeguards implementation effort is concentrated at four NPP sites, which host 15 operational power reactors, and at the Chernobyl site, which hosts three shutdown reactors, the reactor damaged in the 1986 nuclear accident, and two spent fuel processing and storage facilities.

42. On 25 February 2022, Ukraine submitted to the Agency a special report under Article 68 of its CSA informing the Agency that “as a result of the temporarily occupied territory of Chernobyl region, Ukraine has lost control over nuclear material” subject to safeguards on the Chernobyl site. Ukraine submitted two additional special reports, dated 4 March 2022 and 5 July 2002, respectively, to the Agency regarding Ukraine’s loss of control over nuclear material at all facilities on the Zaporizhzhya site and at three LOFs in south-eastern parts of Ukraine.

43. Despite the very challenging circumstances, the Agency has continued to implement safeguards in Ukraine in accordance with the CSA and the AP and in line with the annual implementation plan established by the Agency for Ukraine for 2022. Since the conflict began, the Agency has conducted 12 safeguards missions to verify the declared nuclear material at 23 different facilities and LOFs, including the verification of reactor cores at nine power reactors that had undergone refuelling. In addition, the Agency has successfully implemented three complementary accesses — planned before the conflict began — in order to assure the absence of undeclared nuclear material and activities at the locations to which it had access.

44. Some of the safeguards missions conducted have allowed the Agency to perform restoration, maintenance or upgrades of surveillance cameras, seals and unattended monitors used for the remote transmission of data to Agency Headquarters. While the conflict has temporarily interrupted the transmission of safeguards data from the Chernobyl and Zaporizhzhya sites on several occasions, all safeguards data were ultimately recovered and transmitted to Agency Headquarters once the transmission was re-established.

45. The Agency was unable to perform its planned verification activities at the Zaporizhzhya site until September 2022. Two of the six power reactors were refuelled by the operator but left open pending physical inventory verifications (PIVs) by the Agency. The PIVs were conducted at the beginning of September 2022 at the two reactors, as well as at the dry storage facility and the fresh fuel storage facility. The inability of the Agency to conduct a PIV at the two reactors within the established timeliness of 12–14 months will be analysed as part of the Agency’s internal process for drawing safeguards conclusions for Ukraine.

46. Since the start of the conflict in February 2022, the Agency has strengthened its analyses of open source information and its acquisition and analyses of satellite imagery covering nuclear installations in Ukraine. This has proved to be essential for the preparation of in-field verification activities, in particular

¹⁰ Agreement Between Ukraine and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/550).

¹¹ Protocol Additional to the Agreement Between Ukraine and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/550/Add.1).

at the Zaporizhzhya site, which has been heavily affected by military activities. The Agency has been acquiring and analysing satellite imagery and continually monitoring all available open source information to track developments and to assess the operational status of the plant, including the detection of damage caused by shelling at the site. Prior to the Agency's mission to the Zaporizhzhya site at the end of August 2022, satellite imagery was acquired on a daily basis to support the mission. Evaluations resulting from the satellite imagery analyses were corroborated on the ground by the Agency team.

D. Summary

47. The situation in Ukraine is unprecedented. It is the first time an armed conflict has occurred amid the facilities of a large, established nuclear power programme. A nuclear accident can have serious impact within a country and beyond its borders, and the international community is relying on the Agency to perform a rigorous assessment of the situation and to keep it informed with accurate and timely information.

48. The Agency has been able to conduct two missions to the ChNPP site and will continue to provide assistance and support to the site.

49. Moreover, the Agency has a concrete and detailed technical plan for nuclear safety and security assistance to Ukraine's nuclear facilities and activities involving radioactive sources. In particular it has now started and will continue to deliver equipment to Ukraine. The continued commitment of Member States and close cooperation between Ukraine and the Agency is essential.

50. Following repeated efforts by the Director General to lead another expert mission to Ukraine, the Agency conducted a mission to ZNPP, the ISAMZ. One important outcome of the ISAMZ is that the Agency has established a continued presence at the ZNPP site, which is of paramount importance in helping to stabilize the situation. Such presence enables the Agency to monitor closely the situation at the site, and to receive direct, fast and reliable information.

51. The Director General remains gravely concerned about the situation at the ZNPP. The Seven Pillars have all been compromised at the site. Therefore, the Director General has made recommendations relating to each of the Seven Pillars.

52. The staff at all of Ukraine's nuclear facilities have continued to show endurance and resilience in keeping the facilities safe and secure amid the conflict.

53. The IAEA has continued to undertake a vital verification role to reach independent conclusions that nuclear material under safeguards remains in peaceful activities and that safeguarded facilities are not used for the undeclared production or processing of nuclear material. The IAEA continues to implement safeguards in Ukraine, including in-field verification activities, in accordance with Ukraine's CSA and AP. Based on the evaluation of all safeguards-relevant information available to the Agency to date, the Agency has not found any indication that would give rise to a proliferation concern.

54. Pending the end of the conflict and the re-establishment of stable conditions, there is an urgent need for interim measures to prevent a nuclear accident from happening. This can be achieved by the immediate establishment of a nuclear safety and security protection zone at the ZNPP site. The Agency is ready to start immediately the consultations necessary for the urgent establishment of such a nuclear safety and security protection zone.

Annex

[Second Summary Report by the IAEA Director General *Nuclear Safety, Security and Safeguards in Ukraine*, published on 6 September 2022.]