

Derestricted 7 March 2024

(This document has been derestricted at the meeting of the Board on 7 March 2024)



IAEA

Atoms for Peace and Development

Board of Governors

GOV/2024/9

Date: 27 February 2024

Original: English

For official use only

Item 9 of the provisional agenda
(GOV/2024/5, Add.1 and Add.2)

Nuclear Safety, Security and Safeguards in Ukraine

Report by the Director General

Summary

- The Board of Governors, in its resolutions GOV/2022/17, GOV/2022/58 and GOV/2022/71, requested the Director General to continue to closely monitor the situation regarding nuclear safety, security and safeguards in Ukraine and regularly report formally to the Board of Governors on these matters. This report provides a summary of the situation in Ukraine regarding nuclear safety, security and safeguards. It covers the period from 15 November 2023 to 23 February 2024 and is based on information made available to the Agency, and verified by the Agency, during this period. This report covers the progress made by the Agency in responding to Ukraine's requests to provide technical support and 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 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.

Nuclear Safety, Security and Safeguards in Ukraine

Report by the Director General

A. Introduction

1. At the Board of Governors meeting in November 2023, the Director General provided the Board of Governors with a detailed report entitled *Nuclear Safety, Security and Safeguards in Ukraine* (document GOV/2023/59), covering the period from 1 September to 14 November 2023.

2. On 12 October 2022, the United Nations (UN) General Assembly adopted resolution A/RES/ES-11/4, declaring that, inter alia, the “attempted illegal annexation” of four regions of Ukraine on 4 October 2022 had no validity under international law.¹ The Agency complies with this resolution.

3. On 17 November 2022, the Board of Governors adopted resolution GOV/2022/71², on the safety, security and safeguards implications of the situation in Ukraine, in which it “[e]xpresse[d] grave concern that the Russian Federation ha[d] not heeded the calls of the Board to immediately cease all actions against and at nuclear facilities in Ukraine” and “request[ed] that the Russian Federation do so immediately”. In addition, it “[d]eplore[d] and d[id] not recognize, consistent with resolution A/RES/ES-11/4 adopted by the UN General Assembly on 12 October 2022, the Russian Federation’s attempts to take ownership of Ukraine’s Zaporizhzhya Nuclear Power Plant [(ZNPP)] and its attempted illegal annexation of the Ukrainian territory on which the plant is located”.³

4. On 28 September 2023, the General Conference, at its 67th regular session, adopted resolution GC(67)/RES/16⁴ on the nuclear safety, security and safeguards in Ukraine, in which it “fully support[ed] the continued and reinforced physical presence of the IAEA Support and Assistance Mission to Zaporizhzhya (ISAMZ), given the ongoing risks to nuclear safety, security, and safeguards implementation at the ZNPP” and “[c]all[ed] for the urgent withdrawal of all unauthorized military and other unauthorized personnel from Ukraine’s ZNPP and for the plant to be immediately returned to the full control of the competent Ukrainian authorities consistent with the existing licence issued by the State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) to ensure its safe and secure operation and in order for the Agency to conduct safe, efficient, and effective safeguards implementation, in accordance with Ukraine’s comprehensive safeguards agreement and additional protocol”. In addition,

¹ United Nations General Assembly resolution A/RES/ES-11/4, adopted on 12 October 2022: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N22/630/66/PDF/N2263066.pdf?OpenElement>, para. 3.

² IAEA Board of Governors resolution GOV/2022/71, adopted on 17 November 2022, para. 1.

³ IAEA Board of Governors resolution GOV/2022/71, adopted on 17 November 2022, para. 2.

⁴ IAEA General Conference resolution GC(67)/RES/16, adopted on 28 September 2023, paras 1 and 2.

it “[f]ully support[ed] the Agency’s continued provision, upon request, of technical support and assistance to Ukraine to help ensure the safe and secure operation of nuclear facilities and activities involving radioactive sources, including the continued physical presence of IAEA technical experts at the Chernobyl, Rivne, Khmelnytsky, and South Ukraine Nuclear Power Plants” and “[e]ncourage[d] Member States to offer political, financial, and in-kind support to the IAEA comprehensive programme of technical support and assistance to Ukraine, including through the provision of necessary nuclear safety and security equipment as requested by Ukraine”.⁵

5. During the reporting period⁶, from 15 November 2023 to 23 February 2024, Agency staff continued to monitor and assess the situation at each nuclear site against the seven indispensable pillars (‘Seven Pillars’) for ensuring nuclear safety and security during an armed conflict that were first outlined by the Director General at the meeting of the Board of Governors held on 2 March 2022 and described in document GOV/2022/52⁷. In addition, ISAMZ has continued to monitor and report on observance of the five concrete principles for protecting the ZNPP (‘five concrete principles’) established by the Director General at the meeting of the United Nations Security Council (UNSC) on 30 May 2023 and described in document GOV/2023/30⁸.

6. The Agency assesses the overall situation with respect to nuclear safety and security at the ZNPP to be very precarious, with six out of the Seven Pillars compromised either fully or partially. On 2 December 2023, the ZNPP suffered its eighth total loss of off-site power since the start of the armed conflict, highlighting the vulnerability of the situation at the plant. Ensuring availability of adequate staffing, continued and routine inspection and maintenance of the safety systems and regular housekeeping arrangements at the plant as well as reliable supply chains, continues to be challenging and to present risks to the nuclear safety and security of the plant.

7. The Agency continued to request timely and appropriate access to all areas of the ZNPP of significance for nuclear safety and security and to strongly encourage the ZNPP to ensure that open information sharing take place regularly to enable the Agency to make its assessment and report impartially and objectively on the nuclear safety and security situation at the site. Despite its continued requests, ISAMZ continued to face restrictions in obtaining such access.

8. During the reporting period, ISAMZ did not find any indication that the five concrete principles were not being observed at the site. However, there were observations that some principles were put at risk during the reporting period. ISAMZ has still not been given timely and appropriate access to all areas of the ZNPP of significance for nuclear safety and security, which continues to limit the Agency’s ability to fully confirm that all five concrete principles are being observed at all times.

9. On 2 December 2023, in the margins of the United Nations Climate Change Conference (COP-28) in Dubai, the Director General held discussions with the Director General of Rosatom Alexey Likhachev. The main emphasis of the discussions related to ensuring nuclear safety and security of the ZNPP.

10. On 24 January 2024, the Director General addressed the UNSC to provide an update on the Agency’s activities concerning nuclear safety, security and safeguards in Ukraine. This was his sixth address to the UNSC since the start of the armed conflict. The Director General shared the concerns over the threats and risks posed by the armed conflict and asked the UNSC for continued support for the

⁵ IAEA General Conference resolution GC(67)/RES/16, adopted on 28 September 2023, paras 3 and 4.

⁶ Following the reporting period of GOV/2023/59.

⁷ Report by the Director General to the Board of Governors, document GOV/2022/52, issued on 9 September 2022, para. 8.

⁸ Report by the Director General to the Board of Governors, document GOV/2023/30, issued on 31 May 2023, para. 23.

Seven Pillars and the five concrete principles and for the Agency's role in monitoring the situation in the service of the international community.



Director General Rafael Mariano Grossi speaks to the media after addressing the UNSC on 24 January 2024.

11. The Director General's fourth visit to the ZNPP since the start of the armed conflict took place during the reporting period, alongside high-level talks in Kyiv including with Ukrainian President Volodymyr Zelenskyy. The talks and the visit were part of the Agency's continuing efforts to help stabilize the situation and ensure that progress is made in relation to several ongoing nuclear safety and security challenges, in particular at the ZNPP.

12. During the reporting period, the Agency maintained its continued presence, with Agency staff at all nuclear sites in Ukraine, and remained committed to providing any support it could to help ensure the safe and secure operation of nuclear facilities and activities involving radioactive sources in Ukraine. This includes undertaking impartial assessments of the situation pertaining to nuclear safety, security and safeguards; providing technical expertise and advice, including assistance for ensuring medical support and care for the Ukrainian operating staff, as well as for ensuring radiation safety and nuclear security of radioactive sources; delivering nuclear safety- and security-related equipment; and providing relevant information updates to the public and the international community.

13. This report has been produced in response to resolution GOV/2022/17⁹, in which the Board of Governors requested the Director General and the Secretariat 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"; to resolution GOV/2022/58¹⁰, in which the Board of Governors requested the Director General to "continue to closely monitor the situation and report

⁹ IAEA Board of Governors resolution GOV/2022/17, adopted on 3 March 2022, para. 4.

¹⁰ IAEA Board of Governors resolution GOV/2022/58, adopted on 15 September 2022, para. 7.

formally to the Board on these matters as long as required”; and to resolution GOV/2022/71¹¹, in which the Board of Governors requested the Director General to “continue to closely monitor the situation [in Ukraine] and regularly report formally to the Board on these matters as long as required.”

14. This report provides a summary of the situation in Ukraine regarding nuclear safety, security and safeguards from 15 November 2023 to 23 February 2024. It also covers progress made by the Agency in providing technical support and assistance in nuclear safety and security to Ukraine. Finally, this report summarizes relevant aspects of the implementation under the current circumstances 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.

B. Nuclear Safety and Security in Ukraine

B.1. Agency Missions to Ukraine

B.1.1. IAEA Support and Assistance Missions to the Zaporizhzhya, Rivne, South Ukraine and Khmelnytsky Nuclear Power Plants (NPPs), and to the Chornobyl NPP Site

15. The continued presence of Agency staff at the ZNPP (ISAMZ) was established on 1 September 2022. The IAEA Support and Assistance Missions to the Rivne NPP (RNPP) (ISAMIR), to the South Ukraine NPP (SUNPP) (ISAMISU), to the Khmelnytsky NPP (KhNPP) (ISAMIK) and to the Chornobyl NPP (ChNPP) site (ISAMICH) were deployed between 16 and 23 January 2023 and marked their first anniversary during the reporting period. Since the establishment of the missions at the 5 nuclear sites in Ukraine, 5 teams of Agency staff, comprising up to 13 staff members in total, have been continuously present in Ukraine without any interruption.

16. The purpose of the continued presence of Agency staff at all nuclear sites in Ukraine is to help decrease the risk of a nuclear accident. During the reporting period, Agency staff in Ukraine continued with regular activities at each site, which include the conduct of meetings with plant management, field observations of key plant areas, and discussions with technical counterparts to broaden the understanding of the nuclear safety and security situation at the sites.

17. Rotations of Agency staff at the RNPP, the SUNPP, the KhNPP and the ChNPP site as well as at the ZNPP that took place during the reporting period were conducted as planned. As of 23 February 2024, a total of 98 missions comprising 131 Agency staff members were deployed as part of the continued presence at all 5 nuclear sites in Ukraine, totalling 208.6 person-months in Ukraine. Some of the 131 Agency staff participated in more than one rotation. The Agency staff at all nuclear sites in Ukraine continued to experience air-raid alarms, some of which required them to take shelter, frequently.

¹¹ IAEA Board of Governors resolution GOV/2022/71, adopted on 17 November 2022, para. 8.



The ISAMICH team handover in January 2024. (Photo: ChNPP)

18. The Agency continued its rigorous preparations and logistics for the deployment of missions to Ukraine and to provide independently the necessary logistics for safe and secure rotations at the ZNPP. Maintaining the continued presence of Agency staff at all five nuclear sites in Ukraine continues to be a major undertaking for the Agency and to have a significant impact on the Agency's resources.

19. The main findings and observations from the IAEA Support and Assistance Missions are reflected in Section B.2.

B.1.2. The Director General's Fourth Visit to the ZNPP

20. On 7 February 2024, the Director General made his fourth visit to the ZNPP since the start of the armed conflict to discuss and assess important issues and recent developments in relation to the fragile nuclear safety and security situation at the plant, including the current status of power and cooling systems essential for the safety of the plant and the availability of qualified staff working there. Moreover, the visit provided an opportunity to stress the importance of providing the Agency's staff with timely access and information relevant to nuclear safety and security to monitor observance of the five concrete principles and assess the Seven Pillars.

21. As part of his visit, the Director General held high-level talks in Kyiv on 6 February 2024 with Ukrainian President Volodymyr Zelenskyy and other high-level officials, including the Minister of Energy, German Galushchenko, and the president of the Ukrainian nuclear operator Energoatom, Petro Kotin. The Agency committed to continue its work in Ukraine — including by maintaining a continuous presence at the five nuclear sites — to ensure nuclear safety and security and help stabilize the situation with the aim of preventing a nuclear accident.



Director General Rafael Mariano Grossi meeting the Ukrainian President Volodymyr Zelenskyy on 6 February 2024. (Photo: www.president.gov.ua)



Director General Rafael Mariano Grossi meeting the Ukrainian Minister of Energy German Galushchenko and other senior officials on 6 February 2024.

22. The main findings and observations from the visit are reflected in Section B.2.

B.2. Overview of the Situation at Nuclear Facilities in Ukraine

23. The Agency has continued to monitor and assess the nuclear safety and security situation at Ukraine's nuclear facilities and activities involving radioactive sources against the Seven Pillars. In addition, the Agency continued to monitor and assess observance of the five concrete principles that aim to help ensure the integrity of, and the nuclear safety and security at, the ZNPP. The Agency continued to report regularly on its observations and findings.

24. During the reporting period, the Agency continued preparing an IAEA Technical Document that analyses the issues and challenges faced at nuclear facilities in terms of the practical application of Agency safety standards and nuclear security guidance during armed conflicts, using the knowledge and experience collected in Ukraine since February 2022.

25. An overview of the current nuclear safety and security situation at Ukraine's nuclear facilities and activities involving radioactive sources against the Seven Pillars as well as an overview of the observations made at the ZNPP against the five concrete principles are presented below. A chronology of events in Ukraine during the reporting period is provided in the Annex.

B.2.1. Zaporizhzhya NPP

26. ISAMZ continued its efforts to observe the situation and to gather relevant information needed to assess the nuclear safety and security at the ZNPP.

27. Based on these efforts and on the information shared, the Agency's assessment is that the overall situation with respect to nuclear safety and security at the ZNPP continues to be very precarious. Six of the Seven Pillars remained compromised either fully or partially. However, ISAMZ was not provided with timely and appropriate access to all areas and information related to nuclear safety and security.

28. At the start of the reporting period, Units 4 and 5 were in hot shutdown and continued to generate heating and steam for the plant's needs as well as for heating for the nearby city of Enerhodar, where many plant staff live. Units 1, 2, 3 and 6 were in cold shutdown and remained in that state throughout the reporting period.

29. Following the reported detection of boron in the secondary cooling circuit of a steam generator of Unit 5, the unit was placed into cold shutdown, a state reached on 22 November 2023. Prior to the transition of Unit 5 to cold shutdown, one of the diesel boilers located in the nearby Zaporizhzhya Thermal Power Plant (ZTPP) was placed into operation to make up for the lost heating capacity. Unit 5 remained in cold shutdown for the remainder of the reporting period.

30. On 2 December 2023, the ZNPP suffered its eighth total loss of off-site power since the start of the armed conflict, highlighting the vulnerability of the situation at the plant. As a result, the four reactor coolant pumps of Unit 4 stopped, and Unit 4 was subsequently transitioned to semi-hot shutdown. This state lasted for over four hours until the 750 kV Dniprovskia line was restored and Unit 4 was transitioned back to hot shutdown.

31. The number of mobile diesel boilers in operation at the ZNPP to provide heating varied between zero and nine throughout the reporting period, depending on the ambient temperature and the heating

“The nuclear safety and security situation remains very precarious, and I reiterate my request for unhindered access so that the IAEA can assess the Seven Pillars for nuclear safety and security and monitor adherence to the five concrete principles to help ensure nuclear safety and security at the ZNPP in order to prevent a nuclear accident and ensure the integrity of the plant.”

Director General Rafael Mariano
Grossi, 12 January 2024

needs of the ZNPP and the city of Enerhodar. Additional heating was provided by the units in hot shutdown and by additional boilers located at the ZTPP and the nearby industrial area.

32. The Agency continued to call on the ZNPP to find an alternative, external source of steam generation to cover its needs and allow for all the units to be maintained in cold shutdown. This would also ensure compliance with a regulatory order issued on 8 June 2023 by the SNRIU that limits the operation of all six units of the ZNPP to cold shutdown.

33. Such an alternative, external source of steam generation in the form of diesel steam generators were observed at the site for the first time by ISAMZ on 15 December 2023. On 19 December 2023, the ZNPP confirmed that four new diesel steam generators were being installed to provide on-site steam to areas such as the special building 1 for needs pertaining to liquid waste treatment and were operational during the reporting period. The Agency's technical judgement is that the four diesel steam generators provide enough steam for the plant to treat all liquid waste generated by the site and that there should therefore no longer be a need for any unit to be in hot shutdown. The Agency did not receive any confirmation from the ZNPP as to whether it will place all units in cold shutdown.

Physical integrity

34. During the reporting period, there was no impact reported by ISAMZ on the physical integrity of the six reactor units or of the on-site storage facilities housing spent fuel, fresh fuel and radioactive waste, despite the ongoing military activity, including frequent explosions, some in close vicinity of the plant, and reported aerial vehicles near the plant.

35. ISAMZ reported one air-raid alarm at the site during the afternoon of 29 November 2023 which lasted for approximately ten minutes. The team did not hear any impact and there was reportedly no damage to the site.

Nuclear safety and security systems and equipment

36. On 17 November 2023, ISAMZ was informed that boron had been detected in the secondary cooling circuit of a steam generator of Unit 5, which was in hot shutdown at the time. As a result, the ZNPP increased the frequency of boron measurements in the secondary cooling circuit of Unit 5, the results of which were reported to have remained relatively stable and within the limits permitted by the reactor's technical specifications. No radioactivity was reported to have been detected in the secondary cooling circuit. The ZNPP subsequently commenced the transition of Unit 5 to cold shutdown on 20 November 2023, which was reached on 22 November 2023. The ZNPP informed ISAMZ that it would not immediately investigate the cause of the detected presence of boron. By the end of the reporting period, ISAMZ had not been informed that any investigation had been conducted.

37. During a walkdown of the safety system rooms of Unit 6 on 22 December 2023, ISAMZ observed boric acid deposits on some valves and floors, as well as liquid continually leaking from one valve. During follow-up walkdowns of Unit 6, ISAMZ observed that the deposits were significantly reduced compared to the initial observation and that the leak was also significantly reduced, but that some deposits still remained.

38. ISAMZ was informed that the cause of the leak was due to micro-cracks in the boron tank as a result of ageing and a blockage in the tank's leak detection pipe, and that while the blockage had been repaired, some leakage remained due to micro-cracks in the boron tank, although these were reportedly within the operating limits.

39. On 9 January 2024, ISAMZ conducted a walkdown of the safety system rooms of Unit 6 to assess the result of the cleaned boric acid deposits. During this walkdown, ISAMZ was informed that prior to the armed conflict, there had been a dedicated decontamination and cleaning department to handle such

situations but that staffing was currently insufficient. Such a situation highlights the need for continued and routine inspection and maintenance of the safety systems and regular housekeeping arrangements.

40. On 20 January 2024, ISAMZ was informed that the Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) had issued a “special order” to repair the leak in the boron tank in Unit 6 and that the ZNPP intended to fix the microcracks in the tank, which would require it to be drained.

41. On 22 December 2023, ISAMZ was not given access to the reactor hall of Unit 6. This was the first time that the ZNPP had prevented ISAMZ from accessing the reactor halls of units in cold shutdown. On 25 and 28 December 2023, ISAMZ was also not given access to the reactor halls of Unit 1 and Unit 2. The situation improved in January 2024, when ISAMZ was regularly allowed to access the reactor halls of all units in cold shutdown in accordance with a schedule agreed with the ZNPP.

42. In January 2024 ISAMZ observed that anti-personnel mines along the perimeter of the ZNPP, which had previously been identified by ISAMZ and removed in November 2023, were back in place. They are placed in a buffer zone between the facility’s internal and external fences in a restricted area inaccessible to operational plant personnel. In February 2024 ISAMZ reported that mines had been temporarily removed from the same location where they had been observed in January, and then subsequently replanted. The Agency is not aware of any assessment consistent with the Agency safety standards of the potential implications of the presence of these mines on nuclear safety.

43. Eleven groundwater wells continued to provide approximately 250 cubic metres of cooling water per hour to the 12 essential service sprinkler ponds throughout the reporting period. Due to the winter conditions, the ZNPP maintained the height of the water at a maximum level, with any remaining water from the groundwater wells being pumped into the ZNPP cooling pond. ISAMZ conducted regular walkdowns of the sprinkler ponds throughout the reporting period and confirmed that the height of the water during the walkdowns was sufficient to provide cooling to the six shutdown reactor units.

44. The height of the ZNPP cooling pond at the beginning of the reporting period was 15.67 metres and 15.57 metres at the end of the reporting period, which represented a decrease of just over 1 metre from the height of 16.67 metres on 6 June 2023, when the Kakhovka dam was destroyed. ISAMZ visited the cooling pond on 20 December 2023 and 23 January 2024 and was able to observe the cooling pond operations, including the effects of winter conditions. While ISAMZ was able to confirm that the cooling pond continued to be available as a source of cooling water, they were not permitted to visit the ZNPP cooling pond isolation gate to confirm the status of the reinforcement and the overall integrity of the gate.

45. Throughout the reporting period, ISAMZ held regular discussions with the ZNPP regarding the maintenance conducted in 2023 and the annual maintenance plan for 2024. The ZNPP informed ISAMZ that the 2023 maintenance activities were limited due to the shortage of spare parts and included visual checks, cleaning of equipment, testing of equipment and maintenance of any defects observed. In January 2024, the ZNPP informed ISAMZ that the priority for 2024 was to perform maintenance on the site’s safety systems as well as important activities not conducted the previous year. The 2024 annual maintenance plan reportedly includes the safety systems, diesel generators, unit transformers and the 750 kV electrical switchyard. ISAMZ was additionally informed by the ZNPP that the implementation of the maintenance plan would be dependent on the availability of spare parts. Based on further exchanges and observations by ISAMZ, the Agency concludes that the ZNPP will not be implementing a comprehensive preventive maintenance plan during 2024. The situation in respect of maintenance activities, should it continue, is expected to have implications for nuclear safety over time, due to degradation of the safety systems and components.

46. ISAMZ reported that all safety system trains and emergency diesel generators remained available throughout the reporting period. During the reporting period, ISAMZ regularly conducted walkdowns and observed tests of the safety systems and emergency diesel generators. The team was repeatedly informed by the ZNPP that there was enough diesel fuel available for at least ten days' uninterrupted operation of the emergency diesel generators.

47. ISAMZ conducted walkdowns of the turbine halls of the six reactor units throughout the reporting period. While ISAMZ did not observe any issue related to nuclear safety and security, on each occasion access was limited to the +15 metres level and it was prevented from visiting the western part of the turbine halls. This restricted access made it impossible for ISAMZ to fully assess whether there were any issues or materials present in the turbine halls that could potentially affect the nuclear safety and security of the plant.

Operating staff

48. The overall staffing numbers at the ZNPP continued to be significantly reduced since the start of the armed conflict, when the total number of staff was approximately 11 500. During the reporting period, the total number of staff present at the ZNPP site each day was approximately 2000. During the reporting period, ISAMZ gathered information on the site's planning for staffing the plant and increasing the number of qualified and trained staff. ISAMZ was informed that at present the total number of staff is 4500, with an additional 940 new applications under consideration and that the ZNPP stated there were enough certified personnel at the plant with all essential positions fully filled. The Agency continues to follow up on the matter and to assess the availability of qualified and authorized main control room operators.

49. On 1 February 2024, the ZNPP informed ISAMZ that starting from that day there were no longer any Energoatom workers at the ZNPP and that all on-site staff had citizenship of the Russian Federation and contracts with the Joint Stock Company "Operating Organization of the ZNPP". The ZNPP has stated that the plant's staff are sufficient in number and hold appropriate qualifications, including the newly recruited staff from the Russian Federation. By the end of the reporting period, ISAMZ was unable to confirm how many Energoatom staff from different sections of the ZNPP were affected by this change.

50. ISAMZ continued the practice of conducting a walkdown of the main control rooms of all units, one after the other. However, unlike the first time, when an all-main control room walkdown¹² was conducted on 14 November 2023, ISAMZ was limited in its ability to converse with operating staff and request parameters related to the status and nuclear safety of each unit. ISAMZ was informed that the minimum number of positions, with the requisite composition, was filled with authorized staff. However, on 19 February 2024, ISAMZ noted that many of the main control room operators present still hold Ukrainian authorizations and had reportedly undertaken activities to obtain Russian authorization.

51. ISAMZ visited the ZNPP training centre on two occasions during the reporting period — 16 January and 13 February 2024 — and was informed that 119 of about 260 training centre positions are staffed. Of the 119 staff, approximately 50% have been newly recruited to the ZNPP, with the remaining staff having been there since before the conflict.

52. The ZNPP staff reportedly were continuing to be under strong psychological stress of various kinds.

¹² Report by the Director General to the Board of Governors, document GOV/2023/59, issued on 16 November 2023, para. 51.

53. For the Agency to be able to assess the staffing situation at the ZNPP, including in relation to qualifications and training, and reach a conclusion regarding its potential implications for nuclear safety and security, timely and precise information is needed.

Off-site power supply

54. The status of the off-site power supply to the ZNPP remained vulnerable throughout the reporting period. At the start of the reporting period, one of four 750 kV lines — the Dniprovsk line — and one of six 330 kV power lines — the Ferosplavna 1 line — were providing off-site power to the ZNPP.

55. On 26 November 2023, a short circuit occurred around 100 kilometres north of the plant, resulting in the loss of the connection to the 750 kV Dniprovsk power line at around 10:30 local time. Following the loss of the 750 kV Dniprovsk power line, the ZNPP was powered by the 330 kV Ferosplavna 1 line. The Dniprovsk power line was recovered at 21:53 local time on the same day. Due to this transient, there was a decrease in voltage in one of the safety system trains of Unit 4, which triggered one of the emergency diesel generators to operate for half an hour.

56. At 22:26 local time on 1 December 2023, the off-site power from the 330 kV Ferosplavna 1 line was lost and the plant was supplied with off-site power from the 750 kV Dniprovsk line. Subsequently, at 03:32 local time on 2 December 2023, the 750 kV Dniprovsk line was lost, resulting in the eighth total loss of off-site power since the start of the armed conflict. All 20 emergency diesel generators (EDGs) were actuated. After this, as per the plant procedure, the plant gradually shut down 12 EDGs and 8 EDGs continued to provide on-site power. The 750 kV Dniprovsk line was restored at 08:07 local time on 2 December 2023. According to the ZNPP, the Dniprovsk line was damaged, “presumably as a result of military activity”.

57. The back-up 330 kV Ferosplavna 1 line remained disconnected until 14 December 2023 when maintenance to repair the line, performed within Ukrainian controlled territory, was completed. The ZNPP remained connected to both the 750 kV Dniprovsk line and the back-up 330 kV Ferosplavna 1 line until 20 February 2024, when the back-up 330 kV Ferosplavna 1 line was disconnected. The cause of the disconnection was confirmed to have occurred in Ukrainian controlled territory. The cause of the disconnection remained unknown and the 330 kV Ferosplavna 1 line remained disconnected until the end of the reporting period.

58. The normal configuration for off-site power for the ZNPP is that the reactor units receive power through both the 750 kV Dniprovsk line and the back-up 330 kV Ferosplavna 1 line via dedicated transformers, with additional redundancy such that the 330 kV power could be provided through an autotransformer if the 750 kV Dniprovsk line was unavailable. However, at the start of the reporting period, the ZNPP was maintaining the connection to the back-up 330 kV Ferosplavna 1 line in an abnormal manner with the dedicated back-up power transformers disconnected, thereby reducing the redundancy and diversity of the electrical supply. The Agency’s assessment was that that configuration would necessitate the use of EDGs if the 750 kV line was disconnected. To correct the configuration, the ZNPP completed work on the transformers in December 2023 and reconfigured them so as to ensure that all units are permanently connected to the back-up power.

59. On 18 January 2024, two of the back-up power transformers, comprising one pair out of three pairs of the back-up transformers, tripped due to the activation of a gas protection relay. Consequently, the

“The plant’s vulnerable power status remains one of the main dangers for nuclear safety and security at the site. The situation remains extremely worrying in this respect. The site has already lost all off-site power eight times since August 2022, forcing it to rely on emergency diesel generators.”

Director General Rafael Mariano Grossi, 19 January 2024

ZNPP lost its immediate back-up power supply. The ZNPP received all necessary off-site power from the 750 kV Dniprovsk line — despite the Ferosplavna 1 line still being available — for a period of approximately eight hours until the other pair of back-up power transformers was connected.



Director General Rafael Mariano Grossi visiting the back-up power transformers at the ZNPP on 7 February 2024.

60. The ZNPP commenced an investigation into the cause of the trip. One of the transformers that had tripped was placed in maintenance and was subsequently returned to operation on 30 January 2024. The outcome of the investigation was explained to the Director General on 7 February 2024 and subsequently shared with ISAMZ, with the explanation that the direct cause of the event was a false actuation of the gas protection relay of the pair 5,6 of the back-up power transformers. The transformer protection was actuated as a result of moisture penetration through the rubber gasket of the gas relay cover.

61. ISAMZ conducted walkdowns of the 750 kV open switchyard on 21 December 2023 and 22 January 2024. On each occasion, ISAMZ observed that the 750 kV Dniprovsk line was the only line connected to the electricity grid. Additionally, the switchyard components of the Kakhovska line damaged in 2022 had been dismantled and spare parts for repair were available. However, ISAMZ did not observe that any repair work had been undertaken.

62. Throughout the reporting period, ISAMZ continued to request permission to visit the 330 kV open switchyard of the ZTPP, but this was not granted. As a result, the switchyard has remained inaccessible for technical assessment by ISAMZ for over a year since it last visited on 19 December 2022, and it could potentially have an impact on the nuclear safety and security at the plant.

Logistical supply chain

63. During the reporting period, the supply chain to the ZNPP continued to be provided by the Russian Federation.¹³ ISAMZ engaged proactively to monitor and assess the status and availability of the spare parts and effectiveness of the supply chain. This included visits to the external warehouses, the electrical warehouse, the mechanical warehouse and to the diesel fuel farm at the plant throughout the reporting period. Based on these visits and the exchanges with the ZNPP, ISAMZ reported the following observations:

- While there was reportedly a programme to replace ageing power cables at the ZNPP, there was apparently a limitation in the availability of the required cables with the current inventory, including those received prior to the armed conflict and partially supplied afterwards;
- There is reportedly a central pool with specific equipment for NPPs in the Russian Federation, and the ZNPP receives supplies from this pool. However, the regularity with which supplies are received is questionable, as a number of shelves in the warehouses were observed to be empty during the walkdowns and most items on the shelves appeared to have been there since before the armed conflict;
- There is reportedly a continuous supply of diesel fuel to the site, delivered every other day, to ensure the operation of the mobile diesel boilers, and there is reportedly enough fuel at all times to ensure the uninterrupted operation of all EDGs for ten days.

64. However, based on the observations and information collected by ISAMZ, the supply chain logistics remained fragile and the ZNPP does not appear to have all necessary parts readily available on site. This may have implications for maintenance activities and ageing management and impact the overall nuclear safety and security of the plant. The Agency recognizes that products supplied by the Russian Federation are important for the continued safe and secure operation of the ZNPP but notes that the use of such products is not authorized by the Ukrainian authorities. Moreover, the Agency was not informed of any actions taken by the ZNPP to ensure the compatibility and suitability of such products.

On-site and off-site radiation monitoring systems and emergency preparedness and response

65. There were no changes to the status of the on-site and off-site radiation monitoring systems during the reporting period. All on-site radiation monitoring stations were operational, and only three off-site monitoring stations remained disconnected, as reported in document GOV/2023/44.

66. The online transmission of data from the radiation monitoring system around the ZNPP to the SNRIU continued to be interrupted and was not restored during the reporting period. Data from the off-site radiation monitoring stations continued to be manually provided to ISAMZ several times a week and were uploaded to and displayed on the Agency's International Radiation Monitoring Information System (IRMIS) together with the results of the monitoring conducted by ISAMZ. All radiation levels reported to and collected by ISAMZ were normal throughout the reporting period.

¹³ See para. 2 above.



Radiation monitoring data from the monitoring stations and measurements taken by ISAMZ in the 20 km radius around the ZNPP. Radiation levels are normal.

“Having effective emergency preparedness and response arrangements is one of the seven indispensable pillars for ensuring nuclear safety and security in an armed conflict. It is vital that the Zaporizhzhya nuclear power plant tests its emergency response arrangements. We encourage the plants in Ukraine to conduct more exercises in future to further test their emergency preparedness.”

Director General Rafael Mariano Grossi, 24 November 2023

67. An emergency exercise was conducted by the ZNPP in the week of 20 November 2023. The exercise, the first since the start of the armed conflict, focused on actions to be taken in response to a hypothetical break of a pipe carrying radioactive wastewater and the disconnection of power at one reactor unit. ISAMZ observed the coordination of the emergency response actions from the ZNPP’s temporary emergency centre. ISAMZ also observed field activities during the exercise, including radiation and contamination monitoring activities and preparations for the evacuation of some staff of the plant. ISAMZ observed the standard debriefing after the exercise. Overall, the exercise scenario was carried out as planned. ISAMZ noted that participants in the exercise appeared to be following a script of pre-prepared actions for the exercise scenario rather than making use of available procedures and checklists. This may have limited the opportunity to identify possible areas of improvement by testing actual emergency arrangements, although it might be beneficial in terms of training staff to take the expected actions.

68. An emergency communication drill was conducted by the ZNPP on 12 December 2023. The drill focused on actions to be taken in response to a hypothetical decrease in the water level of the cooling pond at the plant. The drill involved on-site and off-site representatives from different Russian organizations.¹⁴ ISAMZ was given limited opportunity to observe the drill and was unable to collect all the relevant information to properly assess its effectiveness.

69. An unannounced fire drill was conducted at the ZNPP on 20 December 2023. The drill scenario involved a hypothetical oil leakage at the transformer of Unit 2, which resulted in a fire. The drill’s

¹⁴ See para. 2 above.

participants reportedly included regional, city and on-site fire departments. ISAMZ was only made aware of the drill after it had been conducted.

70. Effective emergency arrangements are essential to ensure that the public, property and the environment are protected in case of an emergency, particularly in the circumstances imposed by the armed conflict. Therefore, the Agency considers the conduct of emergency exercises and drills to be a positive development, even in cases where the scope of the exercises is limited. Providing ISAMZ with the opportunity to fully observe exercises and drills will assist the Agency to closely monitor and assess the emergency arrangements in place.

Communications

71. Official communication between the ZNPP and the SNRIU has not been restored. The ZNPP remains in contact with the Ukrainian electricity grid operator on matters related to off-site power supply. ISAMZ reported continued challenges with connecting to mobile telephone networks and constant interruptions to internet connections at the site.

Five concrete principles for protecting the ZNPP

72. During the reporting period, the Agency continued to monitor observance of the five concrete principles at the ZNPP. For this purpose, ISAMZ conducted regular walkdowns at the ZNPP site and had access to most areas requested, though often only after having to wait for a significant period for the access permission to be granted.

- 1 There should be no attack of any kind from or against the plant, in particular targeting the reactors, spent fuel storage, other critical infrastructure, or personnel
- 2 The plant should not be used as storage or a base for heavy weapons (i.e. multiple rocket launchers, artillery systems and munitions, and tanks) or military personnel that could be used for an attack from the plant
- 3 Off-site power to the plant should not be put at risk. To that effect, all efforts should be made to ensure that off-site power remains available and secure at all times
- 4 All structures, systems and components essential to the safe and secure operation of the ZNPP should be protected from attacks or acts of sabotage
- 5 No action should be taken that undermines these principles



The five concrete principles for protecting the nuclear safety and security at the ZNPP established by the Director General Rafael Mariano Grossi at the UNSC meeting on 30 May 2023.

73. During those walkdowns, ISAMZ did not find any indications that the five concrete principles were not being observed. However, there were observations that some principles were put at risk during the reporting period. The access restrictions imposed on ISAMZ by the ZNPP also continue to limit the Agency's ability to fully confirm that all five concrete principles are being observed at all times.

74. On 7 December 2023, ISAMZ was permitted to conduct a walkdown of all six turbine halls, one after the other, for the first time since the request was made on 5 September 2023. ISAMZ did not observe the presence of any heavy weapons during the walkdown. However, ISAMZ was only granted partial access to the eastern side of the turbine halls, on the +15 metres level only, and reported that armed troops were guarding the western end of each turbine hall.

75. Throughout the remainder of the reporting period, ISAMZ was only granted access to one turbine hall at a time, with the same limitations on the eastern side (on the +15 metres level) of each turbine hall.



Director General Rafael Mariano Grossi visiting the turbine hall of Unit 4 at the ZNPP on 7 February 2024.

76. ISAMZ continued to request access to the rooftops of Units 1, 5 and 6. While such access to Unit 5 and Unit 6 was initially granted in December 2023, the walkdown was cancelled on 19 December 2023 by the ZNPP, citing security concerns. ISAMZ continued to not be given access to the rooftops of Units 1, 5 and 6 for the remainder of the reporting period.

77. ISAMZ's access to some reactor halls was also restricted and it was regularly prevented from visiting all parts of the turbine halls throughout the reporting period.¹⁵

78. Having to make continued advance requests for access to relevant areas of the ZNPP and being unable to access some critical areas for very long periods of time pose challenges for the ISAMZ team to make observations and to report fully on observance of the five concrete principles.

79. During the reporting period, ISAMZ did not observe attacks from or against the plant, in particular targeting the reactors, spent fuel storage, other critical infrastructure or personnel, although it did report regular detonations and gunfire in proximity to the ZNPP site. On one occasion, on 29 November 2023, ISAMZ reported an air-raid warning at the ZNPP.

80. However, on 26 and 28 November 2023, ISAMZ heard several rockets that appeared to have been fired from a location close to the plant. The team also heard multiple artillery rounds on 28 November 2023 that appeared to have been launched from a location near to the plant. There was no indication that any weapons were launched from within the ZNPP perimeter. Any heavy weapons usage in the vicinity or near the plant puts at risk the five concrete principles and potentially increases the likelihood of an impact, even unintentional, on the ZNPP.

¹⁵ See paras 41 and 47 above.

“I remain deeply concerned about nuclear safety and security at the plant, both when it comes to its vulnerable off-site power supplies – which can be affected by attacks far away from the site – and the more direct military risks it is facing, potentially undermining the principles that I set out at the United Nations Security Council in May. In this context, the apparent firing of rockets from near the plant is a special source of concern.”

Director General Rafael Mariano Grossi, 26 November 2023

81. The Agency received claims that aerial vehicles launched by Ukraine in order to “attack and commit provocations” at the ZNPP and the town of Enerhodar had been regularly “suppressed”. On 15 February 2024, ISAMZ was informed by the ZNPP of four alleged drone strikes on areas within the city of Enerhodar in the early evening of 14 February 2024. ISAMZ visited two of the four alleged attack sites on 16 February 2024 but was unable to confirm whether the damage observed was directly related to a drone attack two days previously or was the result of damage sustained prior to that event, as no remnants of the drones were observed. Reportedly, such remnants had been removed before ISAMZ’s arrival.

82. On 16 February 2024, ISAMZ heard a loud explosion which appeared to be coming from the ZNPP site or its close vicinity. The ZNPP informed the team that the explosion took place outside the site perimeter and that no damages or casualties were recorded. On 22 February 2024, ISAMZ reported another loud explosion very close to the ZNPP which the ZNPP explained was due to “field training” conducted by the security personnel responsible for defence of the plant. No damage or casualties were reported.

83. ISAMZ did not observe any heavy weapons during walkdowns of any areas to which the teams had access. However, for the Agency to fully confirm the absence of heavy weapons at the ZNPP, timely and appropriate access to all areas important for nuclear safety and security is needed.

84. ISAMZ continued to report the presence of troops at the site and often reported that armed troops had instructed ISAMZ that they could not visit parts of the turbine halls. The Russian Federation states that these troops are from the Russian National Guard and that some chemical, biological, radiological and nuclear (CBRN) specialists are present at the plant.

85. During the reporting period, the ZNPP suffered its eighth total loss of off-site power, presumably due to military activity outside the ZNPP site. The ZNPP had to rely on the use of emergency diesel generators for approximately four and a half hours until the off-site power line was reconnected.

86. The ZNPP stated that key infrastructure at the site was being protected by Russian troops and that additional physical protection measures had been put in place as reported in documents GOV/2022/66 and GOV/2023/10. However, it is not possible for ISAMZ or the Agency to fully confirm that all structures, systems and components essential for the safe and secure operation of the ZNPP are protected against acts of sabotage due to limitations on information and on access to various areas at the site.

B.2.2. South Ukraine, Khmelnytsky and Rivne NPPs

87. The SUNPP, the KhNPP and the RNPP continued to be the only operating NPPs in Ukraine that produced electricity for the Ukrainian network during the reporting period. All reactors (seven in total) at these sites are in operation, except during periods of scheduled outages for maintenance and refuelling.

88. At the beginning of the reporting period, Unit 2 of the KhNPP completed its maintenance outage. The unit reached criticality on 17 November 2023 and returned to full-power operation shortly thereafter.

89. There were no reported instances of the operating NPPs having to reduce power production as a result of the armed conflict during the reporting period. Frequent air-raid alarms were reported by the Agency staff present at these NPPs.



The ISAMIR team on site at the Rivne Nuclear Power Plant in January 2024. (Photo: RNPP)

Physical integrity

90. No physical damage was caused to the KhNPP, the RNPP or the SUNPP as a result of military activities during the reporting period. The activities at all three NPPs to protect their critical structures, systems and components, and vital structures through additional mitigatory measures were reported to have continued.

91. During the night of 28 November 2023, the ISAMIK team reported hearing several explosions in close proximity to their living quarters, over a period of 20 minutes. The KhNPP was not affected.

“Much of the world’s attention — and rightly so — is focused on the very real dangers facing the Zaporizhzhya nuclear power plant, which is of special concern as it is located on the frontline. But last night’s event serves as a reminder that we must not forget about the other nuclear sites in Ukraine, which are also potentially exposed to missile and other attacks.”

Director General Rafael Mariano Grossi, 29 November 2023

Nuclear safety and security systems and equipment

92. All nuclear safety and security systems at the SUNPP, the KhNPP and the RNPP continued to operate as designed and to be fully functional. The plants’ operating staff conducted regular operational testing and preventive maintenance of the systems, some of which was witnessed by the Agency staff present on site. No failures of these systems or challenges in their operation were reported.

Operating staff

93. All three NPPs reported having sufficient qualified operating staff to ensure safe and secure plant operation. The Agency teams at the SUNPP, the KhNPP and the RNPP did not report any change in the staffing levels during the reporting period. However, the operating staff at the three NPPs continue to be exposed to increased stress due to the armed conflict, including as a result of frequent air-raid alarms.



*The ISAMIK team at the training centre of the Khmelnytsky nuclear power plant in January 2024.
(Photo: KhNPP)*

Off-site power supply

94. All three operating NPPs benefit from robust design, which provides for several independent connections with the outside grid, including additional sources of power such as nearby hydroelectric power plants.

95. No reductions in the operating power of the SUNPP, the KhNPP or the RNPP were reported as a result of military activities, such as attacks on the energy infrastructure of Ukraine, during the reporting period.

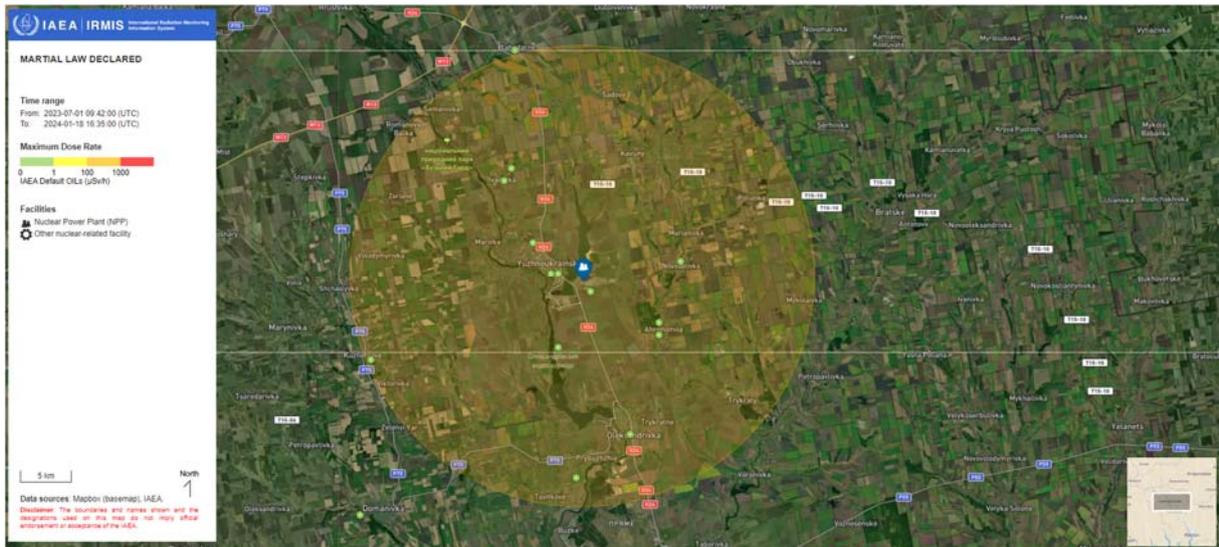
Logistical supply chain

96. No new challenges to logistical supply chains for the SUNPP, the KhNPP or the RNPP were reported during the reporting period.

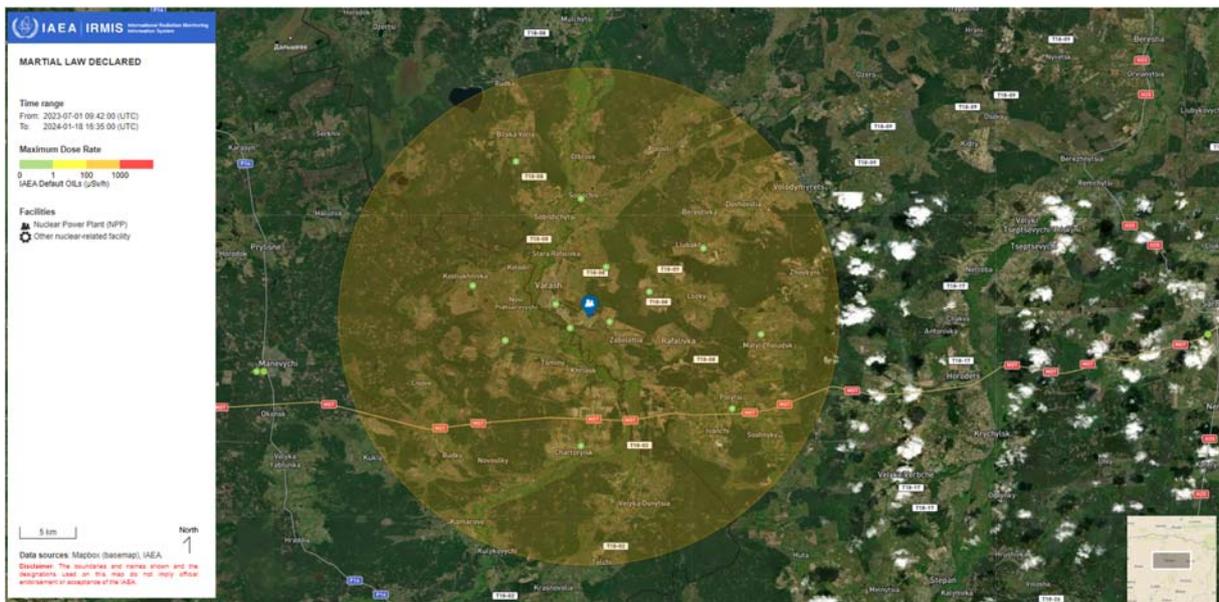
97. The major supply chain issues encountered at the beginning of the armed conflict have been resolved by diversifying the suppliers, setting up national manufacturers and finding alternative transportation methods.

On-site and off-site radiation monitoring system and emergency preparedness and response

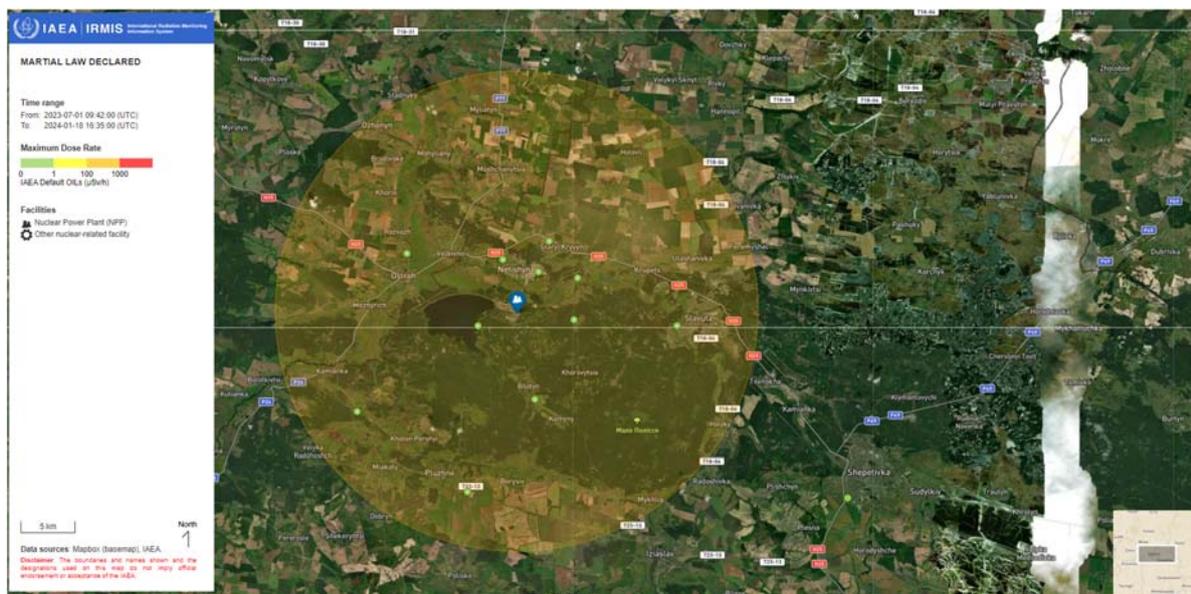
98. On 15 and 16 November 2023, the ISAMIR team observed an emergency exercise at the site from both the on-site and off-site emergency control rooms. The exercise was supported by the staff of the SUNPP and the KhNPP. RNPP conducted a debriefing to discuss the conduct of the exercise, document lessons learned and identify areas for improvement. During the exercise, the SNRIU — in its capacity as a Competent Authority under the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency — shared information with the Agency’s Incident and Emergency Centre.



*Radiation monitoring data from the monitoring stations in the 20 km radius around the SUNPP.
Radiation levels are normal.*



*Radiation monitoring data from the monitoring stations in the 20 km radius around the RNPP.
Radiation levels are normal.*



*Radiation monitoring data from the monitoring stations in the 20 km radius around the KhNPP.
Radiation levels are normal.*

Communications

99. On 12 December 2023, the ISAMIK and ISAMIR teams reported that the mobile phone network had occasionally been disrupted. The teams were subsequently informed that the cause was a cyber-attack on Ukraine's communications network that had affected most of the country.

100. All communication means remained available during the remainder of the reporting period.

101. Ukrainian inspectors from the SNRIU continue to be present at all three NPPs.

B.2.3. Chornobyl NPP Site and Other Facilities

102. The nuclear safety and security situation at the ChNPP site did not show any significant deviation from the situation previously reported in documents GOV/2022/52, GOV/2022/66, GOV/2023/10, GOV/2023/30, GOV/2023/44 or GOV/2023/59 with regard to the assessment of the nuclear safety and security situation against the Seven Pillars.

103. The transportation of spent fuel between the ISF-1 interim wet storage facility and the ISF-2 interim dry storage facility continued to be performed safely during the reporting period.

Physical integrity

104. The ISAMICH team at the Chornobyl NPP site reported that no events occurred during the reporting period that affected the integrity of the facilities on site.

Nuclear safety and security systems and equipment

105. The ISAMICH team reported that there were no situations in which nuclear safety and security systems were not functional. However, the ISAMICH team was informed by the ChNPP that some of the safety and security systems require maintenance and funding to replace older equipment with more modern versions.

Operating staff

106. The transportation for staff to and from Slavutych and the on-site living arrangements remained challenging for ChNPP staff, as detailed in document GOV/2023/59. The management of the Chornobyl

site is aware of the challenges and continued to investigate possible ways to improve the conditions for staff.

Off-site power supply

107. The ChNPP site has available off-site power supply through one 750 kV line, and three 330 kV and five 110 kV back-up power lines. EDGs were available but were not utilized during the reporting period. Maintenance was performed on the 750kV and some of the 330 kV and 110 kV lines during the reporting period.

Logistical supply chain

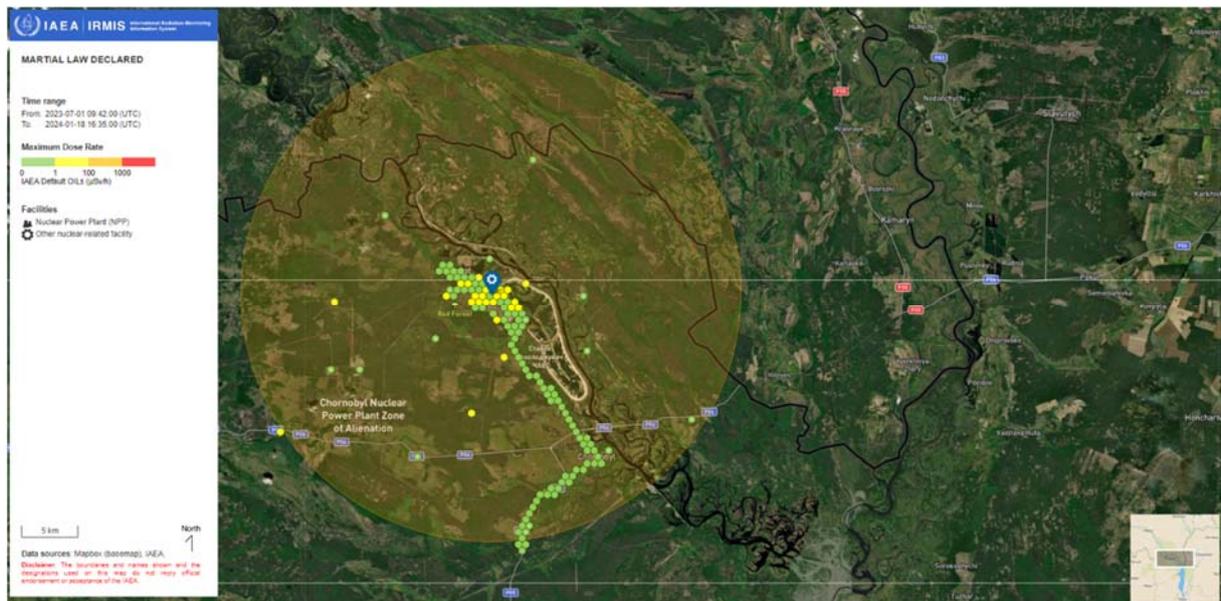
108. Challenges in the supply chain and in transportation to and from the site remain, as the infrastructure in the region has been impacted by the armed conflict.

On-site and off-site radiation monitoring system and emergency preparedness and response

109. In the week of 20 November 2023, the ISAMICH team observed an emergency drill at the radioactive liquid waste treatment plant, based on a scenario where a drum containing liquid radioactive waste was dropped, resulting in a simulated spill of liquid radioactive material. A second drill was conducted in the ISF-1 facility, based on a scenario involving a radiological emergency triggered by a fire.

Communications

110. The ChNPP maintained the availability of all necessary means of communication with stakeholders without interruptions.



Radiation monitoring data from the monitoring stations and measurements taken by the ISAMICH team in the 20 km radius around the ChNPP. Radiation levels are normal.

111. No other events having an impact on nuclear and/or radiation safety and nuclear security were reported for other facilities in Ukraine.

B.3. IAEA Technical Support and Assistance for Nuclear Safety and Security

112. The Agency continued to make progress in the delivery of its comprehensive programme of technical support and assistance to Ukraine. The programme consists of the delivery of nuclear safety- and security-related equipment; in-person technical support and assistance through on-site expert

missions and the continued presence of Agency staff at the five nuclear sites in Ukraine (further information on the latter is provided in Section B.1.); a medical assistance programme for operating staff at NPPs (reported in document GOV/2023/30); and assistance in managing the medium- and long-term environmental, social and economic impact of the flooding in the Kherson Oblast (reported in document GOV/2023/44). It also encompasses remote assistance and the deployment of rapid assistance should the need arise.

113. The Agency and its Ukrainian counterparts have continued to cooperate closely in order to understand better and address the priority needs of Ukraine as efficiently as possible, as the situation evolves. This effort needs to continue with strong coordination and cooperation at the national level, taking into account that the needs are great and that available resources are limited.

114. The Agency has also continued to work closely with a number of Member States and international organizations to ensure coordination in the provision of technical support and assistance to Ukraine and to secure the funding necessary to enable the delivery of the assistance needed.

115. By 23 February 2024, 26 Member States¹⁶ and an international organization¹⁷ had offered extrabudgetary cash contributions to support Agency efforts in providing technical support and assistance to Ukraine in nuclear safety, security and safeguards, including for sustaining the continued presence of Agency staff at the five nuclear sites in Ukraine.

116. An overview of the latest developments regarding the different components of the comprehensive programme for assistance to Ukraine is presented below. The Agency's remaining needs to provide technical support and assistance across the different components of the comprehensive programme reported in document GOV/2023/44¹⁸ have still not been met and amount to approximately €37 million.

B.3.1. Delivery of Equipment

Requests for assistance

117. During the reporting period, one additional request for nuclear safety and security equipment was received on 18 January 2024 under the statutory functions of the Agency, including through the operational arrangements¹⁹ under the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention). This request complements the requests made on 22 and 29 April, 8 July, 9 August and 3 October 2022 published on the Agency's Unified System for Information Exchange in Incidents and Emergencies (USIE) and the requests received on 15 November 2022 concerning the enterprises in the Chernobyl Exclusion Zone, the Radon Association and the Kharkov Institute of Physics and Technology (KIPT), and on 28 November 2022 concerning the energy sector in Ukraine, which were reported upon in detail in document GOV/2023/10.

118. The request dated 18 January 2024 pertains to nuclear safety and security-related equipment for the KIPT, the Institute of Metrology national scientific center and the ChNPP site as well as other

¹⁶ Australia, Austria, Belgium, Canada, China, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Republic of Korea, Malta, the Netherlands, New Zealand, Norway, Poland, Saudi Arabia, Slovakia, Spain, Sweden, Switzerland, the United Kingdom and the United States of America.

¹⁷ The European Commission representing the European Union.

¹⁸ Report by the Director General to the Board of Governors, document GOV/2023/44, issued 5 September 2023, paras 88, 109 and 112.

¹⁹ The operational arrangements include RANET and the *Operations Manual for Incident and Emergency Communication* (EPR-IEComm 2019) available at: <https://www.iaea.org/topics/emergency-preparedness-response/international-operational-arrangements>.

facilities and activities in the Chernobyl Exclusion Zone. The request also covers requirements to improve the living and hygiene conditions in the temporary accommodation for staff at the ChNPP.

119. During the reporting period, the Agency continued working to address these requests for technical support and assistance to Ukraine as well as the needs identified during the expert missions conducted in 2022 and 2023, based on their urgency and taking into account the funding available.

Offers of assistance

120. On 23 January 2024, the Agency received from the United States of America an offer of an in-kind contribution to assist Ukraine. This offer complements the offers made previously by 12 Member States²⁰ registered in the Response and Assistance Network (RANET) and by Greece.

Delivery of equipment

121. The Agency continued to deliver equipment to end users in Ukraine. However, the Agency faced challenges arising from tension on the Polish–Ukrainian border and from changes in the national framework for the receipt of humanitarian aid that resulted in delays in deliveries. Notwithstanding this, additional measures were taken that resulted in continued deliveries throughout the reporting period when 5 deliveries of equipment took place, bringing the total number of deliveries of equipment to Ukraine to 37.

122. The deliveries comprised equipment procured by the Agency under extrabudgetary contributions provided by Australia, the European Union, Japan and the United Kingdom. As a result of these deliveries, entities such as the “Izotop” Ukrainian State production enterprise, the KhNPP, the SUNPP and the RNPP received equipment such as radiocommunication systems, physical protection related equipment, spectrometers and laboratory equipment, or received requested software and related licenses.

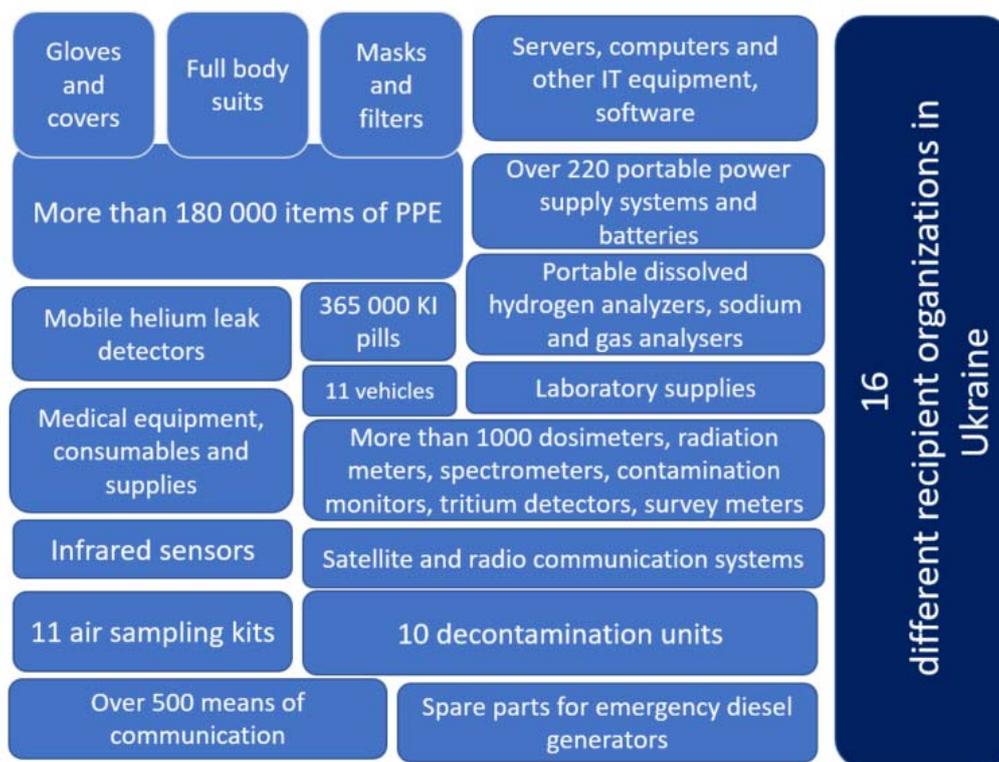


Night vision binoculars received by Izotop on 8 December 2023. The equipment was procured using extrabudgetary funding from Australia. (Photo: Izotop)

²⁰ Australia, Canada, France, Germany, Hungary, Israel, Japan, Romania, Spain, Sweden, Switzerland and the United States of America.

123. In addition, the third and final delivery of spare parts and rubber products for EDGs was received by the SUNPP, as confirmed on 27 November 2023. This delivery was arranged under the Agency’s partnership agreement with France and Energoatom, which was signed on 5 May 2023 and reported upon in document GOV/2023/30.

124. Following these deliveries, the value of the nuclear safety and security equipment delivered to Ukraine since the start of the armed conflict exceeded €8.5 million.

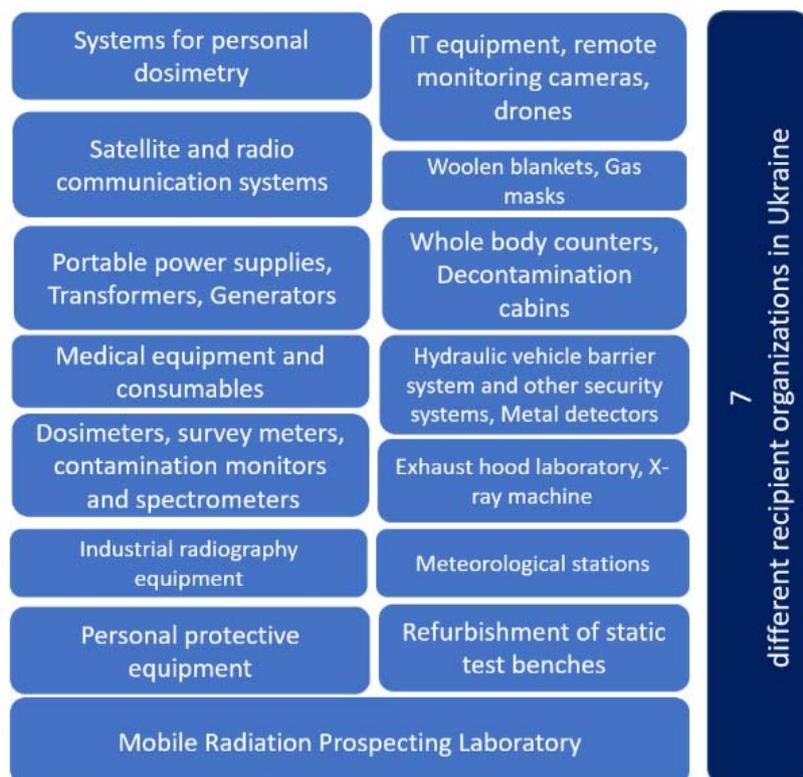


Overview of the nuclear safety- and security-related equipment worth €8.5 million that has been delivered to Ukraine since the start of the armed conflict.

125. During the reporting period, the Agency worked to finalize the arrangements for the delivery of equipment donated by three Member States.²¹ The Agency continued liaising closely with Canada and Ukrainian counterparts to agree on the third and last shipment of donated equipment, and prepared logistics for the delivery of donated equipment from the United States of America. The Agency continued liaising with Japan to facilitate the delivery of its equipment.

126. In addition to these planned deliveries, more nuclear safety- and security-related equipment procured by the Agency is expected to be transported to ten different organizations in Ukraine in the coming months. The total cost of these deliveries is almost €3 million. Additional nuclear safety- and security-related equipment is in various stages of procurement.

²¹ Canada, Japan and the United States of America.



Overview of the nuclear safety- and security-related equipment pending delivery to Ukraine.

B.3.2. ISAMRAD

127. During the reporting period, the Agency advanced the proposal in the form of an Assistance Action Plan for the first phase of delivering assistance within the framework of the IAEA Support and Assistance Mission on the Safety and Security of Radioactive Sources (ISAMRAD) in light of the findings and observations from the fact-finding mission that took place from 23 July to 1 August 2023. During this phase, the Agency envisages the provision of guidance, training and equipment in the area of the safety and security of radioactive sources in Ukraine, with a focus on high activity radioactive sources (Category 1 to 3 radioactive sources, as defined in the Agency's Code of Conduct on the Safety and Security of Radioactive Sources) and also to provide support for recovering radioactive sources under threat due to the ongoing military activities in the areas they are used or located. Such assistance will be provided taking into consideration the nuclear safety- and security-related equipment already delivered by the Agency to identified organizations to enhance safety and security of their radioactive sources, and the equipment in the process of procurement or delivery (see B.3.1).

128. The proposal was shared with the SNRIU and feedback received in February 2024. Pending its finalization, it is expected that the first phase will be initiated in the coming months.

B.3.3. Medical Assistance for Operating Staff at NPPs

129. On 22 November 2023, the Agency organized a High-Level Opening Event to launch a series of activities on the topic of mental health support designed to empower mental health teams and the management of all operating NPPs and the Chernobyl site to provide psychological counselling and mental health support to operating personnel in need. This tailored support is provided under the medical assistance programme as part of the comprehensive programme for assistance to Ukraine.

130. The event was opened by the Director General and attended by other senior officials as well as management, senior officials and mental health teams from relevant Ukrainian organizations and

facilities. The event highlighted the importance of giving adequate consideration to the mental health and well-being of the staff of the NPPs and showed appreciation to the Agency's staff for their efforts and dedication to providing support in this regard.



Director General Rafael Mariano Grossi and other Agency senior officials at the High - Level Opening Event held on 22 November 2023.

131. By 23 February 2024, a total of 16 workshops for mental health teams and management of the operating NPPs and the ChNPP site had taken place. The series of workshops began on 2 November 2023, as reported in document GOV/2023/59, and addressed the topics of trauma, post-traumatic stress disorder and living with the armed conflict.

132. In December 2023, the Agency identified the first round of priority medical equipment and supplies and allocated funding exceeding €1 million for these priority needs for procurement.

B.3.4. ISAMKO

133. The remote discussions and consultations with relevant counterparts in Ukraine continued during the reporting period with the aim of identifying the assistance needed for recovery of the Kherson Oblast to be delivered under the IAEA Support and Assistance Mission to the Kherson Oblast (ISAMKO). The Agency shared an overview of possible support that might be suitable in the areas of water, soil and food safety, animal and human health as well as civil infrastructure and requested the relevant organizations in Ukraine to consider what the needs are and their level of priority.

134. Preliminary feedback on the overview of possible assistance was received in mid-January 2024 and subjected to analysis in order to identify next steps and priority areas for assistance.

B.3.5. Remote Assistance

135. No remote assistance in nuclear safety and security was provided during the reporting period. However, the Agency developed a proposal for training activities on the topics of leadership and

management for nuclear safety and security, including safety and security culture. The proposal envisages remote webinars as well as on-site training at times when the composition of the teams of Agency staff continually present at the sites is suitable. The current proposal is shared with each nuclear site for review and feedback before finalization and implementation.

B.3.6. Deploying Rapid Assistance

136. No nuclear or radiological emergency involving nuclear facilities or activities involving radioactive sources was declared during the reporting period, and no deployment of rapid assistance was requested.

C. Implementation of Safeguards in Ukraine

C.1. Background

137. Ukraine acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) as a non-nuclear-weapon State in December 1994. Ukraine subsequently brought into force a comprehensive safeguards agreement (CSA) with the Agency in connection with the NPT in January 1998 and an additional protocol (AP) thereto in January 2006.

138. The Agency implements safeguards at 35 nuclear facilities and more than a dozen locations outside facilities (LOFs) in Ukraine. The safeguards implementation effort is concentrated at 4 NPP sites, which host 15 operational power reactors, and at the ChNPP site, which hosts 3 shutdown reactors, the reactor damaged in the 1986 nuclear accident, and 2 spent fuel processing and storage facilities.

139. 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 ChNPP site. Ukraine submitted two additional special reports to the Agency, dated 4 March and 5 July 2022, 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, respectively.

140. 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 established annual implementation plans for Ukraine, to verify the declared nuclear material at declared facilities and LOFs and/or design information at such facilities.

C.2. Recent Developments

141. Since the Director General’s previous report, the Agency has continued to rely on remotely transmitted data from its cameras, seals and unattended monitors to maintain continuity of knowledge over declared inventories of nuclear material. All data collected by these systems were transmitted successfully to Agency Headquarters during the reporting period. The Agency has maintained its continuous acquisition and analyses of open source information, and its analyses of satellite imagery covering nuclear installations in Ukraine. This has proved to be essential for the Agency in the preparation of its in-field verification activities, in particular at the Zaporizhzhya site. The Agency has been acquiring and analysing satellite imagery and continuously monitoring all available open source information to track developments and to assess the operational status of the plant, including the detection of possible damage caused by shelling at the site.

142. With the establishment of a continuous presence of Agency staff at the KhNPP, the RNPP, the SUNPP and the ZNPP, as well as at the ChNPP site, safeguards activities have been integrated with the various IAEA Support and Assistance Missions to the extent possible. Designated safeguards inspectors typically comprise part of the technical experts continuously present in Ukraine. For efficiency reasons, Agency inspectors are scheduled so as to be present whenever safeguards activities are planned — for example, to conduct physical inventory verifications or spent fuel transfer verifications — and otherwise provide technical support to the ongoing safety and security missions. Independent safeguards missions are planned, as needed, for activities that cannot be covered in the course of IAEA Support and Assistance Missions, including the installation or servicing of safeguards equipment and the conduct of complementary access.

143. During the reporting period, the Agency performed complementary access at two locations and successfully conducted physical inventory verifications at a number of locations. In particular, physical inventory and design information verifications were performed for facilities on the Chornobyl site and in the KIPT. The Agency also verified spent fuel that was transferred from the Rivne NPP to the centralized storage facility at Chornobyl. Inspections were also carried out at the fresh fuel storage at the Zaporizhzhya site. The participation of Agency inspectors as part of the various IAEA Support and Assistance Missions has continued to enable the implementation of unannounced inspections at many facilities and, during the reporting period, one such unannounced inspection was performed at one site, in addition to interim inventory verifications. Finally, Agency technical experts continued to travel to NPPs and to the ChNPP site to install, service and maintain the Agency safeguards systems that monitor the loading, conditioning and transfer of spent fuel from NPPs to dry storage at Chornobyl.

D. Summary

144. The situation at the ZNPP continues to be very precarious, with six out of the Seven Pillars being compromised fully or partially. During the reporting period, the plant suffered its eighth total loss of off-site power since the start of the armed conflict and continued to face challenges related to staffing, continued and regular inspection and maintenance of critical safety systems, and a reliable logistic supply chain. All these aspects impact the nuclear safety and security situation at the plant. The Agency continued to request timely and appropriate access to all areas of the ZNPP of significance for nuclear safety and security and to strongly encourage the ZNPP to ensure that open information sharing take place regularly to enable the Agency to make its assessment and report impartially and objectively on the nuclear safety and security situation at the site.

145. The Agency did not find any indications that the five concrete principles were not being observed at the ZNPP site. However, there were observations that some principles were put at risk during the reporting period. The access restrictions imposed on ISAMZ by the ZNPP also continue to limit the Agency's ability to fully confirm that all five concrete principles are being observed at all times.

146. During the reporting period, the KhNPP, the SUNPP and the RNPP continued to operate safely and securely despite the challenging circumstances imposed by the armed conflict. Some of these plants experienced disruptions of the mobile communication network due to a cyber-attack on the Ukraine's communications network that affected most of the country.

147. The Agency continued providing technical support and assistance to Ukraine related to nuclear safety and security. During the reporting period, 5 deliveries of procured nuclear safety- and security-related equipment to different organizations in Ukraine were organized, bringing the total number of deliveries to 37. In partnership with France and Energoatom, the Agency also assisted in the delivery of

the third and final consignment of spare parts and rubber products for EDGs for the SUNPP. In total, over €8.5 million worth of equipment has now been delivered to Ukraine since the start of the armed conflict.

148. The Agency maintained a continuous presence at all nuclear sites without interruption and all rotations were timely and as planned. Maintaining the continued presence of Agency staff at all five nuclear sites in Ukraine continues to be a major undertaking for the Agency, requiring significant resources. So far, a total of 98 missions comprising 131 Agency staff members have been deployed as part of the continued presence for nuclear safety and security at all 5 nuclear sites in Ukraine, totalling 208.6 person-months in Ukraine.

149. In addition, the Agency had organized 16 workshops for mental health teams and management of the operating NPPs and the ChNPP site by the end of the reporting period, addressing priority topics of trauma, post-traumatic stress disorder and living with the armed conflict. Moreover, the Agency made a proposal for the first phase of assistance aimed at ensuring safety and security of radioactive sources under threat due to the armed conflict, and continued its actions to identify urgent assistance to support the recovery of the Kherson Oblast.

150. The continued commitment of Member States and their close cooperation with the Agency is essential for ensuring nuclear safety and security in Ukraine under all circumstances and for providing assistance efficiently while ensuring the timely delivery of the Agency's programmatic activities. While the Agency received valuable support in terms of extrabudgetary (cash and in-kind) contributions from a total of 30 Member States and the European Union, the remaining needs are considerable and amount to approximately €37 million. Further support is needed to meet these needs.

151. The Agency 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 Agency 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.

Annex: Chronology of Events from 15 November 2023 to 23 February 2024

Events at the Zaporizhzhya Nuclear Power Plant

- On 15 November 2023, ISAMZ conducted a walkdown of the turbine hall of Unit 5, but access was partially restricted to the +15 metres level and it was prevented from viewing the western side of the turbine halls.
- On 17 November 2023, ISAMZ was informed that boron had been detected in the secondary cooling circuit of steam generator 1 of reactor Unit 5, which was in hot shutdown. No radioactivity was detected in the secondary cooling circuit.
- On 21 November 2023, Unit 5 was transitioned to cold shutdown to determine the cause of boron detected in a cooling circuit.
- On 23 November 2023, the ZNPP conducted an emergency exercise focused on the actions that should be taken in response to a hypothetical break of a pipe containing radioactive wastewater and the disconnection of power from one reactor unit.
- On 24 November 2023, the ZNPP informed ISAMZ that it will not immediately investigate the cause of the presence of boron in the secondary cooling circuit of one of Unit 5's steam generators.
- On 26 November 2023, the ZNPP lost the connection to the 750 kV Dniprovsk line at approximately 10:30. One EDG started operating to supply reactor Unit 4 and was manually shut down after 10 minutes. The 750 kV line was restored at 21:53 and the ZNPP informed ISAMZ that the disconnection was due to a short circuit that had occurred around 100 kilometres north of the plant. Off-site power remained available through the 330kV Ferosplavna 1 line.
- On 26 November 2023, ISAMZ heard several rockets that seemed to have been fired from close to the plant. ISAMZ did not see the projectiles because of clouds but the distinctive sound indicated they were fired from a Multiple Launch Rocket System (MLRS) nearby.
- On 28 November 2023, ISAMZ heard the distinctive sound of several rockets that seemed to have been fired from close to the plant. The team also heard multiple artillery rounds which also seemed to have been fired from near the ZNPP.
- On 29 November 2023, ISAMZ reported an air-raid warning at the site that lasted for about ten minutes in the afternoon. No impact was heard by the team during the air-raid warning and there was no damage to the site.
- On 1 December 2023, the 330 kV Ferosplavna 1 line was disconnected at 22:36.
- On 2 December 2023, at 03:32 the 750 kV Dniprovsk line was disconnected, resulting in a total loss of off-site power to the ZNPP for the eighth time since the start of the military conflict. The 750 kV power line was reconnected at 08:07 the same day. The operation of the four main coolant pumps of Unit 4 was interrupted during the time of the off-site power loss. The Unit was initially moved to semi-hot shutdown and then returned back to hot shutdown when power was restored.
- On 7 December 2023, ISAMZ conducted a walkdown of the turbine halls of all six reactor units one after the other, for the first time. The experts did not observe any mines, explosives, military

equipment or vehicles in the areas they visited. However, the team was restricted to the +15 metres level only and could not access the western side of the halls.

- On 12 December 2023, the ZNPP conducted an emergency communication drill involving on-site and off-site representatives from different Russian organizations.
- On 14 December 2023, the back-up 330 kV Ferosplavna 1 power line was reconnected following its disconnection on 1 December 2023.
- On 14 December 2023, ISAMZ was not given access to the 330 kV switchyard at the ZTPP.
- On 15 December 2023, the ZNPP completed work on the electrical transformers, which were returned to service so that one pair of transformers was permanently connected to provide power to the on-site back-up power lines — known as busbars — of all six reactor units.
- On 18 December 2023, ISAMZ was not granted access to the western part of the turbine hall of reactor Unit 5 during a walkdown. The IAEA has not been able to visit the western part of any of the six turbine halls since mid-October 2023.
- On 19 December 2023, ISAMZ was informed that the ZNPP was installing four new diesel boilers to generate additional steam needed for various nuclear safety functions at the site.
- On 19 December 2023, ISAMZ was informed by the ZNPP that they could not access the reactor rooftops as planned due to security concerns. No alternative date was provided.
- On 20 December 2023, ISAMZ was not allowed to access the isolation gate of the ZNPP cooling pond during a walkdown.
- On 20 December 2023, an unannounced fire drill was conducted at the ZNPP. The drill scenario involved a hypothetical oil leakage at the transformer of reactor Unit 2, which resulted in a fire. ISAMZ was only made aware of the drill afterwards.
- On 22 December 2023, ISAMZ was not granted access to the Unit 6 reactor hall, the first time ISAMZ was not given access to the reactor hall of a unit in cold shutdown.
- On 22 December 2023, during a walkdown of the safety system rooms of Unit 6, ISAMZ observed boric acid deposits on valves and a pump and on the floors of several rooms in the containment building. The plant informed the team that the source of the leak was one of the boric acid storage tanks and that in view of the small magnitude of the leak it was not planned to be repaired immediately, but rather as part of the planned maintenance of the impacted system.
- On 24 December 2023, ISAMZ was told during a morning briefing that it was not allowed to make note of the level readings of the sprinkler ponds during their walkdown — this decision was reversed once the walkdown began.
- On 25 December 2023, ISAMZ was not given access to the reactor hall of Unit 2.
- On 28 December 2023, ISAMZ was not given access to the reactor hall of Unit 1.
- On 9 January 2024, ISAMZ conducted a follow-up walkdown of the safety system rooms of Unit 6 to assess the status of the boric acid deposits observed on 22 December. The team noted that there was a significant reduction in boric acid deposits.
- On 10 January 2024, ISAMZ visited the turbine halls of Units 1 and 2 but was once again not given access to some areas of the halls.

- On 12 January 2024, the team of experts was informed that the installation of the four new diesel boilers had been completed and that commissioning activities had commenced.
- On 15 January 2024, ISAMZ was granted access to the reactor hall of Unit 6 after previously not having been given access.
- On 15 January 2024, the team visited the turbine hall of Unit 6 but was once again not given access to some areas of the hall.
- On 18 January 2024, the gas protection was activated on a pair of transformers connecting the back-up power to the ZNPP, resulting in the loss of its immediate back-up power supply to the reactor units for several hours, even though the back-up 330 kV line remained available.
- On 18 January 2024, ISAMZ discussed the plant's maintenance activities with the ZNPP and was shown its high-level 2024 maintenance plan for such work. The ZNPP informed ISAMZ that the priority is to perform maintenance on the site's safety systems as well as important activities not conducted the previous year.
- On 18 January 2024, ISAMZ conducted a walkdown to all six main control rooms, where the experts were able to observe staffing levels but could not ask questions about their qualifications and experience.
- On 20 January 2024, Rostechnadzor issued a "special order" for the repair of the leak in the storage tank of Unit 6; furthermore, ISAMZ was informed by the ZNPP of its intention to fix the microcracks in the tank, which will require it to be drained.
- On 23 January 2024, ISAMZ performed a walkdown of the cooling pond area, during which it was informed of the status of the pumping stations and cooling towers, how the cold winter weather may affect the cooling pond, the status of the fish in the cooling pond and how water overflow from the sprinkler ponds is managed. However, during the walkdown the team was not permitted to visit the ZNPP cooling pond isolation gate.
- On 25 January 2024, ISAMZ was told that the cause of the gas protection activated on a pair of transformers through which the back-up power was connected to the ZNPP, resulting in the loss of its immediate back-up power supply to the reactor units for several hours, is now known.
- On 25 January 2024, ISAMZ was unable to access the reactor hall of Unit 5 due to a malfunction of the personnel airlock used to access the containment.
- On 29 January 2024, ISAMZ visited the new diesel steam generators and was able to observe the progress of commissioning activities and learn about the technology of the generators.
- On 29 January 2024, ISAMZ was told by the ZNPP that, due to warmer weather conditions, only six of the site's nine mobile boilers were required for heating.
- On 30 January 2024, ISAMZ was told by the ZNPP that the nominal staffing levels for NPPs operated by Rosatom are lower than the corresponding staffing levels of NPPs operated by Ukraine.²² The team was further informed that 4500 staff are currently employed by the Russian operating entity at the ZNPP and that 940 applications are under consideration. Prior to the start of the armed conflict, approximately 11 500 staff worked at the ZNPP.

²² See para. 2 above.

- On 30 January 2024, during a walkdown of the safety system rooms of Unit 1, ISAMZ observed boric acid deposits on the floors and walls of several rooms in the containment building. The plant informed the team that the source of the deposits was water dripping from a sample location. Furthermore, the lighting in some of the rooms was too poor for ISAMZ to make proper observations.
- On 31 January 2024, ISAMZ visited some of the ZNPP warehouses to assess the status of spare parts at the ZNPP and observed that much of the inventory appeared to have been received prior to 2022 and that there many empty shelves.
- On 31 January 2024, ISAMZ was told by the ZNPP that, due to warmer weather conditions, only five of the site's nine mobile boilers were required to generate steam for heating.
- On 1 February 2024, the ZNPP announced that no employees of Ukraine's national operator Energoatom would be permitted at the site. The staff working at the ZNPP now consists exclusively of former Energoatom employees who have adopted Russian citizenship and signed employment contracts with the Russian operating entity, and staff who have been sent to the ZNPP from the Russian Federation.
- On 1 February 2024, ISAMZ was informed by the ZNPP of the completion of commissioning activities for the diesel steam generators, of which three out of four were in operation to treat wastewater.
- On 1 February 2024, ISAMZ was told by the ZNPP that, due to warmer weather conditions, only four of the site's nine mobile diesel boilers were required for heating.
- On 1 February 2024, ISAMZ conducted a walkdown of the turbine building of Unit 4. Access was restricted to the eastern side at the +15 metres level.
- On 2 February 2024, ISAMZ was told by the ZNPP that only three of the site's nine mobile diesel boilers were required for heating.
- On 3 February 2024, ISAMZ was told by the ZNPP that only two of the site's nine mobile diesel boilers were required for heating.
- On 6 February 2024, ISAMZ was told by the ZNPP that all nine mobile diesel boilers had been turned off due to warmer weather conditions.
- On 6 February 2024, ISAMZ visited a wastewater treatment facility in a special building to better understand the use of the steam produced by new diesel steam generators in the process.
- On 7 February 2024, the Director General visited the ZNPP for the fourth time.
- On 8 February 2024, ISAMZ was told that, as the current inventory of wastewater had been treated, all four of the diesel steam generators used for water treatment had been turned off and would be restarted once a sufficient volume of wastewater had accumulated for processing.
- On 9 February 2024, ISAMZ was informed that the gas protection activation on a pair of transformers through which the back-up power was connected to the ZNPP, resulting in the loss of the immediate back-up power supply to the reactor units for several hours, had been caused by a defective seal on the box containing circuitry, which had allowed condensation to enter.
- On 13 February 2024, ISAMZ visited the ZNPP training centre and its simulators where they observed staff training, including main control room operators receiving additional simulator training for units other than those in which they were working.

- On 14 February 2024, ISAMZ observed Rostechnadzor, the Russian nuclear regulator, inspecting the authorizations of operating staff in the main control rooms of Units 2, 3, and 4.²³
- On 15 February 2024, ISAMZ was informed by the ZNPP of four alleged drone strikes in the city of Enerhodar. The first location was reportedly an administrative building located in the close vicinity of the ZNPP's telecommunication service facility; the second was a school yard; the third was a yard in a residential area; and the fourth was a park near an administrative building. No casualties were recorded.
- On 16 February 2024, ISAMZ heard a loud explosion which appeared to be coming from the ZNPP site or its close vicinity.
- On 19 February 2024, ISAMZ conducted a sequential walkdown of all six main control rooms, addressing the matters of staffing and safety.
- On 20 February 2024, at 14:04 local time, the 330 kV Ferosplavna 1 line was disconnected on Ukrainian controlled territory (approximately 13.5 kilometres from the 330 kV ZTPP open switchyard) due to an unknown reason.
- On 22 February 2024, ISAMZ heard a loud explosion which came from very close to the ZNPP, causing vibrations and shaking of the windows at the site.

Events at the Khmelnytsky, South Ukraine and Rivne Nuclear Power Plants

- On 15 and 16 November 2023, the ISAMIR team observed an emergency exercise conducted at the Rivne NPP. The ISAMIK and ISAMISU teams observed the externally based support provided by staff at the KhNPP and the SUNPP.
- On 28 November 2023, the ISAMIK team reported hearing several explosions in close proximity over a 20-minute period late the night before, while in their quarters. The plant was not affected.
- On 12 December 2023, the ISAMIR and ISAMIK teams reported that the mobile phone network had occasionally been disrupted. The teams were informed that the cause was a cyber-attack on Ukraine's communications network that had affected most of the country.
- On 6 January 2024, the ISAMIR and ISAMISU teams were required to take shelter.
- On 6 and 7 January 2024, the ISAMIK team was required to take shelter several times.

Events at the Chornobyl Nuclear Power Plant Site

- On 21 November 2023, the ISAMICH team observed an emergency drill at the radioactive liquid waste treatment plant.

Events at Other Facilities

- The situation at other facilities in Ukraine with nuclear or radioactive material in use remained stable. No new events were reported at these sites.

²³ See para.2 above.