NATIONAL
ATOMIC ENERGY
AGENCY

NATIONAL REPORT OF POLAND
ON COMPLIANCE WITH THE OBLIGATIONS
OF THE CONVENTION ON NUCLEAR SAFETY

Polish 9th national report as referred to in Article 5 of the Convention on Nuclear Safety

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1. Introduction

This report has been prepared, according to the guidelines established by the Contracting Parties under Article 22, to fulfill the obligations of the Article 5 of the Convention on Nuclear Safety (CNS), signed by Poland on 20th September 1994 in Vienna and ratified by the President of the Republic of Poland on 10th May 1995. Present Report is the ninth one, following national reports issued in September 1998, October 2001, September 2004, September 2007, August 2010, August 2013, August 2016 and August 2019. Previous reports were presented during Review Meetings of the Contracting Parties of the Convention on Nuclear Safety held in Vienna in 1999, 2002, 2005, 2008, 2011, 2014 and 2017. Due to the postponement of the 8th Review Meeting of the Contracting Parties of the Convention on Nuclear Safety, the last report was not presented during the meeting initially scheduled for 2020. Moreover, in May 2012, Poland prepared a special report describing "post-Fukushima" actions which was presented during the 2nd CNS Extraordinary Meeting held in Vienna in August 2012.

Although **Poland is a contracting party without nuclear installations according to the Article 2(i) of the Convention**, in the current report, as well as in the previous ones, basic information regarding the application of provisions of the Convention for Polish nuclear installations (research reactor and spent fuel storages) is presented. The report describes the fulfillment of all Articles of the Convention based on the current legislative and regulatory framework. The most important activities connected to the implementation of the Polish Nuclear Power Programme are also described in relevant Articles. The summary of Polish plans for embarking on nuclear power is presented below.

In 2009 the Government adopted "Resolution no. 4/2009 of the Council of Ministers of 13th January 2009 on nuclear power development activities" in which the willingness to embark on nuclear power was made public. On 28th January 2014, the strategic document - Polish Nuclear Power Programme (PNPP), was adopted by the Council of Ministers. **Since the eighth report, the government of Poland has updated the Polish Nuclear Power Program**. The document was approved on **2nd October 2020**. It envisages the construction of 6 units with 6-9 GWe of capacity based on proven large-scale pressurized water reactors (PWR). The first nuclear reactor with a capacity of approximately 1-1.5 GWe will be launched by 2033, and the next five reactors every two years until 2043. In 2018 the Polish government also approved the Energy Policy of Poland until 2040 (EPP2040), which sets the framework for the energy transformation in the country. Energy Policy of Poland until 2040 reconfirms nuclear power will be a vital part of the Polish energy mix as a reliable source of electricity generation. A more extensive overview of the Polish Nuclear Power Program is presented in annex 2, prepared by the Ministry of Climate and Environment. Taking into consideration the government's decision to embark on nuclear power, extensive development of the Polish legal framework was performed over the last couple of years, resulting in amendments of the Atomic Law Act. Significant amendment to Atomic Law Act was implemented in 2019 and is described in chapter 7.6 of the eighth national report.

In 2021 the Ministry of Climate and Environment, together with PAA prepared the first "Strategy and policy on the development of nuclear safety and radiation protection of the Republic of Poland". This strategic document was adopted by the Council of Ministers on 12th April 2022. The main objective of the Strategy is to ensure the protection of people and the environment against the harmful effects of ionizing radiation and to increase the level of nuclear safety and radiation protection in Poland. The Strategy includes, among other things, principles of nuclear

safety and radiation protection and the course of actions aimed to improve nuclear safety and radiation protection continuously.

During the 7th review meeting, Poland has received two challenges:

1. Poland to continue developing its framework to ensure safe implementation of its first nuclear power plant project, meeting the harmonized safety expectations (e.g. WENRA safety objectives for new reactors).
2. PAA to continue strengthening its safety culture requiring challenging attitude.

The abovementioned challenges have been taken seriously by PAA. Results of activities focused on implementing challenge one are described in subsection 7.1 on the legislative and regulatory framework. Information on actions taken in relation to challenge two is described in subsection 10.1, which deals with safety culture in the regulatory body.

President of the 8th Review Meeting informed Contracting Parties on the expectations of reporting on Vienna Declaration principles. Poland continued to report on the fulfillment of Vienna Declaration principles also in the preparation of this report. Relevant Articles and subsections in which Poland reported on principles are presented below:

1. Principle 1 of Vienna Declaration – refer to subsections 17.1, 18.1 and 18.4;
2. Principle 2 of Vienna Declaration – refer to Article 14 and 17;
3. Principle 3 of Vienna Declaration – refer to Article 18 and 19.

During the 7th Review Meeting, Contracting Parties established nine major common issues arising from Country Group Discussions. The President of the 7th Meeting recommended that Contracting Parties consider these issues when preparing their National Reports for the 8th Review Meeting. Those topics could not be discussed during the 8th Reviewing Meeting; therefore, the summary of reporting on established common issues with relevant Articles and subsections is presented below:

1. Issue 1 – safety culture – subsection 10.1 – covered by challenge 2 for Poland;
2. Issue 2 – international peer reviews – summary;
3. Issue 3 – legal framework and independence of regulatory body – subsection 8.2;
4. Issue 4 – financial and human resources – subsections 8.1.5 and 8.1.7;
5. Issue 5 – knowledge management – subsection 8.1.6;
6. Issue 6 – supply chain – Article 13;
7. Issue 7 – managing the safety of ageing nuclear facilities and plant life extension - subsection 14.2;
8. Issue 8 – emergency preparedness – Article 16;
9. Issue 9 – stakeholder consultation & communication - subsection 8.1.9 and partially Article 16.

The President of the 9th Review Meeting encouraged Contracting Parties to report on their experiences in response to the COVID-19 pandemic. A brief description of the impact of the pandemic on inspections is presented in subsection 14.2 and the emergency response in light of the COVID pandemic in Article 16.

Poland is actively participating in international cooperation in order to improve preparation for the introduction of Nuclear Power Poland hosted INIR and IRRS missions in 2013, an INIR follow-up mission in 2016 and an IRRS follow-up mission in 2017. **PAA is planning to host an IRRS mission in 2023**, currently, the preparations and self-assessment are underway.

During the first IRRS mission conducted in Poland in Spring 2013, Poland received 15 recommendations and 16 suggestions. The suggestions and recommendations from the 2013 IRRS mission mostly related to CNS were thoroughly presented in three previous national reports. PAA hosted an IRRS follow-up mission in 2017. Based on the progress made by PAA and other stakeholders in implementing the IRRS action plan, all 15 recommendations, as well as all 16 suggestions, were closed. The team stated that "PAA has made significant progress on near-term activities and initiatives to enhance its ability to plan and execute PAA's mission while adapting in a timely and effective manner to a dynamic environment (including the development of the PNPP and the National Plan on Radioactive Waste and Spent Nuclear Fuel Management)". IRRS follow-up team offered three new suggestions:

- PAA should consider planning, budgeting and resource needs to support the ongoing implementation of the Integrated Management system – refer to subsection 8.1.8;
- PAA should consider providing guidance for the use of exemption and clearance levels – outside of the scope of CNS;
- PAA should consider developing guidance on emergency planning zone sizing in more detail than the general provisions of the Atomic Law – Article 16.

Both IRRS and IRRS follow-up mission reports were posted on PAA's website.

The 2013 INIR mission had provided five recommendations and six suggestions for concluding Phase 1 of nuclear infrastructure development. INIR's follow-up mission from 21st to 23rd of June 2016 assessed Poland's progress in its infrastructure development activities, concluding that **Poland has implemented all the recommendations and suggestions** of a 2013 INIR mission. Poland's INIR mission report is publicly available on the IAEA website.

All information presented in this report is up to date as of 5th August 2022 (unless otherwise stated in the text)

2. COMPLIANCE WITH ARTICLES 6 – 19

Article 6. Existing nuclear installations

Each Contracting Party shall take the appropriate steps to ensure that the safety of nuclear installations existing at the time the Convention enters into force for that Contracting Party is reviewed as soon as possible. When necessary in the context of this Convention, the Contracting Party shall ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practically possible. The timing of the shut-down may take into account the whole energy context and possible alternatives as well as the social, environmental and economic impact.

At the moment, Poland has no nuclear installations according to the definition in Article 2(i) of the Convention. There is neither Nuclear Power Plant in operation nor in construction in Poland. The one planned in Żarnowiec (construction of two units of WWER-440/V213, started in 1985 and terminated in 1990) was finally cancelled in 1991. Poland currently has only one research reactor in operation, which was given a new 10-year licence for operation in 2015. The licensee prepared a new Safety Analysis Report, which the PAA carefully assessed in the first part of 2015. The other research reactors operated in the past had been either permanently shut down or decommissioned - see **Annex no.1** for details.

An upgrade in the safety instrumentation of the MARIA research reactor took place in 2018. A set of thermocouples was installed at each cooling channel's outlet. New alarm signals based on the temperature rise in each single cooling channel were introduced into the reactor's safety system. Based on the licence for operation issued in 2015, the operator of the research reactor "MARIA" should perform periodic safety review after four years of operation. PAA received a periodic safety review report on the 2nd of July 2019. PAA analysis resulted in the addenda of the periodic safety review made by the National Centre for Nuclear Research. The President of PAA approved the supplemented document on 27th of October 2020.

Regarding future nuclear power programme *Resolution no. 4/2009 of the Council of Ministers of 13th January 2009 on nuclear power development activities* stated, among others, that:

- Nuclear Power Program for Poland will be prepared and implemented (after public discussion and government approval);
- Government Commissioner for Nuclear Power in Poland will prepare Nuclear Power Program for Poland (first draft of this document was published in August 2010);
- At least two nuclear power plants will be built.

On 28th January 2014, the Council of Ministers adopted a resolution regarding the Polish Nuclear Power Program. The Program sets forth a list of tasks ensuring safe use of nuclear power in Poland.

On 2nd October 2020, the Council of Ministers passed a resolution regarding the update of the Polish Nuclear Power Program. **Annex no. 2** gives information on the implementation of nuclear power in Poland prepared by the Ministry of Climate and Environment for the needs of this national report.

Principles of the Vienna Declaration will be followed and implemented during Polish Nuclear Power Programme; nevertheless, the main provisions of law that already fulfil those principles are discussed in Articles 14, 17, 18 and 19. As there are no nuclear installations in operation in Poland according to CNS definition, there is no significant experience in this field, so the

answer to the challenge concerning safety improvements can be found in Article 14 and mainly apply to safety assessment and verification.

Article 7. Legislative and regulatory framework

Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations. The legislative and regulatory framework shall provide for:

- ***i. the establishment of applicable national safety requirements and regulations;***
- ***ii. a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence:***
- ***iii. a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licences;***
- ***iv. the enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation.***

7.1. National safety requirements and regulations

The issues of nuclear safety of nuclear facilities are regulated in the Act of 29th November 2000 "*Atomic Law*" (Journal of Laws of 2021, item 1941, as amended). The Atomic Law and its supporting regulations contain provisions that regulate the requirements related to:

1. radiation protection (of staff, society and patients);
2. nuclear and radiation safety, including:
    a. safety of nuclear facilities,
    b. proceeding with nuclear material and sources of ionizing radiation,
    c. matters related to radioactive waste and spent nuclear fuel,
    d. matters related to the transport of nuclear material and radioactive sources and spent nuclear fuel and radioactive waste,
    e. assessment of radiation level and emergency actions,
3. physical protection (of nuclear facilities and nuclear material);
4. non-proliferation of nuclear material and technology (safeguards);
5. civil liability for nuclear damage.

Annexes no. 3 & 4 provide a summary of the entire Atomic Law and a complete list of supporting regulations issued by the Council of Ministers, Minister of Health, Minister of the Internal Affairs and Administration, Minister of Finances and Minister of Environment.

The Atomic Law Act incorporates a number of international regulations, such as:

- Convention on Early Notification of a Nuclear Accident, Vienna, 26th September 1986 (Journal of Laws of 1998, No. 31, item 216) (INFCIRC/335);
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Vienna, 26th September 1986 (Journal of Laws of 1998, No. 31, item 218) (INFCIRC/336);
- Convention on Nuclear Safety, Vienna, 20th September 1994 (Journal of Laws of 1997, No. 42, item 262) (INFCIRC/449);
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Vienna, 5th September 1997 (Journal of Laws of 2002, No. 202, item 1704) (INFCIRC/546);
- Convention on the Physical Protection of Nuclear Material, including annexes I and II, open for singing in Vienna and New York on 3rd March 1980 (Journal of Laws of 1989, No. 17, item 93) (INFCIRC/274/Rev.1);

- Amendment to Convention on Physical Protection of Nuclear Material, Vienna, 8th July 2005 (GOV/INF/2005/10-GC (49)/INF/6);
- Treaty on the Non-Proliferation of Nuclear Weapons, Moscow, Washington, London, 1st July 1968 (Dz. U. 1970, No. 8, item 60) (INFCIRC/140), and resulting acts:
  - Agreement between the Kingdom of Belgium, Kingdom of Denmark, Federal Republic of Germany, Ireland, Republic of Italy, Great Duchy of Luxembourg, Kingdom of Netherlands, European Atomic Energy Community and International Atomic Energy Agency, on Implementation of Article III, Sections 1 and 4, of the Treaty on Non-Proliferation of Nuclear Weapons, Brussels, 5th April 1973 (Dz. U. 2007, No. 218, item 1617);
  - Additional Protocol to the Agreement between the Republic of Austria, Kingdom of Belgium, Republic of Finland, Kingdom of Denmark, Federal Republic of Germany, Republic of Greece, Ireland, Republic of Italy, Great Duchy of Luxembourg, Kingdom of Netherlands, Republic of Portugal, Kingdom of Spain, Kingdom of Sweden, European Atomic Energy Community and International Atomic Energy Agency, on Implementation of Article III, Sections 1 and 4, of the Treaty on Non-Proliferation of Nuclear Weapons, Vienna, 22nd September 1998 (Dz. U. 2007, No. 156, item 1096);
- Vienna Convention on Civil Liability for Nuclear Damage, Vienna, 21st May 1963 (Journal of Laws of 1990, No. 63, item 370) (INFCIRC/500);
- Joint Protocol Relating to the Application of the Vienna Convention and Paris Convention (on liability for nuclear damage), Vienna, 21st September 1988 (Journal of Laws of 1994, No. 129, item 633) (INFCIRC/402);
- Protocol Amending the Vienna Convention on Civil Liability for Nuclear Damage (Journal of Laws of 2011, No. 4, item 9) (INFCIRC/556).

In addition, the Republic of Poland is a party to the Treaty Establishing the European Atomic Energy Community (Euratom). Based on the treaty, a number of directives have been adopted and implemented in the Polish legal system, including but not limited to:

- Council Directive 2003/122/Euratom of 20th November 2006 on the supervision and control of shipments of radioactive waste and spent fuel (OJ L 337 of 05.12.2006, page 21),
- Council Directive 2006/117/Euratom of 22nd May 2003 r. on the control of high-activity sealed radioactive sources and radioactive waste (OJ L 346 of 31.12.2003, page 57; OJ Polish version, chapter 15, vol. 7, page 694),
- Council Directive 2009/71/Euratom of 25th June 2009 establishing a Community framework for the nuclear safety of nuclear installations (OJ L 172 of 2.7.2009, page 18, and OJ L 260 of 3.10.2009, page 40),
- Council Directive 2011/70/Euratom of 19th July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (OJ L 199 of 2.8.2011, page 48),
- Council Directive 2013/59/Euratom of 5th December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom (OJ L 13, 17.1.2014, p. 1–73),

- Council Directive 2014/87/Euratom of 8th July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations (OJ L 219, 25.7.2014, p. 42-48).

A decision on the preparation of any legal act is preceded by receiving opinions of entities interested in the settlement of the matter. This obligation is specified under Regulation of the Council of Ministers of 20 June 2002 on „Principles of legislative technique" and Resolution of the Council of Ministers – Work Bylaws of the Council of Ministers. Consultations with regard to ready drafts of acts or regulations allow to have a broader view of a given matter and final verification of a proposed solution to a problem. The next objective of consultations is to inform the general public about specific solutions (information objective). It is necessary to choose a method of public consultations. Most often, the following forms of consultations are used: public meetings (conferences), requests for opinions, public hearings, consultations via websites, interviews, written consultations and electronic mail. Drafts of assumptions for draft laws and draft normative acts and any documents concerning works on these drafts are made available in the Bulletin of Public Information of the Governmental Legislation Centre. Public entities that submit their comments to a draft are informed about the next versions of the drafted provisions and invited to a conciliation conference to work out the contents of the draft. Additionally, it must be pointed out that each unit may at each stage join the works on drafted provisions if it meets the requirements resulting from the act of parliament concerning lobbying activities in the legislation process in accordance with the procedure laid down in the law.

In accordance with Article 113a of the Atomic Law Act, the PAA's President shall, not less than every three years, assess nuclear regulatory activities and perform an analysis of the current legal status in terms of its adequacy and suitability to nuclear safety and radiation protection. The last internal assessment was conducted in 2020. This assessment identified the need to analyze the necessity to review and update three regulations based on the newest IAEA Safety Standards, WENRA objectives and reference levels and other relevant documents. Two of those regulations are currently under the drafting process in PAA.

Additionally, the PAA's President shall, at least once every ten years, subject the national nuclear safety and radiation protection system, including the nuclear regulatory activities, to external international review. As the last full IRRS mission had been conducted in 2013, PAA will host the next IRRS mission in 2023.

At the 7th CNS Review Meeting Poland received two challenges. This subchapter provided an answer to the challenge "Poland to continue developing its framework to ensure safe implementation of its first nuclear power plant project meeting the harmonized safety expectations (e.g. WENRA safety objectives for new reactors)".

7.2. Licensing system for nuclear installations

The Act of Atomic Law requires (Art. 4.1 point 2) a separate licence for the construction, commissioning, operation and decommissioning of any nuclear facility, issued by the President of PAA. The requirements concerning documentation to be submitted by an applicant and the procedure to be followed to obtain an appropriate licence have been established in the Act of 29th November 2000 "*Atomic Law*" and in the *Regulation of the Council of Ministers of 30th August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such practices* (OJ item 1667). The general procedure for licensing nuclear facilities (including power and research

reactors, radioactive waste and spent fuel management facilities) in the phases of construction, commissioning, operation and decommissioning is described below.

Applications for a licence or an official opinion related to a nuclear facility must be submitted to PAA President. It also applies, with some modifications, to the stage of siting, which does not require the PAA President's licence, but only the official opinion thereof (see reporting on Article 17 for details). Before applying for a licence, the applicant may apply to the PAA President for a general opinion of the planned organizational and technical solutions and draft versions of documents to be submitted along with the application. Pursuant to Article 39d of the Atomic Law Act, having received an application for a licence to conduct activities involving exposure and consisting in the construction of a nuclear facility, the PAA's President immediately publishes the application with an abbreviated safety analysis report in the Public Information Bulletin, in the section dedicated, along with:

- information on the initiation of proceedings in response to the application for a licence to build a nuclear facility;
- information on the right to make submissions or observations;
- information on how and where to make submissions or observations within the 21-day deadline;
- information on how and where the administrative proceedings take place.

The information referred to above is published by the PAA's President in press available in the municipality within whose boundaries the site referred to in the application is located and in the neighbouring municipalities.

In the siting stage, the members of the public and non-governmental organizations take part in the environmental impact assessment process, pursuant to relevant provisions of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessment and the Act of 29 June 2011 on Preparing for and Performing Investments Involving Nuclear Power Facilities and Accompanying Investments.

Draft licences and opinions are prepared by the PAA Nuclear Safety and Security Department on the basis of review and assessment of safety documentation supplied by the applicant and also based on inspections performed by PAA regulatory inspectors on the applicant's premises if necessary. While performing the review and assessment tasks, PAA may use external experts or consultant organizations, but only on the condition that those experts or organizations are free from conflict of interest, i.e., they are not employed by or otherwise dependent on applicant/licensee or shall be excluded from participation in the proceedings by virtue of law. A draft licence or opinion is submitted to the PAA President for approval and the official granting to the applicant. Before that, the PAA President has to apply to the Council for Nuclear Safety and Radiation protection to state its opinion on the draft licence. Within one month from receiving this opinion, the PAA President sends the draft licence to the applicant, who can submit his reservations within another month.

In the siting stage of a nuclear facility (including NPPs, research reactors and spent fuel storages), the authority competent to issue the decision on terms of building and area development conditions on the site of future nuclear facility issues this decision after obtaining the PAA President's positive opinion on the matters concerning nuclear safety and radiation protection (Art. 36). The PAA President reviews the site evaluation report developed by the applicant during the proceedings for granting a construction licence (Art. 35b.3). Before

applying for a nuclear facility construction licence, the investor can apply to the PAA President for a preliminary assessment of the site of a future nuclear power plant (Art. 36a).

Apart from issuing licences, the PAA President approves some documents important for the nuclear safety of nuclear facilities:

- documentation of safety classification of nuclear facilities' systems, structures and components (Art. 36j.3),
- documentation of integrated management system of the organizational unit conducting activities involving exposure and consisting in construction, commissioning, operation or decommissioning of the nuclear facility (Art. 36k.3),
- nuclear facility commissioning programme (Art. 37a.2),
- nuclear facility commissioning report (Art. 37b.2),
- detailed periodical safety review plan (Art. 37e.3),
- periodical safety review report (Art. 37e.5),
- nuclear facility decommissioning programme (Art. 38b),
- nuclear facility decommissioning report (Art. 38c.1).

Modernization of any nuclear facility system, structure or component important for the nuclear safety and radiation protection, and each reactor start-up following such modernization or fuel load requires the written consent of the President of PAA (Art. 37d).

The authorization process also applies to the staff of a nuclear facility. According to Article 12 of the Atomic Law Act, in any facility performing activities involving radiation exposure, the position important for ensuring nuclear safety and radiation protection must be occupied exclusively by an individual possessing appropriate authorization issued by the PAA President. Authorization for such position is granted based on the qualification process established by the *Regulation of the Council of Ministers of 5th March 2021 on the position of major importance for ensuring nuclear safety and radiation protection* and of the exams performed by the Commission for Qualification of Staff for the Posts Important for Nuclear and Radiation Safety, appointed by the PAA President. The Atomic Law also provides for a separate authorization (on similar conditions) of staff performing activities important from the viewpoint of nuclear safety and radiation protection in any organizational unit conducting activities involving exposure and consisting in commissioning, operation or decommissioning of a nuclear power plant (Articles 12c – 12e of the Atomic Law).

Moreover, according to Article 11 of the Act, employees of a nuclear facility have to be duly trained, according to the program prepared by the head of the organizational unit, to possess and maintain the knowledge of nuclear safety and radiation protection regulations appropriate for their positions, as well as appropriate skills and qualifications. In nuclear power plants, the short and long-term training plans also have to be approved by the PAA President (Art. 11b of the Atomic Law).

7.3. Prohibition of the operation without a licence

According to the Article 2 of the Atomic Law Act, activities involving actual and potential exposures to ionizing radiation shall be permitted after undertaking the measures defined in appropriate regulations, aimed at ensuring the safety and protection of human life and health, as well as protection of property and the environment.

The Article 4.1 point 2 of the Act requires that each subsequent stage, i.e., construction, commissioning, operation and decommissioning, requires separate licences, granted by the

PAA President after ascertaining that the requirements and conditions relevant to radiation and nuclear safety at the given stage were met and fulfilled. Pursuant to Article 34 of the Act, no activities involving exposure and consisting in the construction, commissioning, operation or decommissioning of nuclear facilities can be conducted by an organizational unit that fails to comply with the requirements concerning nuclear safety, radiation protection, physical protection and nuclear material safeguards. It means, in particular, that the operation of a nuclear installation without a licence is prohibited.

The applicant/licensee must submit proper safety documentation for the nuclear facility at each stage with his application for the licence to the PAA President. Results of the review and assessment of this documentation provide the regulatory body with the basis for the preparation of a licence with relevant requirements and conditions.

The head of the organizational unit, who, without the required licence, or in violation of the conditions stipulated therein, engages in the construction, commissioning, operation and decommissioning of a nuclear facility, is subject to a fine (Art.123 of the Act), imposed by the PAA President.

7.4. Regulatory inspections and assessment of nuclear installation

According to the Act of Atomic Law, nuclear regulatory authorities' responsibilities include, in particular conducting inspections in nuclear facilities and other facilities possessing (or involved in activities with) nuclear materials, ionizing radiation sources, radioactive waste and spent nuclear fuel (Art. 64.4 point 2). PAA President performs regulatory tasks through nuclear regulatory inspectors. Nuclear regulatory authorities can carry out (Art. 65a.):

- periodical inspections – as per inspection plan approved by PAA President;
- reactive inspections – whenever circumstances arise which may have a substantial impact on the nuclear safety and radiation protection at a nuclear facility subject to inspection;
- continuous inspections - at nuclear power plants by virtue of permanent authorization.

In the context of a conducted inspection, the regulatory inspectors are entitled to (Art.66.1):

- access at any time to the means of transport and the sites, facilities and premises of organizational units, where nuclear materials, ionizing radiation sources, radioactive waste or spent nuclear fuel are produced, used, stored, disposed or transported (in particular – to nuclear facilities),
- access to the documents and other data carriers relevant to nuclear safety and radiation protection in an inspected organizational unit,
- request copies of the documents and data carriers mentioned above to be produced or provided,
- check whether the activity/practice referred to in Article 4.1 of the Atomic Law (subject to obtaining a licence or to be notified to the regulatory body) is conducted in compliance with the nuclear safety and radiation protection regulations and with the requirements and conditions specified in the licence,
- conduct, if necessary, independent technical and dosimetric measurements,
- request written or oral information when it is necessary for clarifying a concern,
- collect samples for laboratory tests,
- inspect the site, facilities, premises and installations of the inspected organizational unit and its transport vehicles,

- record the processes and results of inspection using audio-visual recording systems,
- secure and request securing (confirming security) documents and other proofs,
- during inspections of nuclear power plants – to request the assistance of expert laboratories and organizations authorized by the PAA President, and during inspections of other organizational entities – to request the assistance of experts, specialists and laboratories.

The head of the organizational unit being inspected is obliged (Art. 66.2 of the Act) to take all necessary measures to allow the nuclear regulatory authorities to conduct the inspection. The employees of the unit being inspected have to give the inspectors oral or written explanations on the questions related to the subject of the inspection. Should an inspection reveal a direct threat to nuclear safety or radiation protection, the President of PAA nuclear regulatory inspectors are obliged by Article 68 of the Atomic Law Act to give immediately applicable orders or bans to impose emergency measures designed to eliminate the danger.

In performing regulatory inspections, the international guidelines and experience from former inspections of nuclear facilities are also taken into account. The primary purpose of a regulatory inspection is the independent determination of how the licensee complies with the general nuclear safety and radiation protection requirements, with the licence terms, additional regulatory requirements and good engineering practices. The inspection also is a check on the implementation of the quality assurance programme.

Radiation Protection Department and Nuclear Safety and Security Department have specific procedures and instructions regarding regulatory inspections. Inspections need to be planned (excluding necessary reactive inspections), authorized by the PAA's President, prepared by the leading inspector, proceeded following prepared instructions and adequately documented. This process ensures the effectiveness of routine regulatory inspections. The programme and scope of such inspections are formulated prior to visiting the site. Relevant procedures are evoked or, if necessary, prepared by the inspectors. The personnel designed to carry out each inspection is selected and notified beforehand to provide adequate time to become acquainted with applicable instructions and appropriate background material. Inspection needs to be adequately reported, including naming inspectors, and informants, describing the scope of the inspection, procedure and results of the inspection, issued orders, bans or recommendations and conclusions of the inspection. When it is necessary, post-inspection notice shall be issued by the PAA President.

7.5. Enforcement provisions

The Atomic Law Act gives the regulatory body adequate powers to enforce compliance with safety requirements imposed by laws, regulations and licence conditions (Art. 5.5). According to Article 5.11 of the Act, the PAA President may revoke a licence as needed. In particular, the President of PAA shall revoke a licence if nuclear safety and radiation protection requirements imposed by applicable regulations and the terms of the licence have not been fulfilled. Depending on the regulatory assessment of the situation, the following enforcement actions can be undertaken:

- Oral or written immediately applicable order (Art. 68),
- issuance of a written order or a recommendation to the licensee (Art. 68a, Art. 68b),
- ordering the licensee to curtail activities (Art. 37b.1, Art. 37c.3),
- revoking the licence (Art. 5.11),
- fines enforced by mean of administrative enforcement proceedings (Art. 123),

- punishment by fine or detention (Art. 127).
- recommendation of prosecution through the courts of law.

The nuclear regulatory inspectors have been equipped by Article 68 of the Atomic Law Act with the authority to make on-the-spot decisions.

7.6 Act of Parliament amending the Atomic Law Act and the Act on fire protection

On 23 September 2019 entered into the force the Act of June 13th 2019 amending the Atomic Law and the act on fire protection. The Act is designed to ensure the highest achievable level of nuclear safety and radiation protection in Poland in conformity with the IAEA and European standards.

The new provision introduced in the Act can be essentially assigned to three areas:

- Implementation into national law of the provisions of Council Directive 2013/59 / Euratom of 5th December 2013 laying down basic safety standards to protect against risks arising from exposure to ionizing radiation;
- Implementation of the provisions of Council Directive 2014/87 / Euratom of 8th July 2014 amending Directive 2009/71 / Euratom establishing a Community framework for the nuclear safety of nuclear installations;
- Other issues that needed improvement in terms of nuclear safety and radiation protection (essentially the implementation of the recommendations indicated in the 2013 IRRS mission report).

The detailed information of the scope of the Act of 13 of June 2019 amending the Atomic Law and the act on fire protection have been described in the Polish eighth national report as referred to in Article 5 of the Convention on Nuclear Safety.

Article 8. Regulatory body

1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 7, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.
2. Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy.

8.1. Establishment of the regulatory body

8.1.1. Legal foundations and statute of the regulatory body

The President of the National Atomic Energy Agency (PAA) constitutes the central organ of the governmental administration, competent for nuclear safety and radiation protection based on Article 109 of Atomic Law. The activities of the President of PAA are regulated on the basis of Article 110 of the Atomic Law and its secondary legislation. The President of the PAA, as the central organ of public administration, is independent in taking decisions concerning tasks entrusted to him on the basis of the Atomic Law Act. Since 1st January 2002 the supervision over the PAA President has been exercised by the minister competent for the environmental matters on the basis of Article 28.3 of the Act of Parliament on Governmental Administration Departments of 4th September 1997 and Article 109.4 of the Atomic Law. PAA President is appointed for a 5-year term and may be reappointed for another period only once. This provision has been added in the 2019 amendment of Atomic Law to implement the

recommendation from the IRRS mission held in 2013. The Prime Minister nominates the President of PAA. The latest amendment of Atomic Law introduced specific conditions that must be fulfilled before the Prime Minister may dismiss the President of PAA before his term in office expires.

The President of PAA is executing his tasks through the National Atomic Energy Agency (PAA). The PAA's internal organization is determined by the Order of the Minister of Climate of 18th January 2020 on Granting Statute to the National Atomic Energy Agency (pursuant to Article 113.1 of the Atomic Law). This document determines the departments included in the PAA's structure and the scope of functions that those departments perform. Organizational structure is described in section 8.1.4 of this report. Article 112.2 of Atomic Law establishes the The Council for Nuclear Safety and Radiation protection that serves as an advisory body to the President of PAA. The functions and responsibilities of the Council are described in section 8.1.10 of this report.

8.1.2. Mandate, mission and tasks

Mandate, authority and particular responsibilities of PAA are defined in Chapter 13 of the Atomic Law Act. In accordance with Article 110 of the Atomic Law the scope of activities of the President of PAA includes the tasks that involve ensuring national nuclear safety and radiation protection, in particular:

1. preparation of draft documents related to national policies involving nuclear safety and radiation protection, taking into account the programme for nuclear power development and both internal and external threats;
2. exercising regulatory control and supervision over the activities leading to actual or potential ionizing radiation exposure of humans and the environment, including the issuance of decisions on licences and authorizations and other decisions, as provided in this Act;
3. promulgation of technical and organizational guidelines concerning nuclear safety and radiation protection;
4. performing the tasks involving the assessment of national radiation situation in normal conditions and in radiation emergencies, and the transmission of relevant information to appropriate authorities and to the general public;
5. performing the tasks resulting from the obligations of the Republic of Poland concerning accountancy and control of nuclear materials, physical protection of nuclear materials and facilities, special control measures for foreign trade in nuclear materials and technologies, and from other obligations resulting from international agreements on nuclear safety and radiation protection;
6. activities connected with public communication, education and popularization, scientific, technical and legal information concerning nuclear safety and radiation protection, including activities consisting in providing the general public with information about ionizing radiation and its impact on human health and the environment and about feasible measures to be implemented in the event of radiation emergency – excluding the promotion of the use of ionizing radiation, and in particular, the promotion of nuclear power sector;
7. cooperation with governmental and local administration authorities in matters involving nuclear safety and radiation protection and in matters concerning scientific research in nuclear safety and radiation protection;

8. performing the tasks involving national and civil defense and the protection of classified information, which result from other regulations;
9. preparing opinions, for the purposes of governmental and local administration, concerning nuclear safety and radiation protection with regard to the proposed technical activities involving peaceful uses of atomic energy;
10. cooperation with suitable foreign national entities and international organizations within the scope stated herein;
11. developing the drafts of legal acts on the issues covered by this Act and conducting the process of establishing their final form, according to the procedures established in the working rules for the Council of Ministers,
12. issuing opinions on the draft legal acts developed by authorized bodies;
13. submitting to the Prime Minister annual reports on the activities of the President of PAA and the assessments of the status of national nuclear safety and radiation protection.

PAA's internal documents entitled "Mission, Vision and Operational Strategy of the National Atomic Energy Agency" and "Safety policy" determine the objectives, requirements, and efforts undertaken to ensure that any activity that might lead to ionizing radiation exposure is handled in a safe manner for staff and the society.

8.1.3. Authorities and responsibilities

The Atomic Law requires that **activities involving actual and potential ionizing radiation exposures** from man-made radioactive sources, nuclear materials, equipment generating ionizing radiation, radioactive waste and spent nuclear fuel **are supervised** and **controlled** by the State and can be permitted on the condition of employing means for ensuring safety and protection of life and health of people, and also for the protection of property and environment (Art. 2). This includes the **obligation of obtaining an appropriate licence**, excluding the cases when such activities may be performed on the basis of notification or do not have to be licenced or notified according to the criteria established in the Regulation of the Council of Ministers of 10th March 2021 on the cases when the exposure to ionizing radiation is exempted from mandatory licensing, registration or notification, and on the cases when such activities can be conducted on the basis of a notification

Article 4 of Atomic Law describes 17 activities involving exposures that require a licence or a notification. That list covers, among other things:

- manufacturing, processing, storage, disposal, transport or use of nuclear materials, radioactive sources, radioactive waste and spent nuclear fuel,
- **construction, commissioning, operation and decommissioning of nuclear facilities,**
- **construction, operation and decommissioning of radioactive waste repositories,**
- production, installation, use and maintenance of the equipment containing radioactive sources,
- commissioning and use of the equipment generating ionizing radiation.

According to Article 5, Articles 36-39 and Article 63 of the Atomic Law Act, legal authority to issue licences, binding opinions and to perform regulatory inspections for siting, design, construction, commissioning, operation and decommissioning of nuclear facilities in Poland is given to the President of the PAA.

The President of the PAA issues the licences and accepts the notifications also related to other activities/practices that are listed above, with only the following exceptions: the licences for commissioning and use of X-ray equipment for medical purposes[1] and for commissioning of the laboratories using such equipment are issued by the state regional sanitary inspector or – for organizational units subordinated or supervised by the Minister of National Defence, the commander of the military preventive medicine center.

As a consequence of the above exceptions also the **supervision and control** in the area of nuclear safety and radiation protection over the activities/practices resulting in actual or potential ionizing radiation exposures to people and the environment are executed by (Art. 63.2):

- **"regulatory bodies" (as defined below) – in the cases** when the licence is issued or notification accepted by the President of the PAA;
- regional sanitary inspector or commander of the military preventive medicine centre in the sphere of activities/practices licenced by these authorities.

According to the Article 64.1 of the Act of Atomic Law, the "regulatory authorities" consist of the President of PAA as the supreme nuclear regulatory body and regulatory inspectors. Atomic Law Act defines the tasks of the regulatory authorities in Chapter 9. They include in particular (Art. 64.4):

- **issuing licences and other decisions** on issues related to the nuclear safety and radiation protection, according to the principles and modes established by the Act;
- **conducting inspections in nuclear facilities** and organizational units which possess nuclear materials, ionizing radiation sources, radioactive waste and spent nuclear fuel,
- **issuing on-the-spot orders** if, during the inspection, it is found that nuclear safety and radiation protection are endangered.

8.1.4. Organizational structure of the regulatory body

The current structure of the PAA (Fig. 1) is determined by:

- Act of Parliament the Atomic Law,
- Order of the Minister of Climate of 18th January 2020 on Granting Statute to the National Atomic Energy Agency,
- Order no 3 by the President of the National Atomic Energy Agency of 26th June 2020 on Establishing Organizational Bylaws of the National Atomic Energy Agency.

Nuclear Safety and Security Department is responsible for performing tasks related to nuclear safety, nuclear security and safeguards that include, among other things, issuing licences, conducting inspections and assessment of safety documentation.

Radiation Protection Department is responsible for performing tasks related to radiation protection that include inter alia issuing licences and permits for activities involving exposure, conducting inspections of those activities, and managing the central dose register and register of high-activity sources.

[1] In the following scope: medical diagnostics, invasive radiology, surface radiotherapy and radiotherapy for non-cancerous diseases.

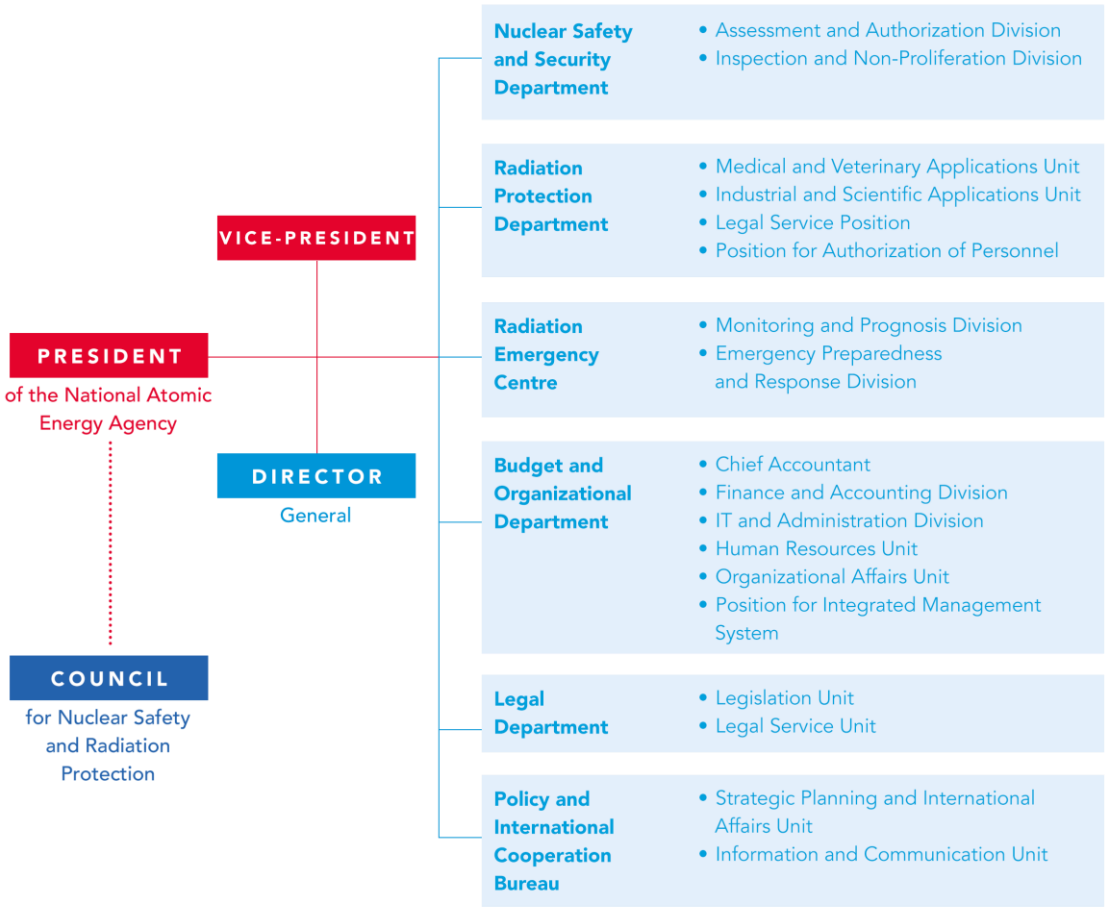

Fig. 1. Organizational Structure of the National Atomic Energy Agency (as of 5th of August 2022)

Radiation Emergency Centre is responsible for assessing the national radiation situation in normal conditions and during radiation emergencies, continuous radiation monitoring and operating a contact point for detection of radiation emergencies and radioactive contamination.

Budget and Organizational Department, Legal Department and Policy and International Cooperation Bureau are performing their tasks to assist the President of PAA and Director General of PAA.

8.1.5. Human resources development

The discussion provided below provides also the answer to part on human resources of common issue 4 from the 7th Review Meeting.

After the governmental decision in 2009 to embark on nuclear power, PAA started the self-assessment process, which included an identification of the PAA needs in the Polish Nuclear Power Programme. As a result of this process, a document entitled “Guidelines for a programme of necessary actions to be taken in the National Atomic Energy Agency” was prepared. The needs for recruitment and training of the staff were identified so that PAA could meet the requirements of a nuclear regulatory body posed by the Polish Nuclear Power Program. In June 2011, the document entitled “A few notes on the tasks, organization, development and financial issues of the National Atomic Energy Agency (Nuclear Regulatory Body) in the perspective of the construction of a nuclear power plant in Poland” summed up

the results of analyses performed with regard to necessary organizational changes and development of the staff. These analyses took into account expected new tasks of the regulatory body relating to the safety assessment of documentation submitted by an applicant/licensee to obtain the PAA President's opinion and licence at different stages of the lifetime of a nuclear power plant. Based on these analyses, the plans and staff development costs were identified. According to those estimates, the number of jobs in PAA should be increased by 39 new positions. The government provided the funds (called “specific provision”) for hiring 39 employees. In January 2015 process of employment for those 39 positions was finished successfully. Since then, the biggest challenge for the PAA was to maintain these personnel, which had gained experience both during work and training.

The strategic document Polish Nuclear Power Programme, updated and published in 2020, included the plans to hire additional staff members by PAA. The strengthening of the regulatory body was one of the main tasks to be performed under the PNPP. By the end of 2033, the PAA should have 110 staff members strictly devoted to tasks related to Polish Nuclear Power Programme. According to the Programme 75% of these positions should be filled by the end of 2023. The Programme also listed funds that will be necessary for strengthening the staff and building PAA’s competencies. These funds were included in the budget of PAA for 2022 and will be included accordingly in the following years. The recruitment program was based on the needs of PAA, which specified, among other things, the number of specialists for specified roles and fields of needed technical review. Preferred education and experience, as well as final competencies and necessary training were specified in the recruitment program.

Overall human resources changes during the last full three years (2019-2021):

- 2019 – 110 employees in PAA, 26 nuclear safety inspectors;
- 2020 – 102 employees in PAA, 23 nuclear safety inspectors;
- 2021 – 114 employees, 25 nuclear safety inspectors.

As of 2022, the recruitment plan is in progress, ten new employees have been hired in Nuclear Safety and Security Department strictly with the funds provided by PNPP.

The discussion above provides an answer to a common issue on human resources from the 7th Review Meeting.

8.1.6. Competence development and maintenance

One of the main tasks for PAA in the Polish Nuclear Power Programme is “Strengthening the staff and building PAA’s competencies,” which includes the participation of PAA employees in specialist domestic and foreign training as well as cooperation and exchange of experiences with the nuclear regulatory authority of the country of the technology supplier. The efficient performance of tasks by nuclear regulatory control personnel requires many years of competence building. In the situation of unavailability of experienced human resources in the domestic market, as is the case with Poland, at least several years’ preparation of staff to work as nuclear regulatory inspectors or nuclear regulatory analysts is needed. PAA will prepare and implement personnel training scheme, including the basics of nuclear engineering and technology as well as the methodology and criteria of regulatory assessment and inspections of nuclear facilities. The training will be carried out mainly in cooperation with foreign nuclear regulatory authorities. From the moment of the nuclear technology provider selection, information and experience exchange with the nuclear regulatory authorities of the provider’s country will be enhanced. As described in subsection 8.1.5, most of the new staff will be

employed in 2022-2023 so that those employees can be trained adequately before PAA receives the application for the construction licence for the first nuclear power plant. This period will be used for intensive preparation of the PAA staff to perform the tasks related to the process of issuing licences and supervision of the construction and operation of the nuclear power plant.

PAA management is committed to developing the competence of PAA staff. PAA has various agreements with regulatory bodies of countries with developed nuclear programmes like the USA, France, United Kingdom, Republic of Korea, Canada and Finland. In the past, more than 30 “on-the-job” trainings were completed in the USA, Canada, UK, Republic of Korea, Slovakia, Czech Republic, France and South Africa. In 2020 and 2021, due to the COVID-19 pandemic, it was impossible to organize such training. In 2022 PAA in cooperation with US NRC and IAEA, organized an “on-the-job training” for three employees of the Nuclear Safety and Security Department in the USA. In the second part of the year, similar training for four more specialists from PAA is planned. This program allows PAA’s staff members to familiarize with the regulatory framework, regulatory decision making, approach to inspections, and safety assessment in countries experienced in oversight of NPPs.

PAA employees participate in various additional training and conferences. In 2019 a total of 394 person-days of training strictly connected to nuclear safety and radiation protection had been conducted. In 2020 it was 318 person-days; in 2021 – 553 person-days. The plans for 2022 amount to 800 person-days of training. In 2020 and 2021 most of the trainings were conducted online due to the COVID-19 pandemic. Since then, the trainings have been conducted in more hybrid forms, some online and others with traditional in-person participation.

One of the common issues identified during the 7th Review Meeting was knowledge management. In order to maintain competence and knowledge, various initiatives were taken by PAA. The database of materials and reports from training, workshops and conferences is developed. PAA is also starting the coaching/mentoring support schemes for newly employed personnel. Highly experienced members of the PAA staff will mentor them.

8.1.7. Financial resources

The discussion provided below provides also the answer to part on financial resources of common issue 4 from the 7th Review Meeting.

The President of PAA is an administrator of his own part of the state budget - "National Atomic Energy Agency." Therefore, PAA’s budget is determined separately every fiscal year. All fees and penalties provided for in the Atomic Law Act constitute income of the state budget and cannot be used directly for the functioning of the nuclear regulatory body. Yearly expenditures for the years 2019-2021 are provided below:

- 2019 – 34.4 million PLN;
- 2020 – 33.9 million PLN;
- 2021 – 20.7 million PLN – the difference is due to the change of the administrative body responsible for the payment of a fee to the IAEA, since 2021, it is the obligation of the Ministry of Climate and Environment.

The plan for 2022 provides a budget of 34.1 million PLN, which is over 50% increase compared to 2021. Those additional funds are provided thanks to the implementation of the Polish Nuclear Power Programme. In Polish Nuclear Power Programme updated in 2020, appendix 3 describes the expenditures related to the implementation of the Programme for the years

2020-2033. One of the items is strengthening the nuclear regulatory body – National Atomic Energy Agency PAA in four areas:

- Strengthening the staff and building PAA's competencies,
- Adaptation of the PAA's hardware facilities and infrastructure to the tasks stemming from the PNP Programme,
- System of technical and expert support for PAA,
- Performing of control and other tasks accompanying the implementation of PAA's tasks stemming from the PNP Programme.

The funds devoted to strengthening the staff and building PAA's competencies allowed the PAA to increase the salaries of experts and hire new staff, including experts with experience. Polish Nuclear Power Programme recognizes that staffing reinforcement also involves the need to ensure appropriate financial resources for PAA. The nuclear power plant project implementation period will see a high demand for the scarce domestic specialist workforce. The situation will involve the risk of personnel outflow from the PAA to the private sector offering attractive remuneration. It is viewed as a risk from the point of view of the efficiency of nuclear regulatory control activities, therefore, preventive measures were taken, primarily based on the pursuit of the elimination of wage disparities between PAA and the commercial nuclear sector. It is assumed that for positions that require specialist knowledge and unique competencies, competitive employment conditions will be ensured compared to the market, which will enable experts to be hired and retained in PAA.

8.1.8. Management system

The management system of PAA has been developed on the basis of the 'management control' standards (obligatory in Polish public administration), other respective legal requirements and the IAEA safety standard GSR Part 2 *Leadership and Management for Safety*.
Key elements and areas of the integrated management systems of PAA are as follows:

- Mission, Vision, Safety Policy, goals and objectives,
- Management system documentation,
- Process management,
- The risk management,
- Internal Audits program,
- Information Security Management System,
- The Management system review and improvement.

Mission, Vision, Safety Policy, goals and objectives

The mission and Vision of PAA were set in 2012. The Safety Policy was approved in December 2016 and constitutes the main policy document for the organization. The Safety Policy covers the elements of regulatory culture (in reference to nuclear safety and radiation protection) and internal safety culture.

Long-term and annual goals, as well as corresponding task and measures, are set in the "Plan of Actions of the President of the PAA". Complementary objectives with measures are included in the task-based budget. Execution of all goals and objectives is systematically reviewed by the management of the PAA.

Management System documentation

The management system of the PAA is described in the IMS Manual, which refers to the requirements of the GSR Part 2 standard. The structure of documentation and the role of particular types of documents was set and described in the Manual. Three levels of documentation are as follows:

- Level I - Directions and main principles (including Statute, Mission, Vision, Safety Policy; Organizational Regulations, MS Manual, long-term programs and strategies),
- Level II - Organization management and process management (President's and DG orders, process general descriptions - charters),
- Level III – Process execution (procedures, instructions, guidelines, job descriptions).

The procedure for control of MS documents was elaborated and implemented. New or changed documents are being verified, approved and made available for employees.
Required records are specified in the MS documents and managed according to the legal requirements complemented by internal Chancellery Instruction and Archive instruction.

Process management

The hierarchy of the PAA processes includes main processes and sub-processes. Processes are classified into three groups: operational (core), management and administrative (supporting). The processes are described in line with the requirements of the process approach (including goals, inputs, outputs, steps and measures). For each process and sub-process, the process owner is appointed responsible for describing, setting goals and measures, monitoring, reviewing and improving the process. The overall responsibility for the effectiveness of the processes is held by the directors of respective units.

The process structure and processes are subject to reviews. The review and changes to the structure are planned for the second half of 2022 - as a consequence of preparations for the next phase of the NPP project.

The risk management

The risks are identified with respect to goals set in the Plan of Actions of the President of the PAA and the task-based budget. Additionally, the financial and corruption risks are being identified and analyzed. The results of risks analysis and assessment are being tabulated in the form of Risk registers. For the risks classified as nonacceptable or serious, the mitigating actions are planned and implemented. The risks and mitigating actions are subject to review twice a year.

Internal audit program

The Internal Audit program was implemented in 2019. The auditors were selected and trained, and a procedure for audits was elaborated. The procedure for internal audit is based on ISO quality management and auditing standards. The independence of internal audit is assured by the rule that auditors never audit the area of responsibility of their own or his/her.

Information Security Management System

The ISMS was implemented in 2021. The system refers to the applicable legal requirements and the ISO 27001 standard. The key informational assets were identified and classified. The information and its carriers are being protected accordingly to the class of the information and the risks identified. In the framework of the ISMS, additional internal audits and ISMS reviews (focused on the information security issues) are conducted. The respective corrective actions are being implemented.

Management system review and improvement

Since 2012 PAA has been reviewing its management system according to management control standards. This kind of review (reported as “self-assessment”) includes employee opinion surveys and assessments conducted by directors of units - with the use of questionnaires.

In 2018 the procedure for review of IMS was elaborated and implemented. The comprehensive IMS review consumes the outputs from other reviews and assessments as well as additional data and information, including implementation of changes, the accomplishment of goals, execution of programs and projects, implementation of improvement initiatives, results of external controls and audits.

The implementation of approved improvement initiatives is being supervised by directors (or Steering Committee in case of projects) and also reviewed during the following IMS review.

8.1.9. Transparency and openness

The discussion provided below serves also as the answer to a common issue from the 7th Review Meeting on “Stakeholder Consultation & Communication”.

Transparency and openness are one of the pillars of the activity of the National Atomic Energy Agency. The public should have access to information on initiatives taken by the Polish nuclear regulatory body, but also be educated in the field of nuclear safety and radiation protection. Providing transparent and comprehensible communication results in a better understanding of the topics undertaken by the National Atomic Energy Agency. Effective and transparent communication marks the importance of the regulator’s transparency and openness in communication with the public.

The Atomic Law Act specifies the scope of activities for the National Atomic Energy Agency related to social communication, education and popularization, as well as scientific, technical and legal information on nuclear safety and radiation protection. These are activities consisting of providing the general public with information about ionizing radiation and its impact on human health and the environment and about feasible measures to be implemented in the event of a radiation emergency. PAA goes beyond the legal requirements and has taken a proactive approach toward informing the public and understanding its needs.

The Agency's activity in the field of social communication is based on:

- regularly informing the public about the current activities of the National Atomic Energy Agency,
- educating the public about nuclear safety and radiation protection through the implementation of social campaigns;
- implementation of informational and educational materials (brochures, films);
- crisis communication (e.g., during the war in Ukraine);
- regular contacts with the media (sending press releases, answering journalistic questions);
- presence in the media (interviews) and in social media;
- providing citizens with access to public information;
- publishing basic information on, inter alia, radiation situation in the online sources available to a broad audience (PAA provides data collections on the portal dane.gov.pl:

and also publishes quarterly reports of the PAA President in the Official Journal of the Republic of Poland);

- scientific and technical communication - since 1989, the PAA has been regularly publishing the quarterly "Nuclear Safety and Radiation protection",
- publishing annual reports on the activities of the PAA President and the assessment of nuclear safety and radiation protection in Poland.

At the same time, PAA tries to adapt its technical facilities to the applicable standards and requirements of WCAG 2.1. People with various visual or hearing impairments need to have access to information in the field of nuclear safety and radiation protection.

In 2020, the Agency's website was moved to the government domain gov.pl. Thus, the National Atomic Energy Agency website has gained a new graphic design accessible to users. At the same time, it is consistent with the portals of other offices operating in the field of public administration. The website also meets the requirements of digital accessibility. The PAA portal is a source of knowledge about the Agency and its current activities, information on nuclear facilities in Poland, radioactive sources and fundamental principles of protection against radiation. The website also provides messages relating to crisis situations (e.g., fires in the Chernobyl Exclusion Zone, incidents at nuclear facilities during the war in Ukraine).

As part of educating the public, PAA implements social campaigns. In November 2021, the PAA launched a "Meet the Radon" campaign. The main goal of this campaign is to increase public awareness of the risks associated with the presence of radon in the environment. The educational project prepared by the PAA is to sensitize Poland's inhabitants to the harmfulness of high doses of radon, the dangerous concentrations of which may accumulate in workplaces, schools, and homes. As part of the campaign, PAA launched a dedicated website: https://www.gov.pl/web/poznajradon and developed an accessible animated film with the most important issues on radon. Campaign activities are to be continued in the coming years.

The Agency is also taking steps to consolidate the positive and professional image of the PAA as the Polish nuclear regulatory authority. In March 2022 - this is the 40th anniversary of the National Atomic Energy Agency - an image film was prepared to show the work of PAA's nuclear regulatory inspectors. The film also refers to the role that PAA will play in the process of implementing the Polish Nuclear Energy Program (PPEJ). Adopted in 2014 and updated in 2020, it provides for the construction of up to six nuclear reactors with a capacity of 6-9 GWh in Poland. The first power plant is to be launched - in accordance with the assumptions of the government program - in 2033. PAA will supervise the entire process and operation of nuclear facilities. In 2022, the PPEJ communication strategy is to be published - in parallel with this publication, the PAA communication strategy for 2023-2027, updated based on the assumptions of PPEJ, will also be issued.

An important aspect of PAA's activities is crisis communication and readiness to provide information in emergencies, which often contribute to a significant increase in interest in the institution, and at the same time, require the supervision to issue regular, understandable messages on issues that may arouse fear in the society. The National Atomic Energy Agency conducts intensive crisis communication during the war in Ukraine - from the first day of the aggression of the Russian Federation troops on the territory of Ukraine (February 24, 2022). The incidents related to the occupation of the Chernobyl Exclusion Zone by the troops of the Russian Federation and the shelling of the Zaporizhzhya Nuclear Power Plant caused social unrest, so PAA received an overwhelming number of journalistic questions. PAA met the expectations of both – the media and the public. The agency published regular notices with

detailed explanations of incidents at or near Ukrainian nuclear installations and facilities. Due to the growing demand, the PAA also published reports on the current radiation situation in the country more often than before. In order to provide the public with reliable information, the PAA President and representatives of the Agency joined the media space by taking part in a press conference, giving interviews on TV, radio or social networks.

PAA is present in social media, which is currently one of the most important communication platforms. In connection with the recruitment and strengthening of the Polish Nuclear Energy Program staff, in 2021, the Agency launched its LinkedIn account. For several years, PAA has been present on Twitter, which is a good platform for exchanging information on the radiation situation in the country. Over the last few months, there has been a noticeable increase in people following the PAA's account. A special one in this respect was March 2022 (the war in Ukraine), when the number of new followers of the PAA account increased by 800% compared to the previous month.

Moreover, PAA constantly provides information at the request of the public in accordance with the Public Information Act and the Act on the provision of information on the environment, public participation in environmental protection and environmental impact assessments, responding annually to about 100 such requests.

In order to improve their competencies in the area of social communication and meet the expectations of the media and society, representatives of the PAA take part in training courses in the field of crisis communication, contacts with journalists and public entrances.

The aim of the PAA is to be an independent, impartial and proactive regulator who assesses in a completely independent manner whether all possible and necessary safety measures have been implemented in the nuclear sector and the areas of application of ionizing radiation to ensure that human health and life are not endangered.

8.1.10. External technical support and advisory committees

The need for the availability of external support during the review stage in the early steps of the licensing process has been recognized in the Atomic Law Act. In Article 66.1, it is stated that PAA, when performing the safety assessment of a nuclear power plant, might use organizations authorized by the President of PAA. This requirement also applies to the nuclear power plant siting stage. PAA might use authorized organizations in the assessment process, although it is not obliged in every case to do so, i.e. PAA might perform the assessment using an internal workforce. However, in the case of assessing a nuclear power plant, when a need for external support has been identified, PAA uses authorized organizations only. It should be mentioned that not only Polish organizations might be granted authorization but foreign and multinational organizations as well. At present (June 2022), only one organization has been granted the authorization of the President of PAA, i.e. the Institute of Heat Engineering of Warsaw, the University of Technology, in the scope of performing deterministic safety analyses in design basis accidents, design extension conditions and neutronics.

The requirements for obtaining the authorization of the President of PAA are described in Article 66a of the Atomic Act Law. In order to explain the authorization process, PAA organized in 2021 an online meeting with a large number of scientific and expert organizations during which information on the authorization requirements and processing of an application was presented. Furthermore, at the same time, in order to make the information more user-friendly, the necessary information has also been posted on the PAA's website. The information prepared covered: the legal information on authorization, the scope of authorization, examples

of the scope of authorization, a suggested application form for authorization, a suggested form enclosing the information on the competence of the applicant, and an explanation of the idea of conflict of interest. As a result of PAA's effort, 9 Polish organizations applied for authorization at the end of 2021 and the beginning of 2022. After assessing the applications, five organizations will be granted the authorization of the President of PAA in the August 2022. Authorizations of other applicants should follow soon. In most cases, the organizations applied for authorization in the scope related to siting of NPP.

With respect to the advisory committees, the Atomic Law Act provides that The Council for Nuclear Safety and Radiation protection acts as the consulting and opinion-giving body of the President of PAA. The Council consists of up to ten experts on nuclear safety, radiation protection and research reactors (currently the Council has six members). The main task of the Council is, in particular, issuing opinions following the request of the PAA's President with regard to draft versions of licences to conduct activities, draft versions of legal acts drawn up by the Agency's President, draft versions of organizational and technical guides issued by the Agency's President.

8.2. Status of the regulatory body

The discussion below also serves as the answer to a common issue from the 7th Review Meeting on "legal framework and independence of regulatory body".

The PAA's independence in performing its functions is assured by the law. Article 109 of the Atomic Law Act provides that the President of PAA constitutes the central organ of the governmental administration, competent for nuclear safety and radiation protection matters to the extent specified in this Act. Independence of the regulatory body is guaranteed by a clear separation of promotional and regulatory functions:

- matters related to the social and economic use of nuclear energy are within the scope of activities of the minister competent for energy matters (according to the Act on Governmental Administration Departments),
- nuclear safety and radiation protection matters are within the scope of activities of the PAA President (pursuant to the Atomic Law Act).

Regulatory decisions made by the PAA President cannot be affected by any other organ of governmental administration. This authority is ensured by the Atomic Law. The President of PAA and other nuclear regulatory bodies are independent in performing their regulatory functions, in particular, regulation of activities involving exposure (issuance of licences and receipt of notifications) and inspection functions determines President's independence in "exercising regulatory control and supervision over the activities leading to actual or potential ionizing radiation exposure of humans and environment, including the issuance of decisions on licences and authorizations and other decisions, as provided in this Act" (Art.110 point 2 of Atomic Law) and no other organ can supervise their regulatory decisions except for the Administrative Courts of Law.

Minister of Climate and Environment provides administrative supervision of the President of PAA and grants the statute of the Agency. PAA President is obliged to report annually to the Prime Minister of Poland. Additionally, at least once in 3 years, PAA President needs to assess nuclear regulatory activities and perform an analysis of the current legal status in terms of its adequacy and suitability for nuclear safety and radiation protection. The last assessment was completed in 2021. The main conclusions were positive, with the most important issue identified as the need to strengthen the human resources of PAA (as described in subchapter

8.1.5) and to review the compliance of polish regulations with the newest IAEA safety standards (described in subchapter 7).

Article 9. Responsibility of the licence holder

Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.

According to Article 35.1 of the Atomic Law Act "the head of an organizational unit authorized to conduct activities involving exposure and consisting in construction, commissioning, operation or decommissioning of nuclear facilities shall be responsible for nuclear safety, radiation protection, physical protection and nuclear material safeguards". Moreover Article 34 of the Atomic Law Act states that "no activities involving exposure and consisting in construction, commissioning, operation or decommissioning of nuclear facilities can be conducted by an organizational unit which fails to comply with the requirements concerning nuclear safety, radiation protection, physical protection and nuclear material safeguards". The responsibility of the head of the organizational unit also entails responsibility for the actions of subcontractors and suppliers, as well as ensuring that subcontractors and suppliers whose activities may affect the facility's nuclear safety, radiation protection, physical protection or safeguards must maintain adequate staff resources to carry out these activities.

Any activity involving exposure and consisting in construction, commissioning, operation and decommissioning of nuclear facilities requires a licence issued by the PAA President. The periodic assessments, inspections and enforcement system will serve PAA as the basis to assess whether the licence holder discharges its prime responsibility for safety. Please refer to compliance with Articles 7.4 and 7.5 for more details. In addition, the PAA President can impose on the head of the organizational unit an obligation to review certain technical and organizational aspects related to the operation of the nuclear facility, as well as the obligation to make any necessary changes identified during this review which will contribute to strengthening safety.

The licence holder is obliged to inform each individual that so requests of the status of nuclear safety and radiation protection of the facility, its impact on human health and the natural environment, and of the volume and isotopic composition of radioactive substance emissions from the nuclear facility to the environment (Art. 35a). At least once in 12 months licence holders must publish such information on their websites.

An NPP investor shall open a Local Information Centre no later than on the day of the submission of the application for the construction permit. The Centre is established to provide information to the local community on the operation of the NPP and the status of nuclear safety and radiation protection in the area surrounding the facility. A local community can establish a Local Information Committee, which can provide community supervision over the project's implementation, represent the local community in relations with the applicant/licensee and inform the local community on the activities of the nuclear power facilities**.** The Committee will be authorized to enter the facility and request information or documents concerning the implementation of the project and operation of the NPP.

The future licensee - PEJ, conducts various nation-wide and local activities that aim to disseminate knowledge about nuclear power, shaping awareness of benefits connected with NPP, challenging stereotypes and building public buy-in for nuclear power in Poland. "*Świadomie o Atomie"* initiative is a programme of educational and information

activities launched in 2011, including comprehensive communication activities carried out by PEJ at the local and national levels.

The licensee's provisions for obtaining appropriate financial and human resources are described in Article 11. The licensee should also use adequate technical and organizational solutions to meet the requirement of optimization of radiation protection at all stages of a nuclear installation operation, designed to prevent accidents and/or limit its consequences. The financial provisions to cover the possible harms caused by a nuclear accident have been arranged according to the Vienna Convention on Civil Liability for Nuclear Damage to which Poland is a Party, by means of obligatory third-party responsibility insurance required from the nuclear installation's operator, in accordance with *the Minister of Finance Regulation on obligatory third-party liability insurance of nuclear installation operator* (Art.103.10), issued on 14 September 2011.

Article 10. Priority to safety

Each Contracting Party shall take the appropriate steps to ensure that all organizations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety.

As stated in Article 9, the prime responsibility rests on the head of an organizational unit that was granted a licence for the construction, commissioning, operation, or decommissioning of a nuclear facility. In addition to the licensee's obligations, other persons (organizations) involved in the project of a nuclear facility are responsible, in accordance with their duties, for ensuring compliance with the nuclear safety and radiation protection requirements. (Art.35.3.).

The Atomic Law Act requires that beginning from site selection, through construction, commissioning and during operation, such technical and organizational measures shall be taken that the number of facility staff and the members of the public exposed to the harmful effects of ionizing radiation as well as the probability of the exposure should be minimized. The doses received by the staff and members of the public should also be as low as possible. Furthermore, potential accidents should be prevented, and if they occur, their consequences should be limited, and large and early releases of radioactive substances should be avoided (Art.35.4.).

Furthermore, any organization involved in the construction, operation, or decommissioning of nuclear facilities shall have an integrated management system that includes a quality policy, quality assurance programme, and safety culture policy (Art. 36k.). The definition of Integrated Management System included in Atomic Law prioritizes nuclear safety by making sure that all decisions are adopted based on their influence on nuclear safety analysis, radiation protection, physical protection, and the protection of nuclear materials. The specific content of the Integrated Management System is provided in the description of compliance with Article 13 of the Convention. *Regulation of the Council of Ministers of 30th August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such practices* provides that the quality management system should include, among other things, a description of the strategy for developing, maintaining and establishing the safety culture at every stage of the lifetime of the plant. Moreover, one of the goals of the quality management system is to "promote and support safety culture in the organizational unit of the applicant and units of the suppliers of items and services".

Regulation of the Council of Ministers of 11th February 2013 on requirements concerning commissioning and operation of nuclear facilities include provisions regarding safety

improvements and safety monitoring of activities. Paragraph 44 states that experience from the nuclear facility operation shall be subject to systematic assessment. It shall refer in particular to extraordinary events in the nuclear facility when the assessment is made to identify their causes. Information resulting from the examination of events important from the viewpoint of nuclear safety or radiation protection and conclusions drawn from this examination shall be submitted to the nuclear facility employees. It is also required that the licensee have a suitable review and assessment system enabling the permanent monitoring of nuclear safety issues and the performance of periodic nuclear safety assessments. Moreover, systematic analyses shall be conducted with regard to operational experience, development of international safety requirements, technological developments, and new knowledge. Afterward, conclusions from these analyses shall be used to improve the nuclear safety in the facility (para. 8.).

On 12th April 2022, Poland adopted its first "Strategy and policy on the development of nuclear safety and radiation protection of the Republic of Poland". The main objective of the Strategy is to ensure the protection of people and the environment against the harmful effects of ionizing radiation and to increase the level of nuclear safety and radiation protection in Poland. Four more detailed strategic objectives were also specified:

- development of the national regulatory system for nuclear safety and radiation protection;
- development of the national radiation monitoring system;
- strengthening national competences in the field of nuclear safety and radiation protection;
- enhancing the research potential and social awareness in the field of nuclear safety and radiation protection.

This document describes the fundamental nuclear safety and radiation protection principles and provides a course of actions to further increase nuclear safety and radiation protection in the country. One of those actions is the promotion of a safety culture and the attitudes enhancing safety culture.

10.1. Safety Culture in a regulatory body

PAA developed a policy for a healthy safety culture. PAA's Safety Policy (approved in December 2016 by the top management) is the main policy document for the organization. Safety culture is also included in PAA's Management System Manual (approved in December 2016). Priority for safety is also considered during work on PAA processes and internal procedures and inspections. In December 2021, PAA approved Action Plan on enhancing safety culture in PAA for the years 2022-2023. This document is a continuation (in April 2017, PAA approved the Action Plan on enhancing safety culture in PAA 2017-2019) of a long-term strategy for safety culture development and consists list of actions that are taken by PAA.

Safety culture and promoting organizational culture play an important role in the PAA's daily work. Management and team leaders encourage employees to open communication and engage them in matters important for safety, including expanding competencies and supporting continuous improvement. In order to get acquainted with best practices in the area of the safety culture, PAA's managers systematically participate in the bilateral meetings and study visits organized in cooperation with other regulatory bodies and authorities (among others US NRC, Canadian CNSC, Finish STUK, French ASN) which set the international standards. On average, twice a year, PAA organizes a meeting for the PAA employees with a foreign expert (September 2020 with US NRC, April 2021 with the IAEA, November 2021 with

US NRC) on the enhancement of safety culture in the organization and on the role of the regulator in licensing process. All employees of the Agency are invited to participate in the international workshops, where various aspects of safety culture are discussed. Furthermore, PAA representatives from all departments participate in the meetings and workshops on the topics of management, leadership, and safety culture organized by IAEA.

The COVID-19 pandemic forced a change to the PAA approach to managing safety and organizational culture. Most of the activities were done remotely, but it did not hinder organizing meetings. On average, twice a year, discussions are held with the PAA President, Vice President, and Director General with PAA employees to present the challenges for the Departments for the next year and to sum up organizational achievements.

In addition to the activities mentioned above, PAA also carried out ongoing tasks to strengthen the safety culture in the organization. The Department Directors conduct regular meetings with employees of their teams, during which specific issues related to the safety culture are discussed. The Department Directors engage in promoting team openness, communication, and exchange of opinions. Issues related to the safety culture are systematically raised by the President, Vice President, Directors, and Managers (*Safety first approach*). Managers promote cooperation and internal communication and support effective communication between Departments. Based on the *PAA policy for healthy safety culture,* the safety culture and safety priority are taken into account in the documents and rules of the PAA management system

During 2017 IRRS follow-up mission, review team underlined that since 2013, PAA had taken positive steps to strengthen its internal safety culture. The IRRS follow-up review team observed that PAA senior leadership proactively prioritizes safety culture throughout PAA's activities and processes and recognizes the value of continued focus on safety culture. PAA top management supports effective collaboration and better internal communication by organizing regular meetings with the President of PAA or open meetings regarding safety culture topics.

At the 7th CNS Review Meeting, Poland received two challenges. This subchapter provides an answer to the challenge "PAA to continue strengthening its safety culture requiring challenging attitude" and to the issue 1 from major common issues identified at the 7th Review Meeting.

Article 11. Financial and human resources

1. Each Contracting Party shall take the appropriate steps to ensure that adequate financial resources are available to support the safety of each nuclear installation throughout its life.
2. Each Contracting Party shall take the appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training and retraining are available for all safety-related activities in or for each nuclear installation, throughout its life.

11.1. Financial Resources

11.1.1. Financial provisions to ensure safety of nuclear installation throughout its lifetime

According to Article 38g.1 point 2 of the Atomic Law Act, the licence to conduct activities consisting in construction, commissioning, operating and decommissioning of nuclear facility shall only be granted to an organizational unit that has sufficient funding to cover the costs of nuclear safety, radiation protection, physical protection and nuclear material safeguards at subsequent stages of the nuclear facility operation, until the facility is decommissioned and in

the case of a licence granted to build the nuclear facility organizational unit needs to have sufficient funding to finish the construction.

In order to confirm that the required funding for the construction of the nuclear facility is available, the following documents shall be enclosed in the application: documents confirming the availability or possibility of obtaining funding to finish the construction, including the financial plan and financial report featuring estimated costs and expenditure which need to be incurred.

In order to confirm that the required funding to cover the costs of nuclear safety, radiation protection, physical protection and nuclear material safeguards at subsequent stages of the nuclear facility operation, until the facility is decommissioned is available, the following documents shall be enclosed to the application: documents confirming the availability of funding, and in particular, bank account statement, bank guarantee or insurance guarantee, a financial report featuring estimated costs and expenditure which need to be incurred.

Therefore, the licensee's policy regarding appropriate funding of its activities should consider the above-stated requirements. PAA will be assessing financial provision with other documentation required in the licensing process. Assessment will be made either by PAA's staff or a contracted external organization that specializes in financial audits.

Principles for financing safety improvements to the nuclear facility over its operational lifetime are ensured by the PAA's President's ability to enforce necessary actions. Modification or modernization of any nuclear facility system, structure or component important for the nuclear safety and radiation protection, and each reactor start-up following fuel load shall require written approval of the President of PAA (Article 37d. of the Atomic Law). If it is considered necessary from the viewpoint of nuclear safety, radiation protection, physical protection and nuclear material safeguards – especially based on the conclusions from the periodical assessment reports, the President of PAA is authorized to amend the conditions of activities covered by the licence (Article 39h.1).

11.1.2. Financial provisions during the period of commercial operation for decommissioning and management of spent fuel and radioactive waste from nuclear installations

Article 38d of the Atomic Law provides for the system of financing the costs of the spent nuclear fuel and radioactive waste disposal and the costs of nuclear power plant decommissioning. In order to cover the costs of the spent nuclear fuel and radioactive waste disposal and the costs of nuclear power plant decommissioning, the organizational unit which was authorized to operate a nuclear power plant shall make quarterly payments to a "decommissioning fund", with a dedicated bank account assigned to the fund. Resources collected on the account can be deposited on fixed-term deposit accounts or invested in bonds emitted by the Minister competent in public finance matters.

The amount of the fee to be paid for the decommissioning fund was determined by *Regulation of the Council of Ministers of 10th October 2012, on the amount of contributions to cover the cost of the final management of spent fuel and radioactive waste and to cover the costs of decommissioning a nuclear power plant made by the organizational unit, which has received a licence for the operation of a nuclear power plant* and is established to be 17.16 PLN for each MWh of electricity produced in a nuclear power plant.

In determining the amount of payments for the decommissioning fund, the Council of Ministers took into account predicted: lifetime of a nuclear facility, the amount of radioactive waste,

including spent nuclear fuel produced by the facility, the final cost of disposal of the waste, and the cost of decommissioning a nuclear facility. It should also be noted that with the progress in implementing the Polish Nuclear Energy Programme in the future, it may be necessary to amend the amount of payments to the decommissioning fund. Deadline for payments was established to be on the fifteenth day of the month following the quarter to which the payment relates, as from the first day of the quarter following the quarter in which the nuclear power plant produced the first MWh of energy until the start of the decommissioning.

Resources collected on the decommissioning fund may only be allocated to cover the cost of the final radioactive waste and spent nuclear fuel disposal from those plants and to cover the costs of decommissioning the nuclear facility. Therefore, withdrawal of resources from the decommissioning fund will take place only after approval is granted by the minister competent for energy matters.

In order to allow the minister competent for energy matters to supervise the organizational unit's obligation to make payments to the decommissioning fund, the head of the organizational unit holding a licence for the operation or decommissioning of a nuclear power plant will have to submit quarterly reports to the minister competent for energy matters stating the amount of payments to the decommissioning fund and the amount of megawatt-hours of electricity produced in this quarter. The report shall be produced according to the template prescribed in the *Regulation of the Council of Ministers of 27th December 2011 on the template of the quarterly report on the amount of contributions paid to the decommissioning fund* no later than the twentieth day of the month following the quarter, which it relates to. If the organizational unit delays making payments for at least 12 months, the minister competent for energy matters applies to the President of the PAA to issue a warrant to stop the operation of a nuclear power plant. The President of the PAA is obliged to order the stop of NPP operation without undue delay.

The amendment of the Atomic Law, which was adopted in 2019, introduced changes to the responsibility for the collection of quarterly reports and withdrawal of the funds. Before 2019 it was the responsibility of the President of the PAA. Those responsibilities are not strictly related to the issues of nuclear safety and radiation protection; therefore, it was proposed that, in accordance with authorities described in the Act of Parliament on Governmental Administration Departments of 4th September 1997, the minister competent for energy matters should take over these responsibilities.

11.1.3. Arrangements for ensuring that the necessary financial resources are available in the event of a radiological emergency

Article 93 of Atomic Law states that costs of intervention measures and the elimination of radiation emergency consequences shall be covered by the organizational unit which caused this radiation emergency. In the event of a radiation emergency which has not been caused by an organizational unit, the costs shall be borne by the perpetrator, whereas in the event of an emergency caused by an unknown perpetrator or when such costs may not be exacted from the perpetrator, and also in the event of an emergency which has occurred outside the borders of the Republic of Poland - such costs shall be borne by the national budget. If the means at the disposal of the authority that directs the actions aimed at the elimination of the hazard and emergency consequences are inadequate, this authority may impose the obligation to render personal and material services with respect to relevant regulations concerning the services rendered to overcome natural disaster situations.

The Atomic Law Act also provides civil liability for nuclear damage. Article 101 provides that exclusive liability for nuclear damage caused by a nuclear incident in the nuclear facility or related to this facility shall be borne by the head of the organizational unit, except for damage caused directly by acts of war or armed conflict. The head of the organizational unit is obliged to conclude a contract for insurance against civil liability for nuclear damage. The licence holder's liability for nuclear damage shall be limited to the amount equivalent to SDR 300,000,000. When the claims for nuclear damage exceed the amount mentioned above, the licence holder shall establish a limited liability fund. The procedures for the establishment and distribution of this fund shall be regulated, as appropriate, by the provisions of the Sea Code on the limited liability for sea claims.

11.2. Human Resources

The basic requirements concerning the competence of the part of the staff of licence holder are specified in the Atomic Law Act. According to Article 38g.1 point 3, the licence to conduct activities consisting in construction, commissioning, operating and decommissioning of nuclear facility shall only be granted to an organizational unit that employs personnel suitably qualified to execute activities stated in the application.

More specific requirements about the personnel qualifications are provided in Article 12c of the Atomic Law Act. It states that in any organizational unit conducting activities involving exposure and consisting in commissioning, operation, or decommissioning of a nuclear power plant, all activities important to nuclear safety and radiation protection shall be performed exclusively by individuals possessing an appropriate authorization issued by the President of PAA. The types of activities important to nuclear safety and radiation protection include activities directly related to managing and operating a nuclear power plant and managing nuclear fuel and radioactive waste at a nuclear power plant. In order to obtain the authorization granted by the President of PAA, an individual needs to inter alia:

- hold a medical certificate on the absence of contraindications for performing work in occupational exposure conditions;
- hold a medical certificate concerning the absence of mental disorders and the absence of any psychological disorders;
- poses a higher education degree and professional experience necessary to be authorized to conduct the relevant activities at a nuclear power plant;
- successfully pass the post-training examination, both theoretical and practical, referred to in *Regulation of the Council of Ministers of 10th August 2012 on activities important for nuclear safety and radiation protection in an organizational unit conducting activity which consists in commissioning, operations, or decommissioning of a nuclear power plant* (abbreviated as "*Regulation on activities*" further in the text).

The authorizations are granted for a period of 3 years.

Above mentioned *Regulation on activities* specifies, among others, a list of activities important to nuclear safety and radiation protection, detailed conditions and procedures for granting authorizations to perform those activities by the President of PAA, required training programs, including practical and the organization of training. Types of activities that require obtaining the authorization are as follows:

- management of the organizational unit;
- managing of commissioning and operation of NPP;
- operating supervision over NPP's operation on the working shift;

- control of the reactor/NPP and operations with the fuel in the reactor and spent fuel pool.

The *Regulation on activities* also specifies required qualifications in education and professional experience for each type of activity. Candidates who apply for the authorization to perform those activities need to undertake both practical and theoretical training specified in the regulation mentioned above. The scope of training depends on the type of activity but always includes both theoretical and practical training. In the case of practical training it covers, among others, simulator training. The simulators of real devices in a nuclear power plant with complete software should allow practicing the performance of activities in the conditions of normal operations of the nuclear power plant and as well as in other plant states. Reference tests of simulators shall be performed at the vendor of a nuclear reactor and manufacturers of systems and elements of the nuclear power plant installations in periods not longer than 12 months. The results of such tests shall be submitted to the President of PAA.

After completion of training, a candidate needs to pass the examinations organized by the President of PAA. The examination consists of theoretical and practical parts. The candidate is allowed to take the practical part of the examination only after passing the theoretical part. The practical exam for candidates applying for authorization for operating supervision and control of the reactor involves conducting a selected activity sequence on a full-time simulator of a nuclear power plant's unit.

Additionally, *Regulation of the Council of Ministers of 30th August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such practices* requires that the schedule of periodic training, recruitment plan, and programs for preliminary and periodic training for authorized employees performing activities important to nuclear safety and radiation protection are required to be submitted at the stage of obtaining a construction licence, and subsequently updated at the stages of commissioning and operation licence.

According to Article 11 of the Atomic Law, other employees of an organizational unit conducting activities involving exposure must possess the appropriate knowledge, skills, and qualifications ensured by undertaking training described in the training program. Those preliminary and periodic trainings are covered by the program prepared by the licence holder. Short-term personnel training plans should be prepared at least once every three years, while long-term training plans should be prepared at 10-year intervals. Those plans are subject to approval by the President of PAA. The first assessment is made at the stage of issuing the licence for the commissioning of a nuclear facility. Scope of training includes, among others:

- general radiation protection procedures and undertaken preventive measures, as related to the activities conducted by an organizational unit;
- radiation protection procedures and undertaken preventive measures as related to a specific workplace;
- procedures of conducting workplace-specific tasks and activities;
- for nuclear power plants – training involving the performance of tasks and activities using simulators of the actual nuclear equipment at the given nuclear power plant

After finishing the training, the employees need to pass an internal examination organized by the head of the organizational unit. Employees who fail to pass the exams are forbidden from working in the organizational unit.

At every stage of licensing, the applicant needs to provide statements that employees of the organizational unit and contracted personnel involved in works important to nuclear safety and radiation protection have enough qualifications and that the number of employees is sufficient to handle those tasks. Copies of documents authenticating obtained authorizations of employees shall be submitted along with those statements.

Regulation of the Council of Ministers of 11th February 2013 on requirements concerning commissioning and operation of nuclear facilities states that in order to ensure a proper level of nuclear safety and radiation protection at the stage of commissioning and at the stage of operation of a nuclear facility, in the organizational unit which possesses a licence for commissioning or operation of the nuclear facility the sufficient workforce shall be guaranteed possessing qualifications and professional experience adequate to tasks performed, provided that:

- the number of employees and their qualifications required for the safe operation of the nuclear facility is systematically verified and documented,
- employees in the positions important for nuclear safety and radiation protection are staffed in accordance with a long-term plan,
- changes in the number of employees that could significantly affect nuclear safety and radiation protection are planned in advance and assessed after implementation.

11.2.1. Human resources policies

Article 108a of the Atomic Law obliges the minister competent for energy matters to conduct activities aimed at ensuring a supply of competent professionals in the nuclear power sector. The minister competent for energy matters is responsible for preparing Human Resources Development Plan for Nuclear Power, aiming to assess staffing needs for the Polish nuclear power sector. The document was prepared in June 2016. The report on the implementation of the activities of the Framework Plan for the Development of Human Resources for the Purposes of Nuclear Power in 2020 was approved by the Minister of Climate and Environment on May 11th, 2021. The preparation of the new National Plan for the Development of Human Resources for Nuclear Power is scheduled for 2023. More detailed information on the Ministry of Climate and Environment's activities in the field of human resources development can be found in Annex no.2 – chapter 3. This information also covers the answer to the common issue 5 from the 7th Review Meeting.

Article 12. Human factors

Each Contracting Party shall take the appropriate steps to ensure that the capabilities and limitations of human performance are taken into account throughout the life of a nuclear installation.

Polish regulatory system takes human factors into account both on the level of the Atomic Law Act and several regulations, including:

- *Regulation of the Council of Ministers of 31st August 2012 on nuclear safety and radiation protection requirements which must be fulfilled by a nuclear facility design* (“*Design Regulation”*);
- *Regulation of the Council of Ministers of 31st August 2012 on the scope and method for the performance of safety analyses performed before applying for a nuclear facility*

construction licence and on the scope of the preliminary safety analysis report for a nuclear facility ("*Safety analysis Regulation*").

According to Article 36c.1 point 3 of the Atomic Law Act, nuclear facility design shall include solutions that provide reliable, stable, easy and safe nuclear facility operation, with particular attention to factors related to man-machine interactions between personnel and structures, systems, and components.

The *Design Regulation* provides more specific requirements. It states that the design shall apply solutions within levels of defense in depth to prevent any possible negative consequences caused by human error during nuclear facility operations or performance of maintenance activities concerning operations, including nuclear facility repairs and modernization (paragraph 4.2.4). Furthermore (paragraph 43 of the *Design Regulation*) nuclear facility shall be designed to minimize the possibility and limit the consequences of human error, with particular consideration given to the spatial layout of the nuclear facility and ergonomics. Nuclear facility design shall ensure that the conditions in the plant are appropriate for the activities of the nuclear facility operator, taking into account the time available for these activities, the anticipated work environment, and the psychological strain of nuclear facility operators. Nuclear facility design shall minimize the probability of situations that require intervention measures by the nuclear facility operator over a short period of time; however, if the operator takes such intervention measures, the design solutions shall ensure that:

- the operator has sufficient time to make the right decisions and implement correct measures;
- the necessary information for the operator to make the right decision is presented simply and unequivocally;
- following the accident, in the main control room or the backup control room and in the route leading to the backup control room, there is an acceptable occupational environment in terms of radiation protection and work health and safety.

Paragraph 44 of the *Design Regulation* considers human factors in the main and backup control room design. It states that when designing the main control room and the backup control room of the nuclear facility:

- human factors shall be analyzed and taken into account appropriately in particular aspects of the man-machine interface to ensure an appropriate and transparent division of control functions between nuclear facility operators and nuclear facility automated systems; furthermore, the minimum number of operating personnel required for the simultaneous performance of measures necessary for the nuclear facility to attain a safe shut-down state shall be specified;
- solutions assuring that the nuclear facility operators will be provided with complex but easy-to-understand information relevant to the timing of decision-making and performance of activities.

Moreover, the layout of instrumentation and control systems and the manner of presenting information in the nuclear facility's main control room shall be designed taking into account the principles of ergonomics so that staff could be provided with an adequate and comprehensive picture of the state and functioning of the nuclear facility (paragraph 83 of the *Design Regulation*). Human factors are also considered in the design of the protection systems. According to paragraph 87.2.3 of *Design Regulation,* the protection system shall be designed

to prevent nuclear facility operator activities that could foil the protection system's effectiveness in operational states and accident conditions but would not render impossible, correct activities of the nuclear facility operator in accident conditions.

The *Safety analysis Regulation* also gives requirements to include human factors in safety analyses of a nuclear facility. Human factors should be considered when identifying the internal postulated initiating events (paragraph 7.1). Those factors include events caused by human error, which could lead to common cause failure should be taken into account, in particular, such as: incorrect or incomplete maintenance and repair activities, incorrect control and protection system settings, and workers' errors. Paragraph 22.2 provides a requirement that the personnel actions to prevent or mitigate the effects of the accident may only be credited in the safety analyses when it is proven that the staff has enough time to perform activities, poses appropriate information to diagnose the event, procedures are available, and the staff has been sufficiently trained. Workers' errors should also be considered during the performance of probabilistic safety analysis.

Inclusion of human factors is also reflected in the structure and content of the safety analysis report, with chapter 5.6 devoted to "Consideration of human factors in the nuclear facility design" and taking human factors into account in chapter 7, "Nuclear facility safety analyses", especially in chapter 7.3 where the assessment of workers actions during the anticipated operational occurrences and under accident conditions is presented.

Regulation of the Council of Ministers of 27th December 2011 on the periodical safety assessment of a nuclear facility considers "impact of nuclear facility's employees and their behavior and issues related to the performance of safety priority principle on the state of a nuclear facility" in the scope of the periodical safety assessment report.

Arrangements for providing feedback from licence holder of experience in relation to human factors, as well as methods and programmes for analyzing and correcting the human errors during operation and maintenance of the facility, will be covered by the licence conditions of activities, integrated management system and more broadly by nuclear facility's procedures.

Article 13. Quality assurance

Each Contracting Party shall take the appropriate steps to ensure that quality assurance programmes are established and implemented with a view to providing confidence that specified requirements for all activities important to nuclear safety are satisfied throughout the life of a nuclear installation.

The Atomic Law Act requires (Art. 7.2) that every licence holder issued a licence by the President of PAA is obliged to establish and implement a quality assurance programme. Submission of this programme within the documentation provided with the application for the licence is a prerequisite to obtain the licence. The programme is subject to review by the regulatory body. Practical implementation of the programme is subject to control by regulatory body inspectors.

According to the Atomic Law (Art. 36k.) quality assurance programme is a part of an integrated management system of a nuclear facility. In order to ensure implementation and documentation of the system as a whole, the integrated management system should include actions that are taken directly by the licence holder as well as other actions crucial for nuclear safety and radiation protection that are taken by suppliers, contractors and subcontractors. An integrated management system is defined via documentation that includes:

1. quality policy;
2. quality assurance programme;
3. description of the management system;
4. description of the organizational structure;
5. description of responsibilities, duties, authorizations of and interdependencies between personnel involved in management, implementation and assessment operations;
6. description of interdependencies between an organization unit and external entities;
7. description of organizational unit processes along with explanations concerning preparation, revision, implementation, documentation, assessment and improvement of the nuclear facility's daily operations;
8. safety classification of nuclear facility systems, structures and components;
9. preliminary safety analysis report or final safety analysis report;
10. safety culture policy understood as a jointly agreed and implemented commitment of management and employees, ensuring the practical functioning of a safety culture in an organizational unit.

The documentation describing the Integrated management system has to be submitted to the President of PAA for approval along with an application for a licence.

Producers and suppliers of nuclear facility systems, structures and components as well as contractors for construction works at the nuclear facility, are obliged to have appropriate quality systems implemented for the services they provide.

The QA programme should describe the ways of assuring that all quality-related activities will be performed in the properly controlled conditions, i.e., by properly qualified personnel using appropriate tools, equipment, methods and technological processes and under suitable environmental conditions, so that the required quality is attained and may be verified by inspection or test. A review and assessment of this programme shall be carried out by the regulatory body at all stages of the licensing process, i.e., prior to and during the construction, during commissioning and operation. If necessary, suitable conditions and requirements will be included in the licence.

The requirements for the inclusion of a quality assurance programme at every step of licensing process are also provided by the *Regulation of the Council of Ministers of 30th August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such practices*. The regulation describes more specific requirements for every step of licensing process.

Documentation describing the integrated management system referred to in Article 36k of the Act, for the commissioning stage of a nuclear facility, covering the activities of all participants of the commissioning of a nuclear facility performing activities essential for ensuring nuclear safety and radiation protection should indicate that this system promotes and supports a safety culture in the applicant's organizational unit and at suppliers and contractors participating in the commissioning and should contain in particular:

1. a description of the management structure, with a presentation of the elements of the integrated management system relating to effective supervision of the management in order to ensure nuclear safety and radiation protection at the stage of commissioning a nuclear facility, in particular - tasks and interdependencies between organizational units responsible for the design, supply of equipment, construction and assembly works and commissioning;

2. a description of the requirements for ensuring a sufficient number of suitably qualified employees for commissioning;
3. a description of the strategy to develop, maintain and strengthen a safety culture;
4. description of the quality assurance program for the commissioning phase, including at least:
    a. description of the process of developing and approving the procedures: conducting tests and commissioning tests, controlling the conduct of these tests and examinations as well as evaluating and approving their results,
    b. description of the procedure to be followed when the test or research results do not fully meet the design requirements,
    c. proposed audits and reviews to ensure that the organizational unit's safety policy is effectively implemented and that conclusions are drawn from the experience of a given organizational unit and from the experience of other organizational units in order to improve nuclear safety and radiation protection;
5. a program for safe management of radioactive waste and spent nuclear fuel containing at least descriptions of:
    a. sources of solid, liquid and gaseous radioactive waste, including data on the production rate and the amount of accumulated waste,
    b. measures to control and reduce the amount of radioactive waste generated in a nuclear facility, including methods of classification, recording and segregation of waste,
    c. characteristics of radioactive waste with different aggregation status and levels of activity,
    d. methods and technical means for processing, conditioning, handling and storage of radioactive waste.

Documentation describing the integrated management system at the stage of nuclear facility operation referred to in Article 36k of the Act should cover the applicant's organizational unit and units of suppliers of goods and services for the purposes of operation, which are essential for ensuring nuclear safety and radiation protection. It should include:

1. description of the management structure, including and justification for achieving effective management oversight in order to ensure nuclear safety and radiation protection at the stage of nuclear facility operation, including in particular descriptions of tasks and interdependencies between the units;
2. description of the requirements for ensuring a sufficient number of suitably qualified employees for the operation and requirements for the provision of goods and services for the operation of the required quality;
3. description of a strategy to develop, maintain and strengthen a safety culture;
4. description of the quality assurance program for the operation phase, covering the activities of all suppliers and contractors of services and goods for the operation;
5. other elements of the documentation describing the integrated management system.

The regulatory body, through the requirements concerning the preparation and implementation of the QA programme, obliges the applicant/licensee, as well as his vendors, to plan, perform, verify and document all their activities in an organized and systematic way. An effective QA programme established and implemented by the licensee, allows the regulatory body to obtain satisfactory confidence in the quality of the nuclear facility’s equipment and in the quality of all performed activities.

According to Article 37 of Atomic Law, both PAA and the Office of Technical Inspection are authorized to inspect the suppliers of nuclear facility systems, structures and components, as well as contractors hired for works important for ensuring nuclear safety and radiation protection during every stage of facility lifetime. Those inspections can cover SSC both on the stage of manufacture and after completion and inspection in a nuclear facility to check the works important for nuclear safety and radiation protection. The arrangements for these provisions should be included in contracts with suppliers and contractors.

The discussion presented above includes the response to a major common issue from the 7th Review Meeting on the supply chain.

Article 14. Assessment and verification of safety

Each Contracting Party shall take the appropriate steps to ensure that:

i. comprehensive and systematic safety assessments are carried out before the construction and commissioning of a nuclear installation and throughout its life. Such assessments shall be well documented, subsequently updated in the light of operating experience and significant new safety information, and reviewed under the authority of the regulatory body;

ii. verification by analysis, surveillance, testing and inspection is carried out to ensure that the physical state and the operation of a nuclear installation continue to be in accordance with its design, applicable national safety requirements, and operational limits and conditions.

14.1. Assessment of safety

Article 36d of the Atomic Law provides that before applying for a nuclear facility construction licence to the President of PAA, the applicant shall carry out nuclear safety analyses, taking into account the technical and environmental factors, and shall have them verified by independent entities which are not involved in the design process of the future nuclear facility. Safety analyses include probabilistic and deterministic safety analyses. Deterministic analyses for anticipated operational occurrences and design basis conditions should be based on the conservative approach. However, the analysis of accidents that are more severe than design basis accidents may be analyzed using the best estimate methods. Based on the safety analysis results, the investor shall draw up a preliminary safety analysis report, which will be included in the construction licence application.

Detailed requirements on the scope of the preliminary safety analysis report are provided in *Regulation of the Council of Ministers of 31st August 2012 on the scope and method for the performance of safety analyses performed before applying for a nuclear facility construction licence and on the scope of the preliminary safety analysis report for a nuclear facility.* This regulation was based on several IAEA safety standards, including NS-G-1.2 (now superseded by GSR Part 4 Rev.1), SSG-2 (now updated to rev.1), SSG-3 (currently under revision process), SSG-4 (currently under revision process), GS-G-4.1 (superseded by SSG-61 in 2021), and relevant WENRA, “EUR” documents as well as guides and regulations from several other countries.

Regulation of the Council of Ministers of 30th August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such practices provides for the detailed scope of safety analysis reports submitted with applications for a licence on the stage of commissioning, operation and decommissioning. The most critical issues that require the most significant updates are explicitly specified. The intermediate safety analysis report submitted at the commissioning stage should update the information from the preliminary safety analysis report, with special

consideration given to, among other things, changes to the design made during the construction and issues connected with emergency preparedness and planning. An operational safety analysis report should include updates on the information from previous reports with particular emphasis on i.a.: commissioning results, operational procedures, severe accident management guidelines, maintenance programmes, and waste management.

According to Article 37e of the Atomic Law head of the organizational unit (licensee) shall perform a periodical safety review. The review should consider aging management issues, operational experiences, and recent advancements in the nuclear community. The exact time interval of the periodic review will be established in the licence but should not exceed ten years. A detailed periodical safety review plan needs to be approved by the PAA's President. Based on the periodical safety review, the head of the organizational unit shall draw up a periodical safety review report and submit it to the President of PAA for approval. The President of PAA has six months to issue a decision on the acceptance of the periodical safety review report. *Regulation of the Council of Ministers of 27th December 2011 on a periodical safety review of a nuclear facility* provides a detailed scope of this review and scope of a periodical assessment report. The assessment should include, among other things, a review of design solutions, the status of SSCs (including aging), a review of safety classification of SSCs, issues related to the natural wear and tear of SSCs, deterministic analyses, and probabilistic analyses. The President of the PAA is authorized to decline the acceptance of the periodic safety review report, which leads to the suspension of the licence. The suspension ceases to apply when the President of the PAA accepts the periodic safety review report.

One of the results of periodic safety review is a preparation of a programme of necessary modernizations and corrective measures intended to enhance the level of nuclear safety in further operations of a nuclear facility. Several other provisions for continuous improvement resulting from safety reviews are covered by the *Regulation of the Council of Ministers of 11th February 2013 on requirements concerning commissioning and operation of nuclear facilities*. Paragraph 8 point 7 of this regulation states: "In order to ensure a proper level of nuclear safety and radiation protection at the stage of commissioning and at the stage of operation of a nuclear facility, an organizational unit which possesses licence for commissioning or operation of the nuclear facility conducts systematic analyses with regard to operating experience, development of international safety requirements, technological developments and new knowledge, and conclusions from these analyses shall be used to improve the nuclear safety of the nuclear facility". Paragraph 44 of this regulation covers use of operational experience from the operated plant to systematically assess the safety of the facility. It shall refer in particular to extraordinary events in the nuclear facility in order to identify their causes. Where justified, suitable corrective measures shall be taken immediately based on the assessment's conclusions. In order to draw conclusions regarding the operation of the nuclear facility, the information shall be obtained and assessed with regard to the operating experience of other domestic and foreign nuclear facilities, especially those of similar type. Data on operating experience shall be collected, documented, and kept in the manner enabling their easy retrieval and obtaining and performing the evaluation by authorized employees of the nuclear facility."

The latest amendment of the Atomic Law that was passed in 2019 has introduced the requirements for topical peer reviews consistent with the provisions of Council Directive 2014/87/Euratom. The President of PAA may ask, in a manner of an administrative decision, the licensees to perform a topical review of the facility (Article 35a.7). The scope and period of the review will be specified in the decision of the President of PAA. A topical review should

end with the preparation of the report that includes the results of the review, actions that were done and actions that will need to be implemented. The President of PAA prepares the national report of the review based on the report provided by licensees. The final national report is shared with nuclear safety authorities from European Union for peer review at the next stage. At the same time, the representatives of the European Commission are invited to participate as observers. The review results form the basis for the national action plan to enhance the nuclear safety of the facilities. The preparation of the action plan is coordinated by ministers competent for climate, energy and internal affairs matters.

Based on the presented information, it can be stated that polish provisions of law meet the second principle of the Vienna Declaration.

14.2. Verification of safety

Safety of nuclear facility during its operation is under constant verification by the licensee and the regulatory body - PAA. The licensee's primary responsibilities for performing safety verification are provided in the *Regulation of the Council of Ministers of 11th February 2013 on requirements concerning commissioning and operation of nuclear facilities.*

The Regulation states that the operation of nuclear facility has to be conducted accordingly to the operational limits and conditions, which are accepted by the President of PAA. These conditions cover, among others, requirements for inspection and oversight of systems, structures and components, which are important to nuclear safety. Moreover, the head of an organizational unit licenced to operate a nuclear facility is obliged to prepare a programme of maintenance, repairs, oversight and inspection of these important items. This programme has to consider ageing processes.

One of the common issues from the 7th Review Meeting of CNS Contracting Parties was "managing the safety of ageing nuclear facilities and plant life extension – ageing management programme".

The National Centre for Nuclear Research, which is the MARIA research reactor operator, has submitted the Ageing Management Programme to the PAA for acceptance. This document is based on the requirements of the IAEA's Specific Safety Guide No. SSG-10 *Ageing Management for Research Reactors.* The Programme covers general objectives and responsibilities and describes conditions and ageing mechanisms of systems, structures and components, which are important to nuclear safety. It also contains a set of detailed guidelines for ageing management dedicated to individual systems, including preventive actions against ageing, monitored parameters, methods of detection of ageing effects and acceptance criteria.

Recognising the importance of peer review mechanisms in delivering continuous improvement to nuclear safety, the amended Nuclear Safety Directive (Council Directive 2014/87/EURATOM) introduced a European system of topical peer reviews (TPR). The first TPR took place between 2017 and 2018, covering the following topics: electrical cables, concealed pipework, reactor pressure vessels, calandria/pressure tubes (CANDU) and concrete containment structures. MARIA research reactor took part in the TPR process. TPR 2, covering fire protection of nuclear facilities, will be performed at the MARIA research reactor between mid-2022 and 2023.

Regarding regulatory verification of safety, the nuclear regulatory bodies (the PAA President and nuclear regulatory inspectors) in accordance with Article 64.4 of the Atomic Law Act, must first of all:

- issue the licences (the PAA President) and other decisions in the matters involving nuclear safety and radiation protection, according to the principles and procedures established by the Act,
- conduct inspections in nuclear facilities and organizational entities that hold nuclear materials, ionizing radiation sources, radioactive waste and spent nuclear fuel.

Particular powers of a nuclear regulatory body were specified in Article 66.1 of the Atomic Law Act. In accordance with this Article, in the context of regulatory control, nuclear regulatory bodies are authorized to:

1. around-the-clock access to the sites, facilities, premises and transport vehicles of the inspected organizational entities, being suitably equipped to do so;
2. scrutinize the documentation, logbooks and other data carriers concerning nuclear safety and radiation protection in the inspected organizational unit;
3. request copies of the documents and data carriers referred to in Item 2 to be produced or provided;
4. verify whether the activities of the inspected organizational unit are conducted in compliance with nuclear safety and radiation protection regulations and with the requirements and conditions established in the licences;
5. conduct independent technical and dosimetric measurements whenever needed;
6. request written or oral information in matters under scrutiny, and to interview the head and personnel of the inspected organizational unit, as well as external workers and apprentices;
7. collect samples for laboratory tests;
8. inspect the site, facilities, premises and installations of the inspected organizational unit and its transport vehicles;
9. record the processes and results of inspection as referred to in Item 8 using audio-visual recording systems;
10. secure and request securing (confirming security) documents and other proofs;
11. during inspections of nuclear power plants – to request the assistance of expert laboratories and organizations authorized by the President of PAA and during inspections of other organizational entities – to request the assistance of experts, specialists and laboratories.

The licensee is obliged to enable nuclear regulatory bodies the performance of inspection ensuring suitable conditions for the inspection. In accordance with Article 37 of the Atomic Law Act inspection concerns producers and suppliers of nuclear facility systems, structures and components, as well as contractors for systems, components and works important for the nuclear safety, radiation protection and safe operation of installations referred to in the regulations issued under Article 5.4 of the Technical Inspection Act of 21st December 2000, carried out or provided during construction, fitting, commissioning, operation and decommissioning of a nuclear facility. The inspection referred to above consists of checking selected nuclear facility systems, structures and components which are ready or being made, as well as works being performed at the nuclear facility.

The head of an organizational unit conducting activities involving exposure and consisting in the operation of a nuclear facility is obliged to regularly forward the nuclear facility operating parameters which are important for the nuclear safety to the President of PAA.

The nuclear regulatory body possesses appropriate legal measures which enable it to respond to a situation when the head of an organizational unit does not comply with the binding

provisions of law concerning the performance of activities involving exposure. The nuclear regulatory body may, first of all, use legal measures specified in Chapter 9 of the Atomic Law Act, i.e., injunctions and interdictions, including an order to stop the operation of a nuclear facility (Article 68), decisions to eliminate non-conformances (Article 68b), post-inspection decisions (Article 69), recommendations (Article 68a). The above measures are used if any non-conformances and irregularities are found during the inspection and are intended to:

1. eliminate a direct threat to nuclear safety and radiation protection (injunctions and interdictions);
2. eliminate non-conformances if it has been found that factual and legal status is not in compliance with conditions specified in the licence or in provisions regulating activities covered by the licence (decisions to eliminate non-conformances);
3. eliminate other errors or failures than those specified in Item 2 (post-inspection decisions);
4. improve the status of nuclear safety or radiation protection in the inspected unit (recommendations).

The nuclear regulatory body may also charge the authorized party with a fine in cases specified in Article 123 of the Atomic Law Act. Fines are imposed in the form of an administrative decision.

Polish regulations allow for regulatory oversight of the safety of nuclear installations and to impose improvements in safety on operating organizations so comply with Vienna Declaration principle 2.

COVID-19 response

The COVID-19 pandemic had a strong impact on the PAA inspection programme. The majority of in-person inspections were cancelled or postponed. Only the most important areas were inspected on-site (*inter alia* safety systems, primary cooling system, emergency power supply). Other topics were inspected remotely by documents review, e.g., verification of the MARIA research reactor operator's testing and maintenance documents. As soon as the restrictions were lifted, PAA inspectors started to conduct more onsite inspections. To ascertain that there are enough qualified personnel to safely operate the MARIA research reactor, PAA received weekly reports about staff availability from the operator.

Article 15. Radiation protection

Each Contracting Party shall take the appropriate steps to ensure that in all operational states the radiation exposure to the workers and the public caused by a nuclear installation shall be kept as low as reasonably achievable and that no individual shall be exposed to radiation doses which exceed prescribed national dose limits.

The radiation protection issue at the national level is addressed in chapter 3 of the Atomic Law Act and several relevant secondary regulations in which internationally endorsed criteria and standards have been incorporated. The Act takes into account the Radiation Protection and Safety of Radiation Sources: IAEA Safety Standards Series No. GSR Part 3. It is also aimed at ensuring compliance with the provisions of the *EURATOM Treaty* and *Council Directive 2013/59/Euratom of 5 December 2013, laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation*. Atomic Law provisions introduce the requirements relevant for the protection of workers and the general public. They provide for the fundamental set of nuclear safety and radiation protection requirements.

Detailed requirements concerning specific facilities and activities conducted by the individual licensees are specified in the licensing conditions. These conditions take into account the results of assessments and analyses performed to establish the operational conditions and limits assumed in safety analysis reports for these facilities and activities.

Dose limits are established in the Atomic Law Act strictly according to the EU Directive 2013/59 EURATOM. The effective dose limit for workers is 20 mSv per year, or the equivalent dose for the lens of the eye – 20 mSv per year, for the skin 500 mSv per year and for the limbs (hands, forearms, feet and ankles) – 500 mSv per year. However, it is allowed to exceed the limit up to the 50 mSv in a calendar year provided that the average annual dose over any five consecutive years, including the years for which the limit has been exceeded, does not exceed 20 mSv.

The same limits are for apprentices and students over 18 years old. For this category, for ages between 16 and 18 years old yearly limit is 6 mSv/y, for younger than 16 years – 1 mSv per year – the same as for members of the public. In addition to the limits on effective dose for apprentices and students aged between 16 and 18 years, the following limits on equivalent dose apply: the limit on the equivalent dose for the lens of the eye is 15 mSv in a year, the limit on the equivalent dose for the skin is 150 mSv in a year, the limit on the equivalent dose for the limbs is 150 mSv in a year. For members of the public equivalent dose limits are 15mSv per year for the lens of the eye and 50 mSv per year for the skin.

As soon as a pregnant worker informs the head of the organizational unit of the pregnancy, the head of the organizational unit shall ensure that the employment conditions for the pregnant worker are such that the equivalent dose to the unborn child does not exceed 1 mSv. In special circumstances authorized by the President of PAA, the occupational dose limits may be exceeded with the exclusion of apprentices, students and pregnant and breastfeeding workers.

Emergency occupational exposures shall remain, whenever possible, below the values of the dose limits for occupational exposure. For situations where the above condition is not feasible, the following conditions apply: reference levels for emergency occupational exposure shall be set, in general below an effective dose of 100 mSv; in exceptional situations, in order to save life, prevent severe radiation-induced health effects, or prevent the development of catastrophic conditions, a reference level for an effective dose from external radiation of emergency workers may be set above 100 mSv, but not exceeding 500 mSv.

The value of the effective dose reference level for members of the public in the event of a radiation emergency should be set to a level below 100 mSv, and for the existing exposure situation should be set to a level below 20 mSv. These are specified in the relevant emergency plan.

Occupational exposure is subject to optimization. For this purpose, the head of the organizational unit may establish the radiation protection targets. They are not subject to review or endorsement by the regulatory authority. On the contrary, the discharges of effluents to the environment are under control by the regulatory body and numerical values of relevant limits are usually included in terms of the licence. For the purpose of protection of population groups living in the vicinity of the nuclear facility, the zone of limited use is established within such a distance from the facility that the effective dose at its perimeter does not exceed the value of 0.3 mSv per year during normal operation and anticipated operational occurences. Under the Atomic Law Act, the responsibility for compliance with the nuclear safety and radiation protection requirements rests upon the head of the organizational unit conducting

activities/practices involving exposure to ionizing radiation (Art. 7). This exposure must not exceed the dose limits described above. At the same time, the principle of exposure optimization must be observed (Art. 9). This means that the activity should be conducted in such a way that – after reasonable consideration of technical knowledge and societal and economic factors – the number of exposed workers and members of the public and their doses are as low as reasonably achievable. According to this principle, the head of the organizational unit is responsible for an assessment of the employees' exposure. If optimization analysis shows the need for reducing exposure to ionizing radiation, the head of the organizational unit shall establish dose constraints for the workers' exposure to ensure that their radiation doses will not be greater than these dose constraints, which in turn are lower than dose limits. If dose constraints are set in the licence, the possibility of exceeding them must be reported by the head of the organizational unit to the authority that issued the licence.

For the purposes of monitoring and surveillance, a distinction is made between two categories of exposed workers: category A: those exposed workers who are liable to receive an effective dose greater than 6 mSv per year or an equivalent dose greater than 15 mSv per year for the lens of the eye or greater than 150 mSv per year for skin and extremities; category B: those exposed workers who are not classified as category A workers. The assessment of the employees' exposure is based on individual dose measurements or radiation measurements in the workplace environment. The head of the organizational unit is obliged to maintain a register of individual doses of exposed workers.

The dose record of category A workers must be annually submitted to the central dose register and to the authorized medical practitioner, who maintains the medical records of these workers according to the requirements established in the *Regulation of the Council of Ministers of 25th May 2021 on the requirements for the individual doses registration*.

In the case of an accidental exposure or emergency exposure situation (emergency worker), the head of the organizational unit is obliged to communicate the results of individual monitoring and dose assessments to the individual, authorized medical practitioner and the regulatory body without delay.

The data related to the doses obtained by category A workers have been collected since 2003 in the central dose register maintained by the President of PAA. These data are based on the assessment of whole-body effective dose or equivalent dose to a specified exposed body part (e.g. the hands). In the cases of exposures to radioactive contamination from the so-called unsealed sources, the assessment of committed dose from internal contamination is performed. The central dose register is kept in the form of an electronic database comprising electronic registration cards, separate for every category A worker. The dose record of the exposed workers is retained during the period of their working life involving exposure to ionizing radiation and afterward until they have or would have attained the age of 75 years, but in any case, not less than 30 years after termination of the work involving exposure. The total number of workers classified as category A and recorded in the central dose register exceeded 7300. The data shows that approximately 97% of category A workers did not exceed the lower limit for this category of exposure (6 mSv/y), and above 99% did not exceed the 20 mSv/y limit. Each case of exposure exceeding the annual dose limit of 20 mSv is subjected to a detailed investigation by regulatory inspectors.

The head of the organizational unit, prior to employing a worker in radiation exposure conditions, shall apply to the President PAA for the information from the central dose register

on the doses received by this worker in the calendar year in which the application is submitted, and also in the period of the four preceding calendar years.

Article 16. Emergency preparedness

1. Each Contracting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency.
For any new nuclear installation, such plans shall be prepared and tested before it commences operation above a low power level agreed by the regulatory body.
2. Each Contracting Party shall take the appropriate steps to ensure that, insofar as they are likely to be affected by a radiological emergency, its own population and the competent authorities of the States in the vicinity of the nuclear installation are provided with appropriate information for emergency planning and response.
3. ***Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be affected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency.***

The main requirements regarding emergency preparedness are provided by Atomic Law Act. The recommendations contained in the Directive 2013/59/Euratom and IAEA General Safety Requirement No. GSR Part 7 has been implemented to Atomic Law in 2019.

Regulation of the Council of Ministers of 25th May 2021 on the emergency plans for radiation emergency defines the responsibilities, scope, requirements and general rules of cooperation in a case of a radiation emergency. According to this regulation, the plans on different levels (on-site, regional level, national level) and appropriate emergency preparedness arrangements have to be in place and maintained by the organizations and bodies responsible for directing actions aimed at eliminating the threat and its consequences, and in particular - for implementation of intervention measures in case of radiation emergency with consequences beyond the site where it has occurred. An emergency management system which includes hazard assessment should be developed at each level. Licensees are categorized according to the potential hazard, which may arise in the case of a radiation emergency associated with the performance of such activities, to the proper threat category specified in the Atomic Law. The hazard assessment should be prepared based on threat categorization. Conclusions from hazard assessment shall be considered during the development of emergency plans and, in particular, the emergency scenarios that may occur. Licensees which belong to threat category I or II shall ensure organizational and technical solutions and human resources to warrant proper and prompt execution of tasks in the case of a radiation emergency, including carrying out actions in the case of simultaneous occurrence of radiation emergencies in several nuclear facilities within the same licensee.

In case when the projected consequences of radiation emergency may cross the area of one voivodeship or borders of the Republic of Poland, the Minister of the Interior and Administration shall ensure coordination of cooperation between, respectively, national or foreign authorities in terms of planning and preparing intervention activities in case of a radiation emergency.

Licensees, regional governors and the Minister of the Interior and Administration are responsible for systematic testing of these plans and arrangements within the prescribed time-intervals as established by the Atomic Law for the national level (Art. 96) and by the *Regulation of the Council of Ministers of 25th May 2021 on the emergency plans for radiation emergency.* Emergency plans for spent fuel and radioactive waste management facilities localized at the Świerk site and for the National Radioactive Waste Repository in Różan are in place. The

external transportation of radioactive waste is essential for these plans. The plans include internal and external communication and cooperation arrangements (President of the PAA, Regional Governor office and services, State Regional Sanitary Inspector, police, fire department). The Atomic Law Act requires that during an on-site radiation emergency, the licensee shall direct actions aimed at the elimination of the threat and its consequences. During radiation emergency on a regional scale, actions, including intervention measures, shall be directed by the regional governor (Voivode) in cooperation with the proper Regional Sanitary Inspector. On a national level, this is the responsibility of the Minister of Interior, with the PAA President's assistance. The regulation describes the scope, content and roles of the parties involved in the public communication process during an emergency.

This minister is obliged by Law (Art. 96.5 of Atomic Law) to perform the exercise to test the national level radiation emergency preparedness plan at least once every 3 years. According to present requirements (Art. 96.1 of Atomic Law, *Regulation of the Council of Ministers on the emergency plans for radiation emergency*), the frequency of testing of the relevant plans at the regional and facility levels must be established within each particular plan by the regional governor or the licensee respectively. In practice, such exercises are performed by licensees that belong to threat category I or II - at least once a year. These exercises shall include verification of all emergency scenarios specified in the on-site emergency plan. Cooperation between threat category I/II activities and external emergency teams should be exercised at least once every 3 years. Licensees that belong to threat category III, IV or V shall perform exercises at least once every two years. The regional emergency plan shall be tested at least once every three years. As there are no NPPs in Poland and existing other nuclear facilities are sited far from the national borders, it is rather unlikely that Poland could create an immediate radiation threat to a neighboring country. Also, the NPPs in neighboring countries are not located in close vicinity to Poland's borders. However, appropriate arrangements have been made to be able to respond adequately to even very unlikely radiation emergency situations.

According to the Atomic Law, the PAA President is responsible for performing the tasks concerning the assessments of national radiation situation in normal conditions and in radiation emergency situations and the transmission of relevant information to appropriate authorities and to the general public. For the purpose of information gathering and assessment and forecasting of radiation situation development, the President of PAA has established **the Radiation Emergency Centre** "CEZAR" being one of the departments **in the PAA structure,** which operates the **National Contact Point** (for domestic matters and for EC, IAEA, CBSS, and bilateral agreements) and has direct access to the data from the Country-wide system for early detection of radioactive contamination (early warning radiation monitoring system), the meteorological data as well as appropriate computerized tools (decision support systems e.g. RODOS, RASCAL), relevant databases, and the staff adequately trained to operate these tools, to perform analysis and prognosis and to formulate recommendations for decision-makers. CEZAR also operates the **International and Domestic National Warning Point** (NWP), working on 24h a day and 7 days a week basis. It serves as a channel for exchanging information on radiation emergencies with IAEA, EC, CBSS, and neighboring countries according to international conventions and bilateral agreements. Poland has signed bilateral agreements on early notification of a nuclear accident and cooperation in nuclear safety and radiation protection with Denmark (1987), Norway (1989), Austria (1989), Ukraine (1993), Belarus (1994), Russian Federation (1995), Lithuania (1995), Slovak Republic (1996), Czech Republic (2005) and Germany (2009). The Radiation Emergency Centre "CEZAR" conducts a

24/7 assessment of the radiation situation in the country. The results of gamma radiation dose rate measurements are presented on the National Atomic Energy Agency website and in the EURDEP system. Additionally, information on the radiation situation in Poland is published in quarterly notices in "*Monitor Polski"* and in the annual report of the President of PAA, which includes the full range of measurement results. Additionally, the PAA informs the general public about the radiological situation (potential threats, comments on rumors) on the website and on social media.

Poland participates in international projects in the emergency preparedness area, therefore Radiation Emergency Centre CEZAR of PAA regularly participates in many international exercises and tests organized by IAEA (CONVEX level 1, 2 and 3), EU (ECURIE level 1 and 3), NEA-OECD (INEX-5 in 2016), Council of Baltic Sea States (CBSS) EGNRS (Expert Group for Nuclear and Radiation Safety), and within bilateral agreements with neighboring countries. Each year CEZAR participates in several domestic exercises on the national or regional level. Special attention is put on aspects of international and bilateral cooperation in an emergency situation with transboundary impact to identify gaps and areas for further improvement. Moreover, in order to support the achievement of further harmonization of response, Poland participates in international initiatives focused on this issue.

The discussion presented above includes the response to major common issues from the 7th Review Meeting on emergency preparedness and stakeholder consultation and communication.

COVID-19 response

Due to the COVID-19 pandemic, State Regional Sanitary Inspector had additional tasks to be done. This has resulted in limited radiometric measurement capabilities. In addition, the maintenance of the National Contact Point had to be ensured, therefore hybrid work and all security measures were put in place.

Article 17. Siting

Each Contracting Party shall take the appropriate steps to ensure that appropriate procedures are established and implemented:

- ***i. for evaluating all relevant site-related factors likely to affect the safety of a nuclear installation for its projected lifetime;***
- ***ii. for evaluating the likely safety impact of a proposed nuclear installation on individuals, society and the environment;***
- ***iii. for re-evaluating as necessary all relevant factors referred to in sub-paragraphs (i) and (ii) so as to ensure the continued safety acceptability of the nuclear installation;***
- ***iv. for consulting Contracting Parties in the vicinity of a proposed nuclear installation, insofar as they are likely to be affected by that installation and, upon request providing the necessary information to such Contracting Parties, in order to enable them to evaluate and make their own assessment of the likely safety impact on their own territory of the nuclear installation.***

17.1. Evaluation of site-related factors

Article 35b of Atomic Law provides those nuclear facilities shall be located within an area that ensures that nuclear safety, radiation protection and physical protection requirements are fulfilled during commissioning, operation and decommissioning of the facility, and emergency measures can be effectively implemented in response to any radiation emergency. The licence holder (or before the issuance of the licence - investor) being liable for nuclear safety should independently evaluate the terrain for the prospect site of a nuclear facility using methods of

evaluation that yield quantifiable results and appropriately reflect the actual conditions of such terrain. Such an evaluation is the prerequisite for selecting the site for a nuclear facility, and concerns:

- seismic, tectonics, geological, geo-engineering, hydrogeological, hydrological and meteorological conditions;
- human-induced external hazards;
- external hazards attributed to the forces of nature;
- population density and land development;
- conditions for the employment of emergency measures in response to a radiological emergency.

The investor needs to prepare the results of the terrain evaluation for the prospective site of a nuclear facility, together with the results of tests and measurements that are the basis for such evaluation, in the form of a site-evaluation report. The site-evaluation report will be subject to assessment by the PAA President in the process of issuing a licence for the construction of a nuclear facility. No separate siting licence will be introduced. Before applying for a nuclear facility construction licence, the investor can apply to the PAA's President for a preliminary assessment of the site of a future nuclear facility.

More detailed provisions for siting are provided by *Regulation of the Council of Ministers of 10th of August 2012 on a detailed scope of assessment with regard to land intended for the location of a nuclear facility, requirements concerning siting report for a nuclear facility* ("*Siting Regulation*"). A list of site-related factors is covered by paragraph 2 of *Siting Regulation*. An excerpt from paragraph 2 of *Siting Regulation* is provided below.

A detailed scope of assessment with regard to land intended for a location of a nuclear facility shall include:

1. information from the field of seismology and tectonics, including inter alia seismic shocks and faults;
2. information from the field of geological and engineering conditions, including inter alia geological and engineering conditions and their changes, the intensity of erosion and accumulation processes, stability of existing scarps and slopes;
3. information from the field of hydrogeological conditions, including underground waters, filtration features of the ground, physical and chemical features of underground waters, prognosis concerning changes of dynamics of underground waters;
4. information from the field of hydrology and meteorology, including inter alia flooding threats and history, the impact of different periods of precipitation, extreme atmospheric phenomena, values (including extremes) of atmospheric and hydro-meteorological variables, impact of long periods of drought on the system of underground and surface waters;
5. information from the field of external events being the result of human activity, including i.e. transport infrastructure, distance from a nuclear facility to active and planned military facilities, potential threat to a nuclear facility posed by industrial plants and installations, acts of terrorism or sabotage, telecommunication devices;
6. information from the field of external events being the result of the forces of nature, including i.e. risk of seasonal loss or deterioration of capacity of nuclear facility's cooling systems, natural fire threat, risk of the detrimental impact of living organisms on a nuclear facility, in particular on its cooling systems;

7. analyses concerning pace, amount and paths of dispersing of radioactive substances outside the nuclear facility and the possibility of carrying out intervention measures in case of radiation emergency under normal operating conditions, predicted operating events and emergency conditions;
8. information from the field of population density and land management;
9. survey of the ground geological structure;
10. distribution of radioactive isotopes' concentration in the ground, surface waters, underground waters and in the atmosphere and analysis of the distribution of ionizing radiation dose rate valid as of the day when the land assessment is carried out.

As presented above, *Site Regulation* includes a set of natural and human-induced hazards that licensee is obliged to investigate. However, the regulation contains a non-exhaustive list of natural hazards. Phenomena that are not covered by the Regulation that can negatively impact the NPP must also be investigated.

Concerning siting topics, PAA (with help from contracted experts and organizations) has prepared three regulatory guides:

- Technical recommendations of the President of the National Atomic Energy Agency concerning the assessment of tectonic stability of substrata and seismic activity of faults with reference to locations of nuclear facilities,
- Technical recommendations of the President of the National Atomic Energy Agency concerning the assessment of geological, engineering and hydrogeological conditions for locations of nuclear facilities,
- Technical recommendations of the President of the National Atomic Energy Agency concerning the assessment seismic activity of substrata with reference to locations of nuclear facilities.

Additional provisions for site-related factors affecting the safety of nuclear facilities are provided by the *Regulation of the Council of Ministers of 31st August 2012 on nuclear safety and radiation protection requirements which must be fulfilled by a nuclear facility design* ("*Design Regulation*").

Paragraph 19.3 of *Design Regulation* provides that in the design of a multi-unit nuclear power plant, consideration shall be given to the possibility of simultaneous impact of given events and external hazards on more than one power unit. Paragraph 45 of the *Design Regulation* states that in a multi-unit nuclear power plant, the systems, structures and components important to nuclear safety and radiation protection cannot be shared by two or more reactors unless it is demonstrated that for all reactors, in operational states, including maintenance activities in the scope of operation, repairs, modernization and during the considered accidents, the requirements on nuclear safety and radiation protection will be met, and in the event of a severe accident of one reactor, the orderly shut-down, cooling and discharge of post-shut-down heat will be ensured for the remaining reactors. Paragraph 49 of the *Design Regulation* states that the design of the nuclear power plant shall take into account its mutual interaction with the power grid, including independence and the number of power lines connected to the nuclear power plant, possible fluctuation and anticipated interference in voltage, mains frequency and system failure, from the viewpoint of ensuring the necessary reliability of power supply to the nuclear power plant systems important for nuclear safety and radiation protection.

Paragraph 47 of the *Design Regulation* provides that the spatial layout of the nuclear facility and the design solutions of nuclear facility buildings shall permit the effective control of access

and the movement of people, equipment and materials onto the premises of the nuclear facility, including workers and emergency service vehicles, with particular consideration being given to protection against the unauthorized access of persons and the unauthorized introduction of objects.

The list below provides the summary of the most important provisions for selected events:

- Fires and explosions – provisions are provided in chapter 8 of section IV of the *Design Regulation* titled "requirements on the fire protection and the prevention of explosions". Systems, structures and components important for nuclear safety and radiation protection shall be designed and distributed to minimize the probability of fire and explosion caused by external or internal events. Redundancy, diversity and physical separation of those systems are required. Fire barriers, fire detection systems, fire alarms and the extinguishing of fires at the nuclear facility shall be designed based on the analyses of the fire threat of the nuclear facility indicating required fire resistance, need for application and output.
- Aircraft crash – provisions are stated in paragraph 33 of the *Design Regulation*. Design solutions ensuring NPP's safety in case a large civilian aircraft crashes into it should be provided. Design should ensure that with limited operator's actions: the reactor core continues being cooled or the primary reactor containment remains intact, and the cooling of spent nuclear fuel or the integrity of the spent nuclear fuel pool is maintained. Moreover, paragraph 67 of this regulation provides that two reactor containments should be constructed. The presence of secondary containment increases nuclear safety and resistance to aircraft crashes.
- External flooding – provisions are stated in paragraph 23 of the *Design Regulation*. In the event of locating the nuclear facility in the areas where the probability of flooding is once every 1000 years or more than once every 1000 years, the nuclear facility shall be designed in a manner preventing the negative consequences brought by floods or flooding. When designing anti-flooding protection for a nuclear facility, consideration shall be given to the maximum water surface ordinate with the probability of occurring once every 1000 years.
- Severe weather conditions, earthquakes, heavy rains – provisions cand be found in two different regulations:
    - *Siting Regulation* in paragraph 5, which states that the land shall not be considered to fulfil location requirements concerning a nuclear facility location in case of the following factors:
        - in the location ground of a nuclear facility at a distance which is less than 20 km from the borders of the planned site of a nuclear facility, there is an active fault or fault in relation to which the probability of activation is more than once in 10,000 years, and such activation could cause a threat to nuclear safety of a nuclear facility (it follows the European Commission recommendation from post-Fukushima stress tests);
        - in the region of the site, there has been an earthquake of 8 grade on the EMS-98 scale within the last 10,000 years, or there is a probability of an earthquake with the same scale which is more than once in 10,000 years;

    - there is the possibility of an earthquake with an occurrence probability of more than once in 10,000 years and with a scale below 8 EMS-98, which will prevent the safe operation of a nuclear facility.
  - *Design Regulation* in paragraphs 21 and 22. Paragraph 21 provides that the nuclear facility shall be designed to ensure its nuclear safety in case of the occurrence of seismic events and their consequences. Consideration shall be given to design seismic events with the shock repetition once every 10 000 years, which generates the highest horizontal ground acceleration spectra. The design seismic event shall define: the shock type and mechanism, its location, magnitude, duration, spectral parameters, vertical and horizontal ground acceleration spectra and the seismic moment tensor. Additionally, when a nuclear facility is in danger of an induced earthquake, natural and induced earthquakes scenarios shall be considered for the identification of the design seismic event. Design solutions should ensure that in the case of a design seismic events, systems, structures and components important to nuclear safety will resist stress arising from such event so that the nuclear facility can be brought into a safe shutdown state. This should be assured in particular by proper seismic classification of SSCs depending on their required resistance to seismic stress, taking into account implemented safety functions, and by defining the appropriate technical requirements depending on seismicity class. Moreover, paragraph 22 adds that the design should take into account the capabilities of SSCs important for performing fundamental safety functions to resist the consequences of seismic events which are more severe than design seismic events, to demonstrate that they will not be suddenly damaged, even in the case of design stress being slightly exceeded. In designing the facility for seismic events, an assumption will be made for the loss of electrical power supply to the nuclear facility from external power grids due to seismic shocks, including pre-emptive shocks and aftershocks.
- Related sequential natural external events – provision is stated in paragraph 18 of the *Design Regulation.* In case of the coincidence of given random events, which could lead to anticipated operational occurrences or accident conditions, such events shall be included in the nuclear facility design. Events that may be due to other secondary events, such as floods following earthquakes, shall be treated as elements of the original postulated initiating event.
- External events and events resulting from human activities are taken into consideration in determining the Postulated Imitating Events adopted for the performance of the safety analyses.

Siting Regulation was based on the number of relevant IAEA safety standards, including NS-R-3, a series of NS-G's from 3.1 to 3.6 (now superseded by newer documents). Taking this into account, as well as the above-presented excerpts from regulations, it can be stated that Polish Law provisions follow Vienna Declaration.

17.2. Impact of the installation on individuals, society and environment

When applying for the licence for the construction of a Nuclear Power Plant licensee will have to provide, among other things:

- Decision on Environmental Conditions issued by General Directorate of Environmental Protection after PAA's President opinion;
- Preliminary Safety Analysis Report including chapter 13 - Impact of the nuclear facility on the environment including the radiological and non-radiological impact of the facility;
- Site evaluation report.

The site evaluation report needs to contain an analysis of all site-related factors, which should include models of dispersing radioactive isotopes to underground waters, surface waters and the atmosphere for assumed design releases, taking into account the food chain and evaluation of effective and equivalent doses received by population as a result of the exposure to ionizing radiation with the indication of parameters and data used, calculation methodology and methods applied for the model verification.

Article 36f of Atomic Law establishes the creation of the restricted-use area around the nuclear facility. This area should be bounded so that:

- the annual effective dose from all routes of exposure shall not exceed 0.3 mSv under normal operating conditions of the nuclear facility and during anticipated operational occurrences;
- the annual effective dose from all routes of exposure shall not exceed 10 mSv in emergencies during which the reactor core does not melt.

Moreover, paragraph 9 of *Design Regulation* provides that nuclear facility design shall ensure the limitation of releases of radioactive substances beyond the reactor containment in case of the occurrence of accident conditions so that in the event of:

- design basis accidents, there is no need to take any intervention measures beyond the limits of the restricted-use area;
- design extension conditions, there is no need to take:
    - early intervention measures beyond the limits of the restricted-use area of the nuclear facility during the releases of radioactive substances from the nuclear facility,
    - medium-term intervention measures at any time whatsoever beyond the limits of the emergency planning zone,
    - long-term intervention measures beyond the limits of the restricted-use area of the nuclear facility.

Consideration should also be given to the interaction between the nuclear facility and the environment (paragraph 17 of the *Design Regulation*). The characteristics of the planned site and the region of the nuclear facility location should determine the impact of the nuclear facility on the environment. The interactions should, in particular, take into consideration:

- definitions of the transmission of radioactive substances to persons belonging to the general population and the environment, including the spreading of radioactive substances in the air, surface water and groundwater;
- in terms of the possible impact on intervention measures and risk assessment for given persons belonging to the general population and the population as a whole in case of an accident, such as:
    - population distribution around the nuclear facility,
    - the use of land and water,
    - communication routes.

To ensure nuclear safety and radiation protection, the nuclear facility design shall provide for equipment to monitor ionizing radiation in the operational states and during and after the considered accidents (paragraph 123 of the *Design Regulation*).

On May 25th, 2016, General Directorate for Environmental Protection (GDOŚ) issued a decision on the scope of the report of environmental impact assessment for identified by PGE EJ 1 (now PEJ) variants locations of the first Polish nuclear power plant, i.e. "Lubiatowo - Kopalino" (municipality Choczewo) and "Żarnowiec" (municipality Krokowa and Gniewino). On March 29th, 2022 PEJ submitted to GDOŚ for reviewing the Environmental Impact Assessment report for those two sites.

17.3. Re-evaluation of site related factors

Not applicable as Poland does not have any Nuclear Facilities according to the definition provided in Article 2 of the convention.

17.4. Consultation with other Contracting Parties likely to be affected by the installation

One of the suggestions from the 2013 IRRS mission stated that *"PAA should consider extending bilateral exchange agreements to share experiences with other countries embarking on, or expanding, its NPP programme"*

To ensure nuclear and radiation safety, the Republic of Poland signed a number of international bilateral agreements. Agreements concerning early notification of nuclear accidents and exchange of information and experience were executed with the neighbouring countries under the international Convention on Early Notification of Nuclear Accidents, i.e. with the Russian Federation (it refers to the zone of 300 km from the Polish border, this area encompasses the Kaliningrad Oblast), Lithuania, Belarus, Ukraine, Slovakia, Czech Republic, Austria, Denmark, Norway and Germany.

Because of the number of nuclear power plants operating in close vicinity of the territory of Poland, the cooperation with nuclear regulators of the neighbouring countries, conducted following the mentioned intergovernmental agreements, is an essential element of Polish nuclear and radiation safety. While assessing possible radiation events, partners of the said agreements use consolidated criteria provided by the International Nuclear Event Scale - INES, which was developed by the IAEA. During the last three years, Poland took part in consultations with Belgium, Ukraine, the Czech Republic, Finland and Belarus regarding their plans to build new NPPs/extend the lifetime of existing NPPs or radioactive storages. Moreover, it is required that before applying for a licence to build a nuclear facility, the applicant is required to obtain an opinion of the European Commission issued pursuant to Article 37 Euratom Treaty. Therefore, countries of the European Union are allowed to participate in the discussion concerning the safety of the planned nuclear power plants.

Article 18. Design and construction

Each Contracting Party shall take the appropriate steps to ensure that:

- ***i. the design and construction of a nuclear installation provides for several reliable levels and methods of protection (defence in depth) against the release of radioactive materials, with a view to preventing the occurrence of accidents and to mitigating their radiological consequences should they occur;***
- ***ii. the technologies incorporated in the design and construction of a nuclear installation are proven by experience or qualified by testing or analysis;***

iii. the design of a nuclear installation allows for reliable, stable and easily manageable operation, with specific consideration of human factors and the man-machine interface.

General provisions for the nuclear facility design, which include the prevention of accidents, are provided by Article 36c of the Atomic Law. More detailed requirements are contained in the *Regulation of the Council of Ministers of 31st August 2012 on nuclear safety and radiation protection requirements which must be fulfilled by a nuclear facility design ("Design Regulation")*. This regulation is based on IAEA Safety Standards (in particular SSR 2/1), WENRA recommendations, European Utility Requirements for LWR NPPs and relevant regulatory provisions and requirements binding in particular UE countries, and as such, it complies with the principles of the Vienna Declaration on Nuclear Safety. Furthermore, siting requirements are contained in *Regulation of the Council of Ministers of 10th August 2012 on a detailed scope of assessment with regard to land intended for the location of a nuclear facility, requirements concerning siting report for a nuclear facility.*

18.1. Implementation of defence in depth

The Atomic Law provides general provisions for the defence in depth concept. Article 36c.1 point 2 requires that nuclear facility design shall take into account the sequence of safety levels to prevent deviations from normal operating conditions, anticipated operational occurrences and design basis accidents, as well as severe accidents, and if any of the deviations, occurrences or accidents cannot be prevented – to control them and to mitigate the radiological impact of the emergency. This requirement is described broader in the *Design Regulation*. Paragraph 3 of this regulation describes five safety levels, as well as functions and actions that should be taken at each level. The sequence of protective barriers ensuring the maintenance of radioactive substances at given barriers of the nuclear facility and preventing their uncontrolled releases to the environment, such as nuclear fuel material (fuel matrix), fuel cladding, pressure boundary of the reactor cooling circuit and reactor containment need to be implemented in the nuclear facility design. In all circumstances, fundamental safety functions of the plant should be performed.

Defence in depth is also included in other requirements for facility design. General requirements provide that the design shall ensure (paragraph 4 of the *Design regulation*):

- high level of quality of the nuclear facility in order to minimize the occurrence of failures and deviations from normal operation and to prevent accidents;
- technical solutions for controlling nuclear facility behaviour during and after the occurrence of a postulated initiating event, with the use of the built-in safety features of the nuclear facility and appropriate components of the nuclear facility;
- nuclear facility control by applying automatic actuation of safety systems in a manner limiting the operator's activities in the earlier phase of the postulated initiating event, as well as the control of the nuclear facility by the operator;
- as far as it is practically possible, equipment and procedures that permit the control of the course of an accident and limit its consequences;
- redundancy of technical solutions to ensure the performance of each of the fundamental safety functions, attaining protective barrier effectiveness and limiting the consequences of postulated initiating events.

Moreover, the nuclear facility design shall apply solutions concerning safety level sequences in order to prevent:

- the endangering of the integrity of protective barriers;
- the failure of one or more protective barriers;
- the failure of the protective barrier resulting from the failure of another protective barrier or system, structure or component of a nuclear facility;
- any possible negative consequences caused by human error during nuclear facility operation or the performance of maintenance activities concerning operation, including nuclear facility repairs and modernization.

Paragraph 5 of the *Design regulation* states that the nuclear facility shall be designed so that, in case of the occurrence of all types of events, except for the most unlikely postulated initiating events, the safety level two, at the most, would be sufficient to prevent their escalation up to the accident conditions.

The design of nuclear facilities should include all postulated initiating events, which serve as the basis for the performance of safety analyses (paragraph 16 of *Design regulation*). They should cover, among other things, both internal and external events. Additionally, the design of the nuclear facility should include its behaviour during design extension conditions (paragraph 13). The nuclear facility shall be designed so that, in the event of design extension conditions, it could be brought towards a controlled state while retaining the safety functions of the reactor containment system. The requirements regarding the prevention of accidents and mitigating the consequences if they occur are presented in subsection 18.4.

18.2. Incorporation of proven technologies

Under the provision of the Article 36b of the Atomic Law, it is required that in the design and construction process of a nuclear facility, no solutions or technologies shall be used which have not been demonstrated to be appropriate in practice in other nuclear facilities, or by means of tests, studies and analyses.

During the construction and manufacture of the facility systems, structures and components, nuclear regulatory inspectors and inspectors from the Office of Technical Inspection will conduct inspections to ensure that high technological standards are met at every step of the construction. Experience of the Office of Technical Inspection inspectors will be a significant asset in the inspection process. Equipment classification and qualification are also required to provide for the high quality and reliability of used equipment. The required reliability of a given safety group for each postulated initiating event, with the assumption of a single failure, shall be ensured by the appropriate choice of technical solutions, which cover the usage of proven components, redundancy, diversity, physical and functional separation and the isolation of components.

18.3. Design for reliable, stable and manageable operation

Paragraph 35 of the *Design Regulation* provides that the nuclear facility design employs diversity and functional independence of systems, structures and components of the nuclear facility important for ensuring nuclear safety and radiation protection in order to attain the required level of reliability based on reliability analyses conducted on the basis of the common cause failure criterion.

Paragraph 43 of the *Design Regulation* provides that a nuclear facility shall be designed to minimize the possibility and limit the consequences of human error, with particular consideration being given to the nuclear facility's spatial layout and ergonomics. It should be

ensured that the operator is provided with optimal conditions to undertake needed actions. Nuclear facility design shall minimize the probability of situations that require intervention measures by the nuclear facility operator over a short period of time; however, if the operator takes such intervention measures, the design solutions shall ensure that:

- the operator has sufficient time to make the right decisions and implement correct measures;
- the necessary information for the operator to make the right decision is presented simply and unequivocally;
- following the accident, in the main control room or the backup control room and in the route leading to the backup control room, there is an acceptable occupational environment in terms of radiation protection and work health and safety.

Moreover, paragraph 44 of the *Design Regulation* considers human factors in the main and backup control room design. It states that when designing the main control room and the backup control room of the nuclear facility:

- human factors shall be analyzed and taken into account appropriately in particular aspects of the man-machine interface to ensure an appropriate and transparent division of control functions between nuclear facility operators and nuclear facility automated systems; furthermore, the minimum number of operating personnel required for the simultaneous performance of measures necessary for the nuclear facility to attain a safe shut-down state shall be specified;
- solutions assuring that the nuclear facility operators will be provided with complex but easy-to-understand information relevant to the timing of decision-making and performance of activities.

18.4. Prevention of early or large radioactive releases (implementation of 1st and 3rd principles of Vienna Declaration on Nuclear Safety in regulations)

The amendment of the Atomic Law that came into force in 2019 introduced a provision for technical and organizational solutions to be implemented in siting, design, construction, operation (including modifications and modernizations) and decommissioning such that the accidents are prevented and in the event of accident consequences are mitigated and large and early releases of radioactive substances are avoided (Art. 35.4).

Paragraph 2, section 2 of the *Design Regulation* provides that a nuclear facility shall be designed in a manner that ensures limiting the radiation consequences of any possible accident without significant degradation of the reactor core, taken into account in the nuclear facility design, to prevent the evacuation of the population and long-term limitations in the use of land and waters around the nuclear facility. Furthermore, paragraph 9 point 2 of *Design Regulation* states that nuclear facility design shall ensure the limitation of releases of radioactive substances beyond the reactor containment in case of the occurrence of accident conditions so that in the event of design extension conditions, there is no need to take neither early intervention measures beyond the limits of the restricted-use area of the nuclear facility during the releases of radioactive substances from the nuclear facility, nor medium-term intervention measures beyond the limits of emergency planning zones, nor long-term intervention measures beyond the limits of the restricted-use area. Additionally, paragraph 10 point 3 of the *Design Regulation* states that nuclear facility design shall ensure that the probability of accidents that could lead to failure of containment or large releases of radioactive substances to the environment should be below 1 in 1 000 000 years of reactor operation.

Paragraph 32.2 of the *Design Regulation* adds that nuclear power plants and research reactors shall be designed to prevent the occurrence of severe accidents, which could lead to a premature failure of the primary reactor containment, or it shall be demonstrated that the probability of occurrence of such accidents is so small that it is not necessary to include it in the design.

18.5. Provisions related to Fukushima Daiichi accident lessons learned

The primary polish regulation concerning the design of the nuclear facility - *Design Regulation* – was in preparation when the accident in Fukushima Daiichi NPP occurred. Many preliminary lessons learned and solutions were implemented in the regulation before its issuance in 2012. The description below presents the most important design and construction provisions related to the Fukushima Daiichi accident lessons learned provided in the *Design Regulation*:

- Paragraphs 93-101 give special attention to emergency power supply sources for the nuclear facility. These sources shall be selected in a manner to ensure the reliable operation of the systems and components important for ensuring nuclear safety and radiation protection. Furthermore, in the event of a loss of external alternating current, the internal sources of power supply to the nuclear facility with alternating current, except for mobile generators, shall ensure the power supply for systems and components important for ensuring nuclear safety and radiation protection, for at least seven days in operational states and during and after the considered accidents. Besides internal sources of power supply, the nuclear facility design shall also provide for an alternative source of supplying the facility with alternating current to be used in case of unavailability of internal sources of power, in particular transportable or portable power generators or combined systems for supplying emergency power to a nuclear facility. Additionally, paragraph 34 states that a nuclear facility shall be equipped with electrical power supply systems from internal and external sources so that the fulfillment of the safety function should be possible by using either of the two sources of electrical power.
- Paragraphs 22 and 23 provide requirements for potential seismic and flooding hazards and their consequences. Systems, structures and components important to the fulfillment of safety functions should be able to withstand the consequences of seismic events more severe than design basis seismic hazard. The design of the nuclear facility should also consider the unavailability of external power supply as the result of seismic events, taking into account pre-emptive shocks and aftershocks.
- Paragraph 76 states that reactor containment system design shall provide for, as required, systems used to limit, reduce, and control the quantities of fission, hydrogen, oxygen, and other substances, which may be released into the reactor containment. Those systems should be designed with the appropriate degree of redundancy and appropriate mutual connections to ensure that each safety group fulfills the required safety function, with electricity supply from internal facility sources or the external power grid, assuming a single failure. In order to reduce the concentration of flammable gases in the reactor containment systems or components which do not require electricity should be used.
- Paragraphs 28 and 29 provide general requirements for the containment of nuclear facilities. The design of a nuclear facility should allow for the achievement of a safe state during design extension conditions while maintaining safety functions of containment. The design solutions of reactor containment and its systems should

guarantee that it will be able to cope with scenarios involving core melts. Additionally, paragraph 32.4 provides that the design of nuclear power plants and research reactors shall provide solutions ensuring limitation, by means of the reactor containment system, of the consequences of severe accidents involving reactor core degradation. More specific requirements for the design of reactor containment systems are also provided in paragraphs 67 – 77.

Article 19. Operation

Each Contracting Party shall take the appropriate steps to ensure that:

- ***i. the initial authorization to operate a nuclear installation is based upon an appropriate safety analysis and a commissioning programme demonstrating that the installation, as constructed, is consistent with design and safety requirements;***
- ***ii. operational limits and conditions derived from the safety analysis, tests and operational experience are defined and revised as necessary for identifying safe boundaries for operation;***
- ***iii. operation, maintenance, inspection and testing of a nuclear installation are conducted in accordance with approved procedures;***
- ***iv. procedures are established for responding to anticipated operational occurrences and to accidents;***
- ***v. necessary engineering and technical support in all safety-related fields is available throughout the lifetime of a nuclear installation;***
- ***vi. incidents significant to safety are reported in a timely manner by the holder of the relevant licence to the regulatory body;***
- ***vii. programmes to collect and analyse operating experience are established, the results obtained and the conclusions drawn are acted upon and that existing mechanisms are used to share important experience with international bodies and with other operating organizations and regulatory bodies;***
- ***viii. the generation of radioactive waste resulting from the operation of a nuclear installation is kept to the minimum practicable for the process concerned, both in activity and in volume, and any necessary treatment and storage of spent fuel and waste directly related to the operation and on the same site as that of the nuclear installation take into consideration conditioning and disposal.***

As Poland does not have any Nuclear Installations by the Convention on Nuclear Safety definition, the information presented below is based mostly on excerpts from Atomic Law and relevant regulations. *Regulation of the Council of Ministers of 11th February 2013 on requirements concerning commissioning and operation of nuclear facilities ("Regulation on Commissioning and Operation")* is based on IAEA Safety Documents (SSR – 2/2, NS-G-2.9, NS-G-2.2, GS-R-3) as well as relevant WENRA documents and regulations and guides from other countries. Therefore, the preparation of relevant Polish regulations meets the Vienna Declaration's third principle.

19.1. Initial authorization

Article 4 of the Atomic Law states that separate licences for commissioning and operation are required. A list and scope of documents required at this stage of licensing process are provided by *Regulation of the Council of Ministers of 30th August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such practices*. The most important documents required at the commissioning stage include (there are 36 documents specified in Regulation):

- Updated Safety Analysis Report including safety analysis, based on the Preliminary Safety Analysis Report with updates, clarifications and supplements arising from the

construction phase, including information about system, structures and components as-built and every other change as important to nuclear safety and radiation protection;
- commissioning programme and procedures;
- operational limits and conditions;
- nuclear fuel reloading program, supported by appropriate neutronic and thermal-hydraulic calculations for the first fuel cycle;
- operational procedures;
- list of planned pre-operational tests;
- training programme for NPP staff;
- updated nuclear facility decommissioning programme;
- description of the structure and activities of separated divisions or teams responsible for maintaining knowledge about the plant's project and design throughout the plant's lifetime.

The most important additional documents required at the operation stage include:
- Final Safety Analysis Report;
- commissioning report, with pre-operational test results;
- statement of the adequacy of human resources to perform activities important for nuclear safety and radiation protection;
- operation programme, including electricity production programme and plan of repairs for at least ten years.

Article 37a.1. of the Atomic law states that "nuclear facility shall be commissioned and operated in a manner that will ensure nuclear safety and radiation protection of personnel and the general public, in accordance with the licence issued by the President of PAA and the implemented integrated management system." Point 2 of Article 37a requires the licensee to submit the commissioning programme to PAA's President for approval. The programme shall list all pre-commissioning tests of nuclear facility systems, structures and components to be completed, and in particular:

- pre-commissioning tests, including tests required under the technical inspection regulations (specific scope of tests is provided in the Regulation on commissioning and operation);
- fuel load and sub-criticality tests;
- preliminary criticality tests and low power output tests;
- power output tests (at power levels specified in the Regulation on commissioning and operation).

Results of nuclear facility commissioning tests at every stage need to be submitted to the President of PAA. The President of PAA may suspend nuclear facility commissioning if the results of commissioning tests indicate any risks for nuclear safety or non-compliance with the nuclear safety requirements. Further requirements are provided by *Regulation on commissioning and operation*.

During the construction, commissioning and operation phase, regulatory inspectors are authorized to inspect producers and suppliers of nuclear facility systems, structures and components, as well as contractors for systems, components and works important for the nuclear safety and safe operation of facility (Article 37.1. of Atomic Law).

19.2. Operational limits and conditions

Every licence specifies the conditions of activities covered by the licence, including operating limits and conditions (Article 39g). Requirements for operating limits and conditions for commissioning and operation of nuclear facilities are provided by *Regulation on Commissioning and Operation.*

The licensee presents proposed operational limits and conditions with the application for commissioning. The President of PAA has the right to modify them, taking into account operational experience or modifications of systems, structures or components, results of new safety analyses, as well as scientific and technological developments. Operational limits and conditions are subject to review during the commissioning and operation of the nuclear facility.

Operational limits and conditions shall include at least (paragraph 3. 1 *Regulation on Commissioning and Operation)*

- safety limits – defined as “values of these physical and technological parameters which must not be exceeded and which directly impact the condition of protective barriers”;
- limiting settings for safety systems, where safety system settings are defined as “parameter values at which protective devices are automatically actuated in the event of anticipated operational occurrences or accident conditions to prevent safety limits from being exceeded”;
- limits and conditions for normal operation;
- requirements concerning inspection and surveillance over the systems, structures and components of the nuclear facility important for ensuring nuclear safety and radiation protection;
- minimum required staffing of operational personnel, including the control room operators.

Safety limits shall be established based on a conservative approach considering uncertainties of safety analyses. In the case of exceeding safety limits during the commissioning or operation of the nuclear power plant or research reactor, the reactor shall be immediately shut down.

Limits and conditions for normal operation shall determine conditions for the safe operation of the nuclear facility in all the modes of its normal operation. They shall include in particular:

- ranges and rates of permissible changes of physical and process parameters of the nuclear facility;
- requirements for functional availability and effectiveness of the systems and components of the nuclear facility important for ensuring nuclear safety and radiation protection so that they could fulfil safety functions in particular conditions;
- measures that should be taken when the requirements as referred to in Item 2 are not met and the identification of the period in which these measures should be taken.

Paragraph 30.2 of *Regulation on Commissioning and Operation* provides that at the end of commissioning of the nuclear power unit or research reactor, an assessment of the results obtained shall be conducted in order to confirm whether operational limits and conditions are proper and practically applicable and to specify possible limitations for the operation which must be implemented as demonstrated by the results of commissioning tests and measurements.

Description of operational limits and conditions shall be made available to the operators of the nuclear facility’s control room in a separate document (technical specification for commissioning and operation, respectively). Furthermore, *Regulation of the Council of*

Ministers of 10th August 2012 on activities important for nuclear safety and radiation protection in an organizational unit conducting activity which consists in commissioning, operations or decommissioning of a nuclear power plant states that theoretical training for the position of the operator should include inter alia “limits and operating conditions and nuclear regulatory authority’s requirements”.

19.3. Procedures for operation, maintenance, inspection and testing

Requirements for appropriate procedures are provided by *Regulation on Commissioning and Operation* and *Regulation of the council of ministers of 30th August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such activities.*

Paragraph 33 *Regulation on Commissioning and Operation* provides basic requirements for operational procedures. Operation of the nuclear facility shall be conducted in accordance with operating procedures developed, verified, approved, modified and revoked according to the principles set out in the integrated management system. Operating procedures of the nuclear facility shall be developed based on the design documentation, in particular, the safety analysis report, also on the basis of operational limits and conditions and the results of nuclear facility commissioning. Operating procedures of the nuclear facility shall be developed for particular states of the nuclear facility. Operating procedures of the nuclear facility shall be made available to employees of the nuclear facility on a permanent basis and to the nuclear regulatory bodies – on demand. The President of PAA may order introducing changes in the operating procedures if the reasons for nuclear safety or radiation protection require so.

The regulation also obliges the head of the organizational unit to establish a program of maintenance, testing, surveillance and inspection of the systems, structures and components of the nuclear facility important for ensuring nuclear safety and radiation protection with relevant procedures. This programme will need to include systematic assessments to confirm that the systems, structures and components can perform their functions in the operational states and in accident conditions and management of aging processes. It is subject to periodic reviews based on operating experience. A specific scope of the programme and implementing procedures will be prepared by the licensee during the commissioning phase. Design, assessment, inspection and implementation of any modernizations and modifications introduced in the nuclear facility during its operation shall be made in accordance with the procedure constituting an element of the integrated management system.

Regulation on the documents required with the application for the licence provides that in addition to commissioning and operational procedures, there should be a procedure established for preparation, acceptance and implementation of procedures, as well as a procedure for implementing modifications in other procedures.

19.4. Procedures for responding to operational occurrences and accidents

Operating procedures of the nuclear facility shall be developed for particular states of the nuclear facility. That means that both at commissioning and operation phases, the licensee needs to have procedures for normal operation, procedures for accidents and emergency procedures, including severe accident management guidelines. PAA may further develop more specific guides on the establishment of specific procedures.

19.5. Engineering and technical support

As explained in response to compliance with Article 11.2 of the Convention, in order to ensure a proper level of nuclear safety and radiation protection at the stage of commissioning and at the stage of operation of a nuclear facility, in the organizational unit which possesses a licence for commissioning or operation of the nuclear facility the sufficient workforce possessing qualifications and professional experience adequate to tasks performed shall be guaranteed.

During the construction of Olkiluoto 3 in Finland significant share of work was done by Polish companies e.g. Polbau, Elektrobudowa, Energomontaż-Północ, KMW Engineering. Thanks to this experience big part of the construction can be done with the help of Polish engineers and companies. However, there are very few experts in the field of design of nuclear power reactors, and as well there is a lack of experienced operational staff. The main scientific support for the Polish Nuclear Power Programme is National Centre for Nuclear Research in Świerk (NCBJ). NCBJ is an operator of the polish research reactor MARIA.

19.6. Reporting of incidents significant to safety

The Atomic Law Act states that “the head of organizational unit conducting activities involving exposure and consisting in commissioning, operation or decommissioning of nuclear facilities shall immediately notify the PAA President, the regional governor, district or municipal authorities competent for the area where the facility is located, as well as municipal authorities of the adjacent areas on all emergencies related to actual or potential nuclear hazards”. He also shall publish or update information concerning hazardous nuclear emergencies within the last 12 months on the facility’s official website and shall forward it to the President of PAA (Article 35a).

In the event of a radiation emergency, the head of the organizational unit shall secure the emergency site and notify the President of PAA immediately. In justified cases, the head of the organizational unit shall also notify other organizations and services following the on-site emergency plan.

The licence will specify the conditions concerning anticipated operational occurrences, accidents and emergency conditions that are required to be reported to the nuclear regulatory body. Such provisions were introduced in the licence granted for the operation of research reactor Maria in 2015.

19.7. Operational experience feedback

According to Article 37c of Atomic Law head of the organizational unit operating NPP will keep records on the day-to-day operation of the nuclear facility; introduce technical and organizational solutions to be able to collect and analyse on an ongoing basis the nuclear facility operating parameters which are important for the nuclear safety and radiation protection, in consideration of the operating experience so far. The licensee is also obliged to regularly forward the nuclear facility operating parameters important for nuclear safety and radiation protection to the PAA’s President**.**

Regulation of the Council of Ministers of 30th August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such practices obliges the licensee to include in the Safety Analysis Report information about the programme of operational experience feedback based on operating experience of the plant and other nuclear facilities, especially those of similar type.

The specifics of this programme are provided by *Regulation of the Council of Ministers of 11th February 2013 on requirements concerning commissioning and operation of nuclear installations*, which also provides several further requirements. In order to ensure a proper level of nuclear safety and radiation protection at the stage of commissioning and at the stage of operation of a nuclear facility, systematic analyses shall be conducted with regard to operating experience, development of international safety requirements, technological developments and new knowledge, and conclusions from these analyses shall be used to improve the safety state of the nuclear facility (paragraph 8.7). During commissioning and operation of the nuclear facility, it shall be verified that the integrated management system has been implemented correctly in the scope of radiation protection and it shall be assessed whether this system meets the set objectives and, if necessary, suitable corrective and updating measures shall be taken to ensure its implementation in the light of operating experience (paragraph 9.3). Program of maintenance, testing, surveillance and inspection of the systems, structures and components of the nuclear facility is subject to periodic reviews on the basis of operating experience (paragraph 37.3). During maintenance, modernization or modification outages of the nuclear facility, the performance of comprehensive assessments should be made to draw conclusions and lessons learned to be used for future maintenance, modernizations and modifications (paragraph 45.2).

Experience from the nuclear facility operation shall be subject to systematic assessment. It shall refer in particular to extraordinary events in the nuclear facility in order to identify their causes. Information resulting from the examination of events important from the viewpoint of nuclear safety or radiation protection and conclusions drawn from this examination shall be submitted to the employees of the nuclear facility. In order to draw conclusions regarding the operation of the nuclear facility, the information shall be obtained and assessed with regard to the operating experience of other domestic and foreign nuclear facilities, especially those of similar type. In order to detect states, situations or deficiencies which could potentially lead to deviations from the normal operation, assigned employees of the nuclear facility shall conduct appropriate analyses of operating experience so that it shall be possible to take necessary countermeasures to prevent such events. Internal procedures which are applicable in the nuclear facility shall oblige the nuclear facility's employees to notify the head of the organizational unit about any events related to nuclear safety or radiation protection and shall also encourage employees to inform about the events which potentially could lead to adverse effects from the viewpoint of nuclear safety or radiation protection. Data on operating experience shall be collected, documented and kept in the manner enabling their easy retrieval and obtaining and performing the evaluation by authorized nuclear facility employees (paragraph 44).

During the 2013 IRRS mission, one of the suggestions was that "*The regulatory body PAA should establish an internal process for using the feedback from operating experience, incidents and accidents in Poland as well as in other countries".*

Since the end of 2013, PAA has gained access to 3 databases consisting records and information about operational experience in various countries. Those are CONEX, CLEARINGHOUSE and IRS databases. Currently, only the IRS base is used as the CONEX database has been merged into IRS. Based on the information provided in the IRS database, a dedicated team in PAA is preparing "quarterly reports on operational experience in NPPs" that are intended mainly for the employees of PAA's Nuclear Safety and Security Department as the opportunity to learn about problems, occurrences, events at NPPs in different phases of the lifetime and regulatory approach in other countries. Every operational experience that

was chosen to be described in the quarterly report is explained and followed by the conclusions ranked in different categories: relating to law changes, regulatory actions, inspections, safety analysis and calculations, regulatory procedures and general observations. IRRS follow-up mission in 2017 closed the suggestion based on reported progress. Since 2017 the process has been furtherly improved.

As Poland is still at the stage before tendering process for a technology vendor, the most important events that are analyzed are those arising during the stage of construction. PAA has found the usage of operational experience databases as a great tool to prepare for upcoming challenges during the Polish Nuclear Power Programme as it allows to learn about problems that may arise, what to consider during inspections and assessments, how vendors, contractors and regulatory bodies respond to problems or events. It also gives the opportunity to attend the annual meetings of database users, which helps to improve international cooperation in the matter of sharing operational experience. In the future, PAA will urge the licensee to participate in international cooperation on sharing operational experience and invite universities and technical support organizations to use the databases.

19.8 Management of spent fuel and radioactive waste on the site

Article 50 of Atomic Law states that Radioactive waste and spent nuclear fuel shall be stored in conditions allowing their segregation and, in a manner, ensuring the protection of humans and the environment. Spent nuclear fuel, after the cooling period in the reactor pool, shall be stored in a wet storage facility (in an aqueous environment) or in a dry storage facility (in an inert gas atmosphere), under conditions ensuring that on the spent nuclear fuel element surface the temperature permissible for a given type of nuclear fuel shall not be exceeded, and preventing the occurrence of self-sustaining nuclear fission reaction (preservation of sub-criticality). Furthermore, the *Regulation on Commissioning and Operation* states that the collection, segregation, processing, movement and storage on the facility site and preparation for transport outside the nuclear facility site of radioactive waste and spent nuclear fuel during the commissioning or operation of the nuclear facility shall be in accordance with the radioactive waste and spent nuclear fuel safe management programme.

Specific requirements for the on-site handling of spent fuel and radioactive waste are listed in the *Regulation of the Council of Ministers of 14th December 2015 on radioactive waste and spent nuclear fuel.*

3. Concluding summary on the fulfilment of the obligations

During the time since the submission of the last National Report, two significant developments occurred in the implementation of the Polish Nuclear Power Programme. On 2nd October 2020, the government of Poland updated the Polish Nuclear Power Program, providing, among other things new schedule for the Program. Please refer to annex 2 for details. Additionally, project company responsible for executing the plans to construct the first Polish NPP - PEJ ltd submitted the Environmental Impact Assessment Report for the first nuclear power plant in Poland to the General Director for Environmental Protection (GDOŚ) on 29th March 2022. The strategic document Polish Nuclear Power Programme included the plans to hire additional staff members by PAA. The strengthening of the regulatory body is one of the main tasks to be performed under the Programme. It is planned that PAA will hire 55 additional staff members in 2022 and 2023. Programme also provided the amounts of funds that will be necessary for strengthening the staff and building PAA's competencies. These funds were reflected in the budget of PAA for 2022 and will be included accordingly in the following years.

Moreover, in 2022, Poland adopted its first "Strategy and policy on the development of nuclear safety and radiation protection of the Republic of Poland". This document reinforces the commitment to nuclear safety by the all stakeholders and provides a course of actions to further increase nuclear safety and radiation protection in the country. PAA has also performed, in 2020, an assessment of its regulatory activities and an analysis of the current legal status in terms of its adequacy and suitability for nuclear safety and radiation protection.

Additionally, as the President of the PAA shall, at least once every ten years, subject the national nuclear safety and radiation protection system to external international review, the PAA will host an IRRS mission in 2023. The last IRRS mission took place in 2013 and was followed up in 2017 when all the recommendations and suggestions were closed. Poland has also hosted the INIR mission in 2013, follow-up in 2016, and IPPAS in 2016. Participation in the Peer Review process was one of the major common issues identified during the 7th Review Meeting. Poland actively participates in international Peer Reviews as evidenced by hosting IRRS, INIR and IPPAS missions. Furthermore, PAA staff members participated in international peer reviews as experts (the IRRS mission in 2019 in Canada, and the IPPAS mission in 2021 in Czech Republic).

Eight more major common issues were identified at the 7th Review Meeting. The President of the 7th Meeting recommended that Contracting Parties consider these issues when preparing their National Reports for the 8th and 9th Review Meeting. Poland has provided the description of actions for each issue as specified in the list of issues provided in the introduction. Taking into account the progress of implementation of the Polish Nuclear Power Programme especially issue 4 on financial and human resources and issue 9 on stakeholder consultation and communication are of greatest importance. Updated Polish Nuclear Power Programme included provision for the financial strengthening of the regulatory body so that PAA can keep its experienced staff and hire additional experts. Thanks to those funds, the work on the development of human resources in PAA is ongoing. Regarding public consultation and communication, significant work is done by all stakeholders – PAA, Ministry of Climate and Environment and PEJ ltd – in their respective areas to inform the public on all matters important to nuclear safety. PEJ has established Local Information Centres in the past and, in 2022, started to organize meetings with local communities to discuss the implementation of the Nuclear Power Programme and its impact on the environment and the communities. Activities of PAA are described in chapter 8.1.9.

During the 7th review meeting of CNS, Poland received two challenges in connection with the legislative framework and safety culture in PAA. First challenge: ”Poland to continue developing its framework to ensure safe implementation of its first nuclear power plant project meeting the harmonized safety expectations (e.g. WENRA safety objectives for new reactors)”. Poland’s legal framework is continuously improved, in 2019, Atomic Law was amended to introduce the provision of two EU directives and the most essential conclusions of the IRRS mission. PAA is also reviewing selected regulations and will prepare drafts that will reflect the newest safety standards and international expectations. Please refer to Article 7.1 for more information.

The second challenge refers to “PAA to continue strengthening its safety culture requiring challenging attitude”. As described in Article 10.1, PAA has made a significant effort to strengthen its safety culture. In December 2021, PAA approved Action Plan on enhancing safety culture in PAA for the years 2022-2023. This document is a medium-term strategy for safety culture development and consists of a list of actions that are taken by PAA. Please refer to Article 10.1 for more information.

Vienna Declaration on Nuclear Safety principles will be one of the fundamentals in implementing the Polish Nuclear Power Programme. In reporting on relevant Articles (14, 17, 18, 19), Poland has presented that supporting Regulations to the Act of Atomic Law are developed based on IAEA Safety Standards, WENRA recommendations and regulations from experienced countries with Nuclear Programmes; therefore, this is a good legal basis for introducing nuclear power in accordance with first and second principles of the Vienna Declaration. Poland will continue this practice in future amendments and in the process of issuing new regulations.

With the planned progression of Polish Nuclear Power Programme upcoming tasks and challenges for the next 3 years include:

- The assessment of the Environmental Impact Assessment Report for the first nuclear power plant in Poland by the General Director for Environmental Protection (GDOŚ). Concurrently the process of transboundary environmental impact assessment will be conducted.
- Selection and contract of the technology for the first Polish NPP.
- According to the schedule it is also expected that PEJ ltd. will apply for the licence for the construction of the first NPP.

Based on the presented evaluation, it can be concluded that **Polish regulations and practices continue to be in compliance with the obligations of the Convention** to the extent applicable to Poland, and further progress is underway in the view of the Polish Nuclear Power Programme. Compliance with the Convention on Nuclear Safety (and other instruments of the international nuclear safety regime) was one of the key criteria when Poland was conducting works on the development of a national legislative and regulatory framework as preparation for introducing nuclear power programme.

Annex no. 1 – Nuclear Installations

Installations (other than defined in the Article 2(i) of the Convention on Nuclear Safety)

Research reactors

The only Polish **operational research reactor „MARIA"** is a high flux **channel-pool type** one, of nominal thermal power of **30 MW** (**first criticality date 18.12.1974**), at present operating at about 20 MW thermal power and mainly used for isotopes production, silicon doping and physical experiments. It was operating at the time of entering into force of the Convention, after an extensive process of upgrading. In the years 1999-2002, a process of conversion from 80% to 36% enriched reactor core fuel was completed. Another conversion from HEU to LEU took place between 2012 and 2015. At this moment, there are only LEU fuel assemblies in the core. The reactor core conversion necessitated the modernization of the fuel channels' cooling systems, which took place in 2013. The main point of this modernization was the replacement of pumps.

The facility, **operated by the National Centre for Nuclear Research NCBJ** (former Institute of Atomic Energy IEA and Institute for Nuclear Studies IPJ merged in 2011), on 31st March 2015, was granted a new licence for operation valid until 2025. The reactor is subject to a process of constant upgrading and accommodation to actual tasks. All principles enumerated in Article 19 concerning its operation are observed. The exchange of experience (Article 9 (vii)) is naturally limited as the reactor's design is very specific. The spent fuel from this reactor is stored in a technological pool connected to the reactor pool inside the reactor building (AR, wet type of storage).

The first research **reactor "EWA"** (pool type) 10 MW_{th} (first criticality date **14.06.1958**), used for isotope production and physical experiments in horizontal channels, was shut down and unloaded of fuel in 1995. Its **decommissioning** process authorized under a general licence issued to its **operator (IEA)** is continued. The spent fuel unloading, decontamination and the majority of dismantling works were performed by IEA before 2002, when the facility was handed over with spent fuel facilities to the newly created State-owned public utility enterprise Radioactive Waste Management Plant (ZUOP). Since the beginning of the 2002 ZUOP has been continuing EWA decommissioning works and operating two separate facilities that used to contain all EWA reactor spent fuel (AFR, wet type of storage), before their repatriation to the Russian Federation within GTRI (see more information below) initiative. **Currently, no spent fuel is stored at the Świerk site besides the one placed in MARIA reactor technical pool.**

The former **critical assembly "ANNA"** (first criticality date **12.01.1963**), **zero-power reactor "AGATA"** (pool type, first criticality date **05.05.1973**) and **small power (100 kW_{th}) reactor "MARYLA"** (pool type, first criticality date **29.12.1963**) long ago had been **permanently shut-down**, unloaded of fuel and **dismantled**.

MARIA and EWA reactors and the spent fuel storage are sited at the nuclear research center in Świerk, where waste treatment and storage facilities for ILW and LLW are also located. High activity spent sealed sources are also temporarily stored at Świerk.

Spent fuel facilities and GTRI

Before the year 2009 spent fuel elements from the MARIA reactor were stored in the MARIA reactor operated by IEA (**AR, wet**) and spent fuel storage facility operated by ZUOP. Spent fuel from the EWA reactor (HEU and LEU fuel) was stored in two spent fuel storages operated

by ZUOP. Within the framework of GTRI Poland implemented RRRFR Programme (Russian Research Reactor Fuel Return Programme). In the years 2009-2016 eight spent fuel shipments were performed and all HEU spent fuel from both EWA and MARIA reactors were shipped back to Russian Federation. At this moment, there is no HEU spent fuel stored in Poland.

Radioactive waste facilities

Radioactive waste of low and intermediate activity produced in Poland is collected, processed, solidified and prepared for disposal by the State-owned public utility ZUOP. ZUOP operates the following installations and facilities at the Świerk site:

- LILW storage tanks for liquid waste,
- treatment station for LILW liquid and solid waste: evaporator and reverse osmosis unit, chemical treatment station (liquid waste), cementation unit, hydraulic press (12 ton),
- temporary storage facility.

At the Różan site, ZUOP operates a surface-type repository, which was initially a military fort, and converted to a repository in 1961. This repository serves for the disposal of low- and intermediate-level waste containing short-lived beta and gamma isotopes, SSRS, as well as temporary storage for long-lived waste. In the first decade of the repository operation, the concrete facilities No. 2, 3 and partially No.1 were filled with not segregated, only partially conditioned waste. Since 1968, short-lived low- and medium-level waste has been disposed of in a part of the dry moat area (facility no. 8), and alpha-bearing waste is being placed in temporary storage in facility no. 1 with the intention of retrieval. In the frame of the PHARE Project performed in the years 2003 and 2004, the safety analysis reports related to respectively the operation, closure and post-closure phase of the Różan facility were also prepared. This project also considered the decommissioning options regarding facilities nos. 2 and 3 at the site, including waste retrieval, repackaging and re-disposal.

Różan repository is currently the only radioactive disposal site available in Poland. According to present expectations, this repository is foreseen to be filled by 2025. It is likely that another site for a national repository for future waste arising will have to be found. The National Plan for the Management of Spent Fuel and Radioactive Waste was adopted in 2015 and fulfilled the obligation imposed by the Council Directive 2011/70/EURATOM. The National Plan was prepared by the Ministry of Economy (now the Ministry of Climate and Environment) and approved by the Council of Ministers. It establishes actions in the scope of responsible and safe management of radioactive waste and spent fuel and ensures effective and safe management of radioactive waste and spent nuclear fuel in Poland. The document covers such issues as:

- siting and construction of the new national radioactive waste repository for low and intermediate-level waste (to be put in operation after the closure of the Różan repository ~ 2025),
- continuation of research and development on deep geological repository undertaken in the late 90s of last century,
- continuation of works connected with the closure of the Różan repository,
- aspects related to radioactive waste coming from nuclear power plants.

Concerning the siting activities for the near-surface repository for low- and intermediate-level waste, the Ministry of Climate and Environment, in cooperation with the National

Environmental Found, has prepared a special project covering such issues as gathering, analysis, verification and evaluation of available archival materials collected as a result of a three-year Strategic Governmental Programme undertaken in 1999, as well as conducting additional research being necessary to enable the selection of the optimal location of LLW/ILW-SL radioactive waste repository. With respect to the closure of the Różan repository, new safety analysis report related to the closure and post-closure phase will be prepared

Uranium mining

Most mining activities took place in the southwest of the country. Mining of ore ended in 1968, and processing was terminated in 1973. There are some 100 dumps, mostly abandoned, of waste rock and ore totaling approximately 1.4 x 10^6 $m^{3,}$ as well as one tailing pond, which remediation project (partly funded by the EC) was finished in 2004.

Annex no. 2 – Implementation of Nuclear Power Programme

Prepared by the Ministry of Climate and Environment

INFORMATION

on the implementation of the nuclear power in Poland

1. Current status of the Polish Nuclear Power Programme

The government of Poland has updated the Polish Nuclear Power Program (PNPP). The document was approved on October 2nd, 2020 and it envisages the construction of 6 units with 6-9 GWe of capacity based on proven, generation III(+) large-scale pressurized water reactors (PWR), operational by 2043. The first nuclear reactor with a capacity of approximately 1-1.5 GWe will be launched by 2033, and the next five every two years until 2043.

The Polish government has also approved the Energy Policy of Poland until 2040 (EPP2040), which sets the framework for the energy transformation in the country. It presents solutions to meet the EU climate and energy goals, such as the commissioning of the first nuclear power plant in the country planned for 2033. Energy Policy of Poland until 2040 reconfirms nuclear power will be a vital part of the Polish energy mix as a reliable source of electricity generation. In accordance with the recently approved – in March 2022 - Principles for the update of the EPP2040, nuclear power generation based primarily on large-scale nuclear reactors (above 1000 MW) will be consistently implemented due to its low sensitivity to fuel supply interruptions and its ability to ensure the supplies of stable and clean energy.

1.1. The project company

The project company, which will be responsible for the execution of the plans to construct the first Polish NPP, has been put into a restructuring and reinforcement process after changes of its ownership. In April 2021, the State Treasury reached an agreement with a consortium of owners (three main electricity utilities, including the biggest one - PGE Group and KGHM – a copper mining company) to take full control of PGE EJ 1. As a result, the company changed its name from PGE EJ 1 to “Polskie Elektrownie Jądrowe sp. z o.o.” – PEJ (Polish Nuclear Power Plants) limited liability company. According to the Regulation of the Council of Ministers dated 4th May 2021, the rights derived from the Company shares are exercised on behalf of the State Treasury by the Government Plenipotentiary for Strategic Energy Infrastructure.

PEJ ltd., the responsibilities of which include preparing the investment process and acting as the Investor in the project, supports the government administration in its efforts to implement the Polish Nuclear Power Programme as well as in the selection of a technology vendor and the related strategic co-investor for nuclear power plants in Poland.

1.2. Site selection

PEJ ltd. submitted the Environmental Impact Assessment Report for the first nuclear power plant in Poland to the General Director for Environmental Protection (GDOŚ) on 29th March 2022. Along with the environmental report, PEJ ltd. has submitted a complete set of documentation for the need of transboundary environmental impact assessment. In parallel, PEJ ltd. has advanced the Site Evaluation Report preparation. Obtaining the Decision

on Environmental Conditions and Location Decision is scheduled for 2022 or 2023 in case of extended transboundary consultations on environmental impact assessment

An investor has also indicated a coastal commune of Choczewo as the preferred site where the first Polish nuclear power plant is to be built. The site named “Lubiatowo-Kopalino” has been chosen on the basis of detailed site investigation and environmental surveys conducted since 2017, on a scale unprecedented in Poland, proving that the site meets all the environmental requirements set out for such facilities and is safe for residents.

1.3. Industrial involvement

In December 2021, the Ministry of Climate and Environment approved the Programme of Support for Domestic Industry‘s Cooperation with the Nuclear Power Sector. The programme contains information on specific actions and a time schedule for their execution. The aim of the program is to develop and set up a range of activities aiming to prepare the local industry for successful participation in the PNPP. The construction of the nuclear power plant can be carried out by Polish companies by up to 70% of the project value – in the case of the second unit and the following ones.

1.4. Legal framework

The Polish government is preparing the necessary legal changes to ascertain those existing regulations do not hinder nuclear development plans. The new legal framework under development would facilitate licensing process for nuclear power plants, in particular by enabling addressing in multiple parallel levels of regulatory approvals. In addition, it would extend some functions of the National Atomic Energy Agency (PAA) in the field of environmental impact assessment of the planned NPPs. These changes are consistent with best practices in major nuclear countries. It will contribute to streamlining administrative procedures associated with preparing and implementing investments in nuclear power facilities and associated investments and it will ensure greater state supervision over the unit implementing the nuclear power facility investment.

Substantial revision of the Nuclear Investment Law and Atomic Energy Act is anticipated to come into force in the 4th quarter of 2022.

1.5. The envisaged project implementation schedule

The upcoming months will be significant for the implementation of the PNPP. It is scheduled, *inter alia*, to select the technology for both nuclear power plants, to obtain the Decision on Environmental Conditions and Location Decision for the first nuclear power plant, as well as to sign the contract with the technology provider and the main EPC contractor.

Nuclear power plants construction schedule according to PNPP:

2022 – selection of technology for NPP1 and NPP2

2022 – obtaining the environmental and location decisions for NPP1

(approval of NPP1 location site choice)

– signing the contract with the technology provider and the main EPC contractor

2023 – commencement of preliminary and preparatory work at NPP1 site

– signing the connection agreement with the TSO for NPP1

– commencement of work on the selection of site location for NPP2

2025 – issuance of the construction licence for NPP1 by PAA President

2026 – obtaining the building permit and commencement of NPP1 construction

2028 – obtaining the environmental and location decisions for NPP2 (approval of NPP2 location site choice)

2029 – commencement of preliminary and preparatory work at NPP2 site

– signing the connection agreement with the TSO for NPP2

2031 – issuance of the construction licence for NPP2 by PAA President

2032 – issuance of the commissioning licence by the PAA President, nuclear start-up and synchronisation of the first reactor at NPP1

– obtaining the building permit and commencement of NPP1 construction

2033 – issuance of the operation licence by the PAA President and commissioning of the first reactor at NPP1

2034 – issuance of the commissioning licence by the PAA President, nuclear start-up and synchronisation of the second reactor at NPP1

2035 – issuance of the operation licence by the PAA President and commissioning of the second reactor at NPP1

2036 – issuance of the commissioning licence by the PAA President, nuclear start-up and synchronisation of the third reactor at NPP2

2037 – issuance of the operation licence by the PAA President and commissioning of the third reactor at NPP1

2038 – issuance of the commissioning licence by the PAA President, nuclear start-up and synchronisation of the first reactor at NPP2

2039 – issuance of the operation licence by the PAA President and commissioning of the first reactor at NPP2

2040 – issuance of the commissioning licence by the PAA President, nuclear start-up and synchronisation of the second reactor at NPP2

2041 – issuance of the operation licence by the PAA President and commissioning of the second reactor at NPP2

2042 – issuance of the commissioning licence by the PAA President, nuclear start-up and synchronisation of the third reactor at NPP2

2043 – issuance of the operation licence by the PAA President and commissioning of the third reactor at NPP2

2. Informative and social activities connected with the introduction of nuclear energy in Poland

As the public support is one of the major challenges for the implementation of any new nuclear power plant throughout the world, efforts to build public awareness have been taken by various stakeholders of the Polish nuclear power program (PNPP). There are two main organizations responsible for public communication of the PNPP - The Ministry of Climate and Environment and PEJ ltd. Both are simultaneously campaigning on the subject, which consists of numerous activities both on the national and local levels.

Communication activities include:

- organization of conferences and webinars related to nuclear power, participation in job fairs,
- publication of educational materials about nuclear power on the Internet, preparation of brochures and leaflets and their distribution to various stakeholder groups, publication of content on nuclear power in the press,
- disseminating knowledge on nuclear power and safe management of radioactive waste at science picnics and science festivals,
- introducing books describing the possibilities of nuclear power in the context of climate change to the Polish reading market,
- preparation of educational films on nuclear power and radioactive waste,
- preparation of accompanying and promotional activities related to the 60th anniversary of the establishment of the National Radioactive Waste Repository in Różan,
- preparation of a thematic exhibition, which was shown at universities in the Pomeranian and West Pomeranian provinces,
- conducting public opinion polls on support for nuclear power in Poland,
- cooperation with non-governmental organizations.

According to the public opinion poll conducted by the Ministry of Climate and Environment in 2021, 74% of Poles support the construction of nuclear power plant in the country, with 20% against and 6% undecided. 58% of respondents would agree to have a NPP built near their homes. The construction of a nuclear power plant is an important issue for Poles because, in their opinion, it will increase Poland's energy security (82%) and help to fight climate change (78%).

Local support in 3 communes - potential sites of the planned first NPP - remains strong and stable. According to the survey conducted by the investor PGE EJ1 (now PEJ ltd.) in 2019 in 2 potential sites (Lubiatowo-Kopalino located in Choczewo commune and Żarnowiec site located in 2 communes: Gniewino and Krokowa) 71% of inhabitants support NPP construction - 2% increase comparing to the year before.

In this context, an important role is played by Local Information Centres, which have been established by PGE EJ1 (now PEJ ltd.) in April 2013 in the three municipalities Choczewo, Krokowa and Gniewino. At the Information Centres the residents and visitors can find information related to the project and nuclear power on a daily basis.

The research and scientific institutes (e.g. National Centre for Nuclear Research - NCBJ, Institute of Nuclear Chemistry and Technology - IChTJ) are also very active in informing on the wide scope of the nuclear energy applications, including electricity generation.

The Ministry of Climate and Environment, PEJ ltd. and NCBJ also make efforts to build a basis for the education on nuclear energy. Direct cooperation with schools and teachers facilitates disseminating knowledge and will benefit in the future since the PNPP is a long-term effort.

3. Human resources development

The main goal of the PNPP in the area of human resources is the development of the staff that guarantees effective and safe construction and operation of the NPPs and, in a later perspective – their decommissioning.

Pursuant to the Article 108a point 4 of the Atomic Law[2] , the minister responsible for energy matters undertakes the activities to ensure the competent human resources for the nuclear power. Moreover, the PNPP includes activity no. 2.1. - Development of human resources for the purposes of nuclear power.

All institutions directly involved in the process of preparation and implementation of the PNPP are obliged to develop human resources for nuclear power. Those institutions are the Ministry of Climate and Environment, the Ministry of Science and Higher Education, the Ministry of Family and Social Policy, National Atomic Energy Agency, Radioactive Waste Management Plant, Office for Technical Inspection, investor and future licensee– PEJ ltd. and other inspection or control authorities.

The main activities carried out by the Ministry of Climate and Environment in the field of human resource development include:

- preparation of applications for submitting 3 new nuclear occupations to the classification of occupations and specializations for the needs of the labour market;
- organization of 6 nationwide on-line training courses devoted to teaching about energy and nuclear power for 340 teachers, incl. physics, chemistry, biology, geography and education for safety and methodology advisers at primary and secondary schools entitled: "How to teach about nuclear energy?";
- organizing a nationwide webinar for 40 primary and secondary school teachers on energy and nuclear power in distance learning;
- organizing and conducting 353 demonstration lessons on energy and nuclear power at 66 primary and secondary schools in 9 voivodeships;
- organizing of the 2nd edition of nationwide competitions of knowledge about nuclear energy for students at secondary schools, in a remote mode, entitled: "NUKLEO";
- organizing 2nd editions of nationwide knowledge competitions about the environmental impact of power engineering for students at primary school grades 7-8, in a remote mode, entitled: "WITH ENERGY FOR THE CLIMATE";
- organizing and carrying out a nationwide educational project in a remote mode, addressed to research clubs at secondary schools and concerning the measurement of radon concentration in rooms, along with the development of a lesson plan for teachers and instructions on how to make the measurement entitled: "SCHOOL RADON MAP OF POLAND"'
- reviewing the education offers of public universities in courses of study related to nuclear energy and power and nuclear medicine in the academic year 2019/2020 and

[2] Atomic Law (Journal of Law of 2021, item. 1941).

also education offers planned by universities in these areas for 2020/2021 and 2021/2022;
- updating the handbook for teachers entitled “I know how to teach about nuclear energy. Guidebook for teachers” with lesson plans to be carried out at school;
- developing a scenario of activities on nuclear energy to be conducted in kindergarten entitled: "Atomic blocks for pre-schoolers”;
- developing cooperation with primary and secondary schools, libraries and VFD units in the local communes of the future nuclear power plant, as well as with Local Information Points of PEJ ltd. and local government authorities in Pomerania;
- cooperation with domestic and technical universities;
- deepening international cooperation with institutions, enterprises, universities and experts from abroad in exchanging good practices in the area of human resources development for the needs of the Polish nuclear power (due to the COVID-19 pandemic mainly on-line);
- monitoring the implementation of the Framework Human Resource Development Plan for the needs of Nuclear Power by the institutions involved in the implementation of the PNPP and preparation of annual reports on the implementation of the plan;
- work on the preparation of the National Human Resource Development Plan for the needs of Nuclear Power, which will be adopted in 2023.

The Framework Plan for human resources development for the needs of nuclear power in Poland was adopted by the Management of the Ministry of Energy on June 26th, 2016. The main objective of the Framework Plan was the creation of an adequate and competent staff by all PNPP’s stakeholders. It is expected that all stakeholders will develop an effective cooperation model in order to utilize the synergy of mutual activities to prepare the necessary human resources maximally based on the national potential. The report on the implementation of the activities of the Framework Plan for the Development of Human Resources for the Purposes of Nuclear Power in 2020 was approved by the Minister of Climate and Environment on the 11th of May 2021.

The elaboration of the properly detailed plan for human resources development requires information on the size of the nuclear project, chosen technology chosen by the investor, as well as the model of cooperation with the vendor concerning the HRD know-how transfer. The Framework Plan was prepared due to the lack of the above knowledge and it will be the base for the preparation of the National Plan for the Development of Human Resources for Nuclear Power, which is scheduled for 2023. The document will take into account the staffing needs of the entities involved in the implementation of projects and the operation of power plants and their ability to satisfy those needs domestically and from abroad, the recruitment system, and career paths. Each public body implementing the nuclear program is expected to prepare its own human resource development plan.

In Poland, there exists an educational and scientific infrastructure that can be used to develop education and training for the needs of nuclear energy. Most of the nuclear sciences specialists are grouped in two large centres:

- Warsaw (Warsaw University of Technology, Warsaw University, National Centre for Nuclear Research, Institute of Nuclear Chemistry and Technology, The Institute of Plasma Physics and Laser Micro fusion or Central Laboratory for Radiation protection);

- Cracow (Jagiellonian University, AGH University of Science and Technology, Cracow University of Technology or The Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Sciences).

Besides, it should be emphasized that several Polish technological schools and universities have opened and led various programs and majors (undergraduate, graduate and doctoral studies) directly connected with nuclear power. There is also well developed scientific and research base in the nuclear field. Many Polish institutes conduct scientific work in the area of nuclear chemistry and physics. Additionally, a research nuclear reactor "MARIA" operated at the National Centre for Nuclear Research in Świerk plays an important role in training for Polish scientific background.

Annex no. 3 – Atomic Law

Summary of the Act of Atomic Law

The Atomic Law Act, initially enacted by the Parliament of the Republic of Poland on 29th November 2000, was amended several times in the years 2001-2019. The last significant amendment, namely the Act of 13th June 2019, amending the Atomic Law and the act on fire protection, entered into force on 22nd September 2019. The Act has been described in detail in the Polish 8th national report as referred to in Article 5 of the Convention on Nuclear Safety. The act was aimed at complementing the national legal framework with the provisions of Council Directive 2013/59/Euratom of 5th December 2013, laying down basic safety standards to protect against risks arising from exposure to ionizing radiation, of Council Directive 2014/87/Euratom of 8th July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations and other issues that need improvement in terms of nuclear safety and radiation protection (essentially the implementation of the recommendations indicated in the 2013 IRRS mission report).

The Act is divided into 20 Chapters:

Chapter 1, entitled *"General provisions",* defines the subject and presents definitions of terms used in the text of the Law.

Chapter 2, entitled *"Licences addressing nuclear safety and radiation protection issues",* lists the activities which require licences or notifications from the point of view of nuclear or radiation safety and activities that are prohibited. It also sets up adequate procedures regarding the licensing and defines the authorities granting licences to perform activities.

Chapter 3, entitled *"Nuclear safety, radiation protection and health protection of workers",* places the responsibility for nuclear safety and radiation protection on the head of the organizational unit pursuing the activities involving exposure and defines the scope of this responsibility, in particular in a case of ceasing activity. It formulates the requirement for justification of such activities, as well as a number of other requirements, such as supervision and inspection, the imperative to follow the "optimization principle" with regard to exposures, adequate training of workers, authorization of persons working on certain positions and performing certain activities important from the nuclear safety and radiation protection point of view, radiological safety of individuals in cases of medical exposures, occupational exposures and radiation protection of workers and external workers, and their rights. This chapter also specifies the conditions for carrying out actions aimed at elimination of radiation emergency consequences, maintaining the central register of doses received by individuals, categorization of radiation workers (categories A and B) and requirements concerning dosimetric equipment. Finally, it introduces provisions regarding exposure to indoor radon and a system of subsidizing certain activities in the area of nuclear and radiation safety from the State budget.

Chapter 3a, entitled *"Medical application of ionizing radiation",* enumerates medical applications of ionizing radiation and formulates principles of carrying on activities that involve patient's exposure to ionizing radiation, in particular – mandatory justification of exposure and optimization of radiation protection. It places responsibilities for patient exposure on the authorized medical practitioner and relevant responsibilities and duties in the area of inspection and clinical audits - on medical institutions. It defines principles and requirements for quality management system in radio-diagnostics, invasive radiology, nuclear medicine and radiotherapy, including the reference radiological procedures for standard medical exposures,

the terms of issuance of relevant permits and authorizations and the authorities competent for granting them. Finally, it formulates the scope and terms of the creation of the National Radiation Protection Centre in Medicine and the central database for medical radiation facilities.

Chapter 4, entitled *"Nuclear facilities",* places the responsibility for assuring nuclear safety, radiation protection, physical protection and nuclear material safeguards on the head of the organizational unit which holds the licence for construction, commissioning, operation or decommissioning of a nuclear facility. For the process of construction of a nuclear facility, the scope of these requirements is extended to other participants in the investment process, the obligations of the head of the organizational unit notwithstanding. This chapter also addresses the fundamental conditions that must be met by a nuclear facility design, the questions of licensing and regulatory review in the stages of construction, operation and decommissioning of nuclear facilities and establishing of the restricted areas around such facility, the information duties of the head of a nuclear facility and the PAA President concerning nuclear safety and radiation protection issues, as well as formulate the right for the PAA President to curtail or suspend the operation of nuclear facility when nuclear safety may be endangered. The nuclear facility (at a stage of construction, commissioning, operation and decommissioning) is required to adopt an integrated management system that, among the others, must include a quality assurance programme. One of the most important licence prerequisites for the applicant is to possess the appropriate financial means required to ensure:

- fulfilment of the requirements of nuclear safety, radiation protection, physical protection and nuclear material safeguards during the respective stages of operation of a nuclear facility until decommissioning is completed; specifically, the operator of a nuclear power plant has to establish a special fund to cover the costs of the final management of radioactive waste and of the decommissioning costs;
- for the licence for construction – completion of the construction of a nuclear facility.

Chapter 4a, entitled "Public communication pertinent to nuclear power facilities", contains provisions to establish Local Information Centres, Local Information Committees and Municipal Information Points, which are meant, among others, to provide information on a nuclear power facility and to monitor the activities of the operator.

Chapter 4b, entitled "Strategy and policy on the development of nuclear safety and radiation protection", contains provisions to establish nuclear safety and radiation protection strategy, which determines, in particular: the purposes of the nuclear safety and radiation protection strategy, the description of the legal framework for nuclear safety and radiation protection and description of the current state of nuclear safety and radiation protection; the principles of nuclear safety and radiation protection; the courses of actions aimed to develop nuclear safety and radiation protection. The first strategy was adopted by the Council of Ministers on 12th April 2022..

Chapter 5, entitled "Nuclear materials and technologies", formulates requirements for adequate nuclear materials accountancy and their physical protection as well as for appropriate control of nuclear technologies (as required by appropriate international agreements and conventions). In particular, it includes a prohibition of the use of these materials and technologies to construct nuclear weapon or nuclear explosives; any scientific research in this area is subject to notification to the PAA President prior to their commencement. It also defines other PAA President's duties and responsibilities in this area, as well as the obligations of the heads of units performing activities with nuclear materials and

of other users of lend or buildings where such an activity could be possible, in connection with inspections performed by PAA, IAEA or EURATOM inspectors. The chapter contains provisions for the development of the Design Basis Threat

Chapter 6, entitled “Ionizing radiation sources”, formulate requirements for the accountancy and inspection regarding radioactive sources and equipment containing such sources or generating ionizing radiation. It also includes the requirement of appropriate protection of radioactive sources against damage, theft or possession by an unauthorized person.

Chapter 7, entitled “Radioactive waste and spent nuclear fuel”, classifies radioactive wastes, states the responsibilities of the head of the organizational unit which is handling wastes, and addresses the questions of wastes disposal, including provisions on siting of waste repositories and of the necessary protection of humans and the environment. The amended Atomic Law introduced provisions that the organizational unit which has generated the radioactive waste or the spent nuclear fuel is held responsible for ensuring that it is possible to manage the radioactive waste and the spent nuclear fuel from the moment of their generation until their disposal at the repository, including for financing of this procedure and coverage of the related disposal costs, altered the principles of classification, storage, disposal and keeping records of radioactive waste and spent nuclear fuel. With regard to the classification of radioactive waste, the notion of activity level or dose rate on the surface of waste material has been replaced by a criterion of radioactive concentration of radioisotopes the former contain.

Chapter 8, entitled “Transport of nuclear materials, ionizing radiation sources, radioactive wastes and spent nuclear fuel”, formulates requirements for safe transporting of such materials and regulates the issues of their import, export and transit through the Polish territory, as well as on reporting of these activities to the PAA President;

Chapter 8a, entitled “Import, export and transit through the territory of Republic of Poland of radioactive waste and spent nuclear fuel”, establishes formal and organizational conditions connected with the procedure of licensing the above-mentioned activities.

Chapter 9, entitled “Control and inspection from the viewpoint of nuclear safety and radiation protection conditions”, allocates the control and inspection responsibilities to appropriate authorities, formulates these responsibilities as well as the rights of the regulatory authorities, introduces enforcement measures, and establishes qualification requirements with regard to nuclear regulatory inspectors;

Chapter 10, entitled “National radiation situation assessment”, obliges the PAA President to conduct systematic assessments of the national radiation situation and formulates requirements thereof, including the use for these purposes of a dedicated Radiation Emergency Centre established within the PAA and receiving appropriate data from “stations” and “units” serving for early detection of radioactive contamination (the list of such “stations” and “units” has been established by means of the Governmental regulation) and operates the International Contact Point for early warning and information exchange with IAEA, EU and other Countries in a case of a radiation emergency. It also obliges the PAA President to provide information to the general public, regional governors, Council of Ministers and/or to the chairman of the appropriate crisis management team at the national level.

Chapter 11, entitled “Radiation emergency management”, introduces the distinction between different types of radiation emergencies and lists the actions to be undertaken in case of such emergencies, as well as formulates the responsibilities on all levels. It refers to the national emergency preparedness plan established through a Governmental regulation and sets up

rules for the implementation of specific intervention measures (including the issue of costs to be borne in such cases). It also formulates a requirement to conduct periodic exercises to test the national emergency preparedness plan and addresses the questions of protection against the use of food and feeding stuffs that exceed the permitted levels of radioactive substances contents, both produced within the Polish territory or imported;

Chapter 12, entitled “Civil liability for nuclear damage”, allocates the responsibility for nuclear damage caused to individuals, property and the environment to the operator and limits its liability to 300 million SDR, allows the operator to establish a limited liability fund in a case when claims exceed this figure, obliges the operator to be insured (also in case of the transport of nuclear material from a nuclear facility), sets the minimal guaranteed amount of insurance and procedures for claiming the compensation, sets time limits for suing for the damage, and locates the competence in the issues of nuclear damage.

Chapter 12a, entitled “Activities pertinent to the development of nuclear power”, describes the activities of the minister competent for energy matters in the field of the use of atomic energy for the social and economic needs of the state, especially aimed at the development of nuclear power programme. In particular, this chapter contains provisions for developing, approving and updating a long-term programme called “the Polish Nuclear Power Programme”.

Chapter 13, entitled “The President of the National Atomic Energy Agency”, states that the President of the PAA is the central organ of the governmental organization and is appointed for a term of five years by the Prime Minister to whom he reports directly, on request by the Minister competent for climate matters, who supervises PAA administratively. The President of PAA can only be removed from the office by the Prime Minister before the end of the term for causes stipulated in the Atomic Law Act. The President executes his tasks (which are listed in Art. 110 of the Atomic Law) through the National Atomic Energy Agency, the statute of which is to be issued by the Minister competent for climate matters. In addition, this chapter introduces a PAA President’s consulting and opinion-giving body, the Council for Nuclear Safety and Radiation protection, which is appointed by the Minister competent for Climate matters upon the opinion of the President of the PAA.

Chapter 14, entitled “State-owned public utility “Radioactive Waste Management Plant”, establishes the above-named plant as a legal personality while the supervision over the plant is placed under the responsibilities of the minister competent for energy matters, which provides the plant with a statute. This chapter specifies, inter alia, that the utility receives a subsidy from the national budget for radioactive waste and spent fuel management.

Chapter 15, entitled “Penal regulations”, introduces financial penalty or other means of punishment for cases of violations of rules established by this Law.

Chapter 16, entitled “Transitional, adaptive and final provisions”, formulates detailed conditions for the enactment of this Law.

Annex no. 4 – List of regulations

Executive Regulations to the Act of Atomic Law

1. Regulation of the Council of Ministers of 11th February 2013 on requirements concerning commissioning and operation of nuclear facilities (*Dz. U. z 2013 r., poz. 281*)
2. Regulation of the Council of Ministers of 11th February 2013 on nuclear safety and radiation protection requirements for the decommissioning phase of nuclear facilities and on the content of a nuclear facility decommissioning report (Dz. U. z 2013 r., poz. 270)
3. Regulation of the Council of Ministers of 10th October 2012 on the amounts of contributions to cover the costs of spent nuclear fuel and radioactive waste disposal and the costs of nuclear power plant decommissioning by organizational unit authorized to operate a nuclear power plant (*Dz. U. z 2012 r., poz.1213*)
4. Regulation of the Council of Ministers of *31st* August 2012 on nuclear safety and radiation protection requirements which must be fulfilled by a nuclear facility design (*Dz. U. z 2012 r., poz. 1048*)
5. Regulation of the Council of Ministers of *31st* August 2012 on the scope and method for the performance of safety analyses performed before applying for a nuclear facility construction licence and on the scope of the preliminary safety analysis report for a nuclear facility (Dz. U. z 2012 r., poz.1043)
6. Regulation of the Council of Ministers of 10th August 2012 on detailed scope of assessment with regard to land intended for the location of a nuclear facility, requirements concerning siting report for a nuclear facility (Dz. U. z 2012 r., poz.1025)
7. Regulation of the Council of Ministers of 10th August 2012 on activities important for nuclear safety and radiation protection in an organizational unit conducting activity which consists in commissioning, operations or decommissioning of a nuclear power plant (Dz. U. z 2012 r., poz. 1024)
8. Regulation of the Council of Ministers of 5th March 2021 on the position important for ensuring nuclear safety and radiation protection (Dz. U. poz. 765))
9. Regulation of the Council of Ministers of 5th March 2021 on radiation protection inspectors (Dz. U. z 2022 r., poz. 640)
10. Regulation of the Council of Ministers of 11th August 2021 on nuclear regulatory inspectors (Dz. U., poz. 1577)
11. Regulation of the Minister of Economy of 23rd July 2012 on detailed rules and conditions for the establishment and operation of Local Information Committees and on the cooperation in the field of nuclear power facilities (Dz. U. poz. 861)
12. Regulation of the Council of Ministers of 27th December 2011 on periodical safety review of a nuclear facility (Dz. U. poz. 556)

13. Regulation of the Council of Ministers of 26th March 2012 on the special purpose subsidy awarded to ensure national nuclear safety and radiation protection while using ionizing radiation (Dz. U. poz. 394 as amended)
14. Regulation of the Council of Ministers of 27th December 2011 on the standard quarterly report on the amount of decommissioning fund payment (Dz. U. z 2021 r., poz. 393)
15. Regulation of the Minister of Environment of 18th November 2011 on the Council for Nuclear Safety and Radiation protection (Dz. U. Nr 279, poz. 1643)
16. Regulation of the Minister of Climate of 27th August 2020 on the standard official id unit document of nuclear regulatory inspector (Dz. U. poz. 1518)
17. Regulation of the Minister of Health of 29th September 2011 on psychiatric and psychological tests of employees performing activities important for nuclear safety and radiation protection (Dz. U. Nr220, poz. 1310)
18. Regulation of the Minister of Finance of 14th September 2011 on value of the minimum guaranteed amount of the third-party liability insurance for the operators of nuclear devices (Dz. U. Nr. 206, poz. 1217)
19. Regulation of the Minister of Interior and Administration of 13th April 2011 on the list of border crossings through which nuclear materials, radioactive sources, devices containing such sources, radioactive waste and spent nuclear fuel may be imported into and exported from the territory of the Republic of Poland (Dz. U. Nr. 89, poz. 513)
20. Regulation of the Minister of Health of 18th February 2011 on conditions for the safe use of ionizing radiation for all types of medical exposure (Dz. U. z 2017, poz. 884, as amended)
21. Regulation of the Prime Minister of 8th January 2010 on the procedures for the supervision and inspection by nuclear regulatory authorities in the Internal Security Agency, the Intelligence Agency and the Central Anticorruption Bureau (Dz. U. z 2017 r., poz. 55)
22. Regulation of the Council of Ministers of 21st October 2008 on the authorization and approval for import into the territory of the Republic of Poland, export from the territory of the Republic of Poland and transit through this territory radioactive waste and spent nuclear fuel (Dz. U. Nr 219, poz. 1402)
23. Regulation of the Council of Ministers of 4th November 2008 on physical protection of nuclear material and nuclear facilities (Dz. U. Nr 207, poz. 1295)
24. Regulation of the Minister of Health of 27th August 2020 on ordering non-medical exposures related to employment or insurance (Dz. U. poz. 1568)
25. Regulation of the Minister of Climate of 18th September 2020 on the allocated and special purpose subsidy, fees and the content of the annual material and financial plan of a state public utility ‘Radioactive Waste Management Plant' (Dz. U. poz. 1624)
26. Regulation of the Council of Ministers of 20th February 2007 on the requirements for controlled and supervised areas (Dz. U. z 2022 r., poz. 722)

27. Regulation of the Council of Ministers of 10th March 2021 on cases in which the performance of activities related to exposure to ionizing radiation from natural radioactive isotopes does not require notification (Dz. U. poz. 627)
28. Regulation of the Minister of the Interior and Administration of 22nd April 2021 on the scope of information included in order for non-medical exposures with the use of radiological devices related to immigration, assessment of the age of people and identification of objects hidden in the human body (Dz. U. poz. 817)
29. Regulation of the Council of Ministers of 25th May 2021 on the requirements for the individual dose registration (Dz. U., poz. 1053)
30. Regulation of the Council of Ministers of 25th May 2021, on the analysis of hazards from activities related to exposure to ionizing radiation and the form in which the conclusions from the analysis of hazards are presented (Dz. U. poz. 1059)
31. Regulation of the Minister of Health of 18th October 2021 on the form and detailed scope of model medical radiology procedures for standard medical exposures and detailed medical radiology procedures (Dz. U. z 2021 r., poz. 1920)
32. Regulation of the Council of Ministers of 30th November 2020 on the types of intervention measures introduced in the external zone and the values of operational intervention levels constituting the basis for the implementation of these measures in the external zone (Dz. U. poz. 2247).
33. Regulation of the Council of Ministers of 17th December 2020 on building materials for which the activity concentrations of K-40 radioactive isotopes, radium Ra-226 and thorium Th-232 shall be determined, detailed requirements for making these determinations and activity concentration index, the exceeding of which is notified to the competent authorities (Dz. U. z 2021 r. poz. 33)
34. Regulation of the Minister of Health of 22nd December 2006 on the supervision and control of observance of terms of radiation protection in the organizational units using x-ray devices for medical diagnosis, interventional radiology, surface radiotherapy and radiotherapy of non-malignant diseases (Dz. U, z 2007 r., poz. 11)
35. Regulation of the Minister of Health of 21st August 2006 on detailed safety requirements for work involving radiological devices (Dz. U., poz. 1325)
36. Regulation of the Council of Ministers of 12th July 2006 on detailed safety requirements for work involving ionizing radiation sources (Dz. U. z 2022 r. poz. 967)
37. Regulation of the Council of Ministers of 25th May 2021 on the emergency plans for radiation emergency (Dz. U. poz. 1086, poz. 1086),
38. Regulation of the Council of Ministers of 27th April 2004 on intervention levels for various intervention measures and criteria for cancelling intervention measures (Dz. U. Nr 98, poz. 987)
39. Regulation of the Council of Ministers of 27th April 2004 on the determination of entities competent to inspect maximum permitted levels of radioactive contamination of foodstuffs and feeding stuffs following a radiation event (Dz. U. Nr 98, poz. 988)

40. Regulation of the Council of Ministers of 30th November 2020 on the protection against ionizing radiation of outside workers exposed during their activities in controlled areas (Dz. U. poz. 2313)
41. Regulation of the Council of Ministers of 27th April 2004 on prior information to the general public in the event of a radiation emergency (Dz. U. Nr 102, poz. 1065)
42. Regulation of the Council of Ministers of 17th December 2002 on the stations for early detection of radioactive contamination and on the units that conduct measurements of radioactive contamination (Dz. U. Nr 239, poz. 2030)
43. Regulation of the Council of Ministers of 23rd December 2002 on the requirements for dosimetric equipment (Dz. U. Nr 239, poz. 2032)
44. Regulation of the Council of Ministers of 14th December 2015 on radioactive waste and spent nuclear fuel (Dz. U. poz. 2267, as amended)
45. Regulation of the Council of Ministers of 3rd August 2021 on the documents required with the application for the licence for activities involving the exposure to ionizing radiation or with the registration of such activities (Dz. U. poz. 1667)
46. Regulation of the Council of Ministers of 10th March 2021 on the cases when the exposure to ionizing radiation is exempted from mandatory licensing, registration or notification, and on the cases when such activities can be conducted on the basis of a notification (Dz. U. poz. 796)
47. Regulation of the Council of Ministers of 14th December 2015 on periodical safety review of a nuclear waste repository (Dz. U. z 2016 r. poz. 28)
48. Regulation of the Minister of Health of 6th March 2020 on training in the field of patient radiation protection (Dz. U. z 2022 r. poz. 851)
49. Regulation of the Minister of Health of 8th June 2020 on the scope of information kept in the Central Register of Data on Medical Exposures (Dz. U. poz. 1051)
50. Regulation of the Minister of Health of 18th June 2020 on areas where the average annual radioactive concentration of radon in the indoor air in a significant number of buildings may exceed the reference level (Dz. U. poz. 1139)
51. Regulation of the Council of Ministers of 11th August 2021, on the indicators used to determine ionizing radiation doses used in assessment of exposure (Dz. U. poz. 1657)
52. Regulation of the Minister of Health of 13th September 2021 on the minimum requirements for healthcare entities carrying out medical exposure activities involving the provision of health services in the field of X-ray diagnostics, interventional radiology or diagnostics involving administration of radiopharmaceutical products to patients (Dz. U. poz. 1725)
53. Regulation of the Minister of Health of 14th October 2021 on the minimum requirements for healthcare entities carrying out medical exposure activities involving provision of health services in the field of radiotherapy and treatment with radiopharmaceutical products (Dz. U. poz. 1890).

54. Regulation of the Minister of Health of 18th October 2021 on the form and detailed scope of model medical radiology procedures for standard medical exposures and detailed medical radiology procedures (Dz. U. poz. 1908)
55. Regulation of the Council of Ministers of 1st October 2021 on the security of radioactive sources (Dz. U. poz. 1958)
56. Regulation of the Minister of Health of 19th October 2021 on the information kept in the National Database of Radiology Equipment (Dz. U. poz. 1959)