ENSREG
European Nuclear Safety Regulators Group

Report of the European Nuclear Safety Regulators Group (ENSREG)

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CONTENTS

EXECUTIVE SUMMARY

This seventh report from the European Nuclear Safety Regulators Group (ENSREG) covers activities carried out in 2020 and 2021.

As an expert advisory group to the European Commission, ENSREG's priorities include promoting the highest nuclear safety standards and ensuring continuous improvement in nuclear safety and in the safe management of spent fuel and radioactive waste while maintaining full openness and transparency to the public and key stakeholders.

The main work carried out by ENSREG and its three working groups on nuclear safety, waste management, and communication and transparency during the period covered by this report included:

- Monitoring, together with the Commission, any potential impacts of the Covid-19 pandemic in 2020-2021 on nuclear safety, including steps taken by regulators and in EU Member States in view of preparedness planning to ensure the continued safety of nuclear installations in the face of pandemic.
- Finalisation of the first topical peer review on ageing management and preparation of the second topical peer review. All countries that participated in the first topical peer review updated their national action plans. ENSREG issued a status report on the progress of follow-up of both national action plans and the EU-level actions. ENSREG also decided on the topic and scope of the second topical peer review that will be on fire protection at nuclear installations and approved the overall process document. At the same time, work on the preparations of the terms of reference, the technical specifications and the stakeholder engagement plan commenced.
- Following the implementation of the post-Fukushima stress tests national action plans, ENSREG's working group 1 prepared a summary report, based on the updated national action plans submitted at the end of 2019 / early 2020. It was adopted by ENSREG in November 2020. Relevant Member States submitted a further updated national action plan at the end of 2021. By the end of 2021, a few actions remained under implementation from the post-Fukushima stress tests in five participating Member States, most of which were completed by the end of 2022. The delays in the implementation of the actions were mainly due to unforeseen factors, such as changes in measures or facility plans, difficulties in the supply chain, additional safety measures/analyses requested by the regulator, unexpected delays caused by administrative and public procurement procedures or priority given to other plant modifications improving the overall safety of the plant. The national nuclear safety regulators determine the acceptability of delays versus the overall safety improvement activities. A prudent implementation of the measures is considered more important than rapid implementation alone, thus ensuring that nuclear safety is not compromised despite the delayed implementation of certain actions. The next summary report will be prepared and published in 2024.
- Supporting the carrying out of Integrated Regulatory Review Service (IRRS) and Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) peer reviews in coordination with the International Atomic Energy Agency (IAEA), including ensuring the availability of a sufficiently large European pool of experts. ENSREG members also participated in reviews with the IAEA to seek greater efficiency and synergies between both programmes. At the end of 2021, the first cycle of IRRS peer reviews had been performed in all but one EU Member States as per Article 8e (1) of the Council Directive 2009/71/Euratom establishing a Community framework for the safety of nuclear installations, amended by Council Directive 2014/87/Euratom.
- Carrying out and following up nuclear stress tests in EU neighbouring countries. ENSREG completed the peer review on the implementation of the Belarusian stress test national action plan for the Astravets nuclear power plant. In addition, the peer

review process for stress test national report for the Akkuyu nuclear power plant in Türkiye was launched at the end of 2021. The ENSREG report on the implementation of the Armenian stress test national action plan for Metsamor nuclear power plant was endorsed. During this period, ENSREG also decided to set up a dedicated Board for Stress Tests in Third Countries for supervising all stress test peer review exercises in neighbouring countries. The Board started its work in September 2020.

1. INTRODUCTION

This is the seventh report on European Nuclear Safety Regulators Group's (ENSREG's) activities since it was established in May 2007. Issued every 2 years since 2009, these reports are intended to inform the Council of the EU and European Parliament of ENSREG's work to improve the safety of nuclear installations and spent fuel and radioactive waste management in EU Member States.

1.1. Nuclear safety in the EU

The establishment of the European Atomic Energy Community (Euratom) in 1957 formed the basis for nuclear energy policy in Europe. Its main functions consist of furthering cooperation in the field of research, protecting the public by establishing common safety standards, ensuring an adequate and equitable supply of ores and nuclear fuel, monitoring the peaceful use of nuclear material, and cooperating with other countries and international organisations.

Each Member State is fully responsible for deciding on its energy policy and related energy mix. During the period covered by this report, 13 out of 27 Member States used nuclear energy to generate power.

In 2022, there were 103 nuclear power reactors in operation in the EU, with an average age of 35 years. Many nuclear operators are facing the choice between either moving to a long-term operation regime or shutting down and decommissioning. Several Member States are planning new reactors, with three currently under construction in two Member States and one under commissioning in Finland. In addition, applications for construction licences have been submitted for three reactors in two Member States. In addition to power reactors, a broad range of fuel cycle plants (from conversion to reprocessing and final disposal of radioactive waste) are in operation in the EU.

Many Member States also operate research reactors and all use radioactive sources in medicine or industry. As a result, all Member States generate radioactive waste to a greater or lesser extent, with the bulk coming from nuclear power generation and associated activities. In Europe, the management of radioactive waste, including its transport, has reached a mature stage of development. However, establishing disposal facilities for intermediate, high-level and long-lived waste remains a major challenge for the future. The first European facility for the geological disposal of spent nuclear fuel is expected to enter into service by 2025 in Olkiluoto, Finland.

1.2. ENSREG – establishment

In May 2007, the Council supported the establishment of a high-level group at EU level to define a common approach to the safety of nuclear installations, the management of spent fuel and radioactive waste and the financing of the decommissioning of nuclear installations. The group was established by a Commission Decision in July 2007[1] as the European High Level Group on Nuclear Safety and Waste Management and was later renamed as European Nuclear Safety Regulators Group.

ENSREG is composed of senior representatives of the EU Member States' regulatory or safety authorities competent in the areas of the safety of nuclear installations and the safe management of spent fuel and radioactive waste[2]. Several non-EU countries (Norway, Switzerland, Türkiye, Ukraine, United Kingdom) and international organisations (European Council, the International Atomic Energy Agency (IAEA), OECD Nuclear Energy Agency (OECD NEA), Western European Nuclear Regulators Association (WENRA) have observer status in ENSREG. Ukraine joined the group as observer in January 2021. Following Brexit, United Kingdom's membership in the group was terminated as of 1 January 2021 and, based

[1] Commission Decision of 17 July 2007 on establishing the European High Level Group on Nuclear Safety and Waste Management: http://www.ensreg.eu/sites/default/files/HLG(2007)1.1.P.pdf.

[2] http://www.ensreg.eu/members-glance/national-regulators

on the negotiated Euratom/UK Nuclear Cooperation Agreement, the UK was formally invited and became an observer in ENSREG as of May 2021. Belarus had an observer status in ENSREG until March 2022 when its observer status was suspended following Belarus support to Russia's illegal war in Ukraine.

ENSREG's main goal is to continuously improve nuclear safety in the operation of nuclear facilities and to promote and adopt the relevant regulatory framework in order to deploy an appropriate safety policy. ENSREG is committed to encouraging initiatives to improve nuclear safety, the safe management of spent fuel and radioactive waste across the EU where these initiatives add value to activities already undertaken at national and international level.

ENSREG also provides a platform for sharing best practice and technological improvements.

1.3. ENSREG – purpose and structure

As an expert advisory group to the Commission, ENSREG works to:

- improve the cooperation between Member States on issues of nuclear safety and safe management of spent fuel and radioactive waste;
- improve the overall openness and transparency in these fields; and
- advise the Commission on additional EU rules in these fields.

ENSREG currently has three working groups to carry out its work programme (see item 1.8):

- **Working Group 1 (WG1)** – Improving Nuclear Safety Arrangements and International Cooperation;
- **Working Group 2 (WG2)** – Improving Radioactive Waste Management, Spent Fuel and Decommissioning Arrangements;
- **Working Group 3 (WG3)** – Improving Transparency Arrangements.

The three working groups consist of designated representatives from ENSREG members; their secretariat is ensured by the Commission. IAEA participates as observer in WG 1. IAEA, OECD-NEA and UK participate as observers in WG 2. Switzerland participates as an observer in WG 3. The groups meet as necessary, but generally at least twice a year. They interact as required and when necessary with each other. Their chairs report to ENSREG at each regular plenary meeting. They advise and prepare proposals for endorsement by the ENSREG plenary and coordinate several ENSREG activities. Their activities are reviewed periodically to ensure that they include any requests or tasks allocated by ENSREG.

1.4. National responsibility for nuclear safety

The national responsibility of Member States for the safety of nuclear installations is the fundamental principle on which nuclear safety regulation has been developed. The prime responsibility for the safety of a nuclear installation lies with the licence holder under the supervision of national competent regulatory authority established in each EU Member State. All Member States follow the international principles for ensuring nuclear safety and the safe management of radioactive waste and spent fuel set out in the **Convention on Nuclear Safety**[3] and the **Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management**[4]. They are also subject to the relevant EURATOM legislation, notably the Council Directive 2009/71/Euratom establishing a Community framework for the safety of nuclear installations (OJ L 172, 2.7.2009, p. 18–22), amended by Council Directive 2014/87/Euratom (OJ L 219, 25.7.2014 p. 42–52) – hereinafter referred to in the report as '**Amended Nuclear Safety Directive'**[5]; Council Directive

[3] Convention on Nuclear Safety | IAEA
[4] Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management | IAEA
[5] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02009L0071-20140814

2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (OJ L 199, 2.8.2011, p.48-56) – hereinafter referred to in the report as '**The Radioactive Waste and Spent Fuel Management Directive'**[6]; and Council Directive 2013/59/EURATOM laying down basic safety standards for protection against dangers arising from exposure to ionising radiation (OJ L 13, 17.1.2014, p. 1-73) – hereinafter referred to in the report as '**Basic Safety Standards Directive'**[7]. The requirements applied in each country are also developed based on international guidance on best practices.

1.5. International safety conventions

All Member States and Euratom are Contracting Parties to the **Convention on Nuclear Safety (CNS)** and the **Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention).**

The **CNS** was adopted in Vienna in June 1994 and entered into force in October 1996. Its aim is to achieve higher levels of safety that will be developed and promoted through regular meetings. It obliges Contracting Parties to submit reports on the implementation of their obligations for "peer review" at these meetings.

The obligations of the participating states cover the siting, design, construction and operation of nuclear power plants as well as the availability of adequate financial and human resources, the assessment and verification of safety, quality assurance and emergency preparedness.

The CNS requires Contracting Parties to submit reports on the implementation of their obligations for peer review every 3 years. The Convention's Eighth Review Meeting was planned to be held from the end of March to the beginning of April 2020, but was initially postponed to March 2021. Due to the Covid-19 pandemic, the meeting could not take place in 2021 and it was decided to merge it with the next Review Meeting. For this reason, a Joint Eighth and Ninth Review Meeting was held in March 2023.

The **Joint Convention** was adopted in September 1997 and entered into force in June 2001. It applies to spent fuel and radioactive waste resulting from civilian nuclear reactors and civilian applications. It also applies to spent fuel and radioactive waste from military or defence programmes if such materials are transferred permanently to and managed within exclusively civilian programmes, or when declared as spent fuel or radioactive waste for the purpose of the Convention by the Contracting Party.

The Joint Convention also applies to planned and controlled releases into the environment of liquid or gaseous radioactive materials from regulated nuclear facilities and other facilities using radioactive material, including naturally occurring radioactive materials waste from the nuclear fuel cycle.

As with the CNS, the Joint Convention requires participating states to submit reports every 3 years for peer review on the implementation of their obligations. The Seventh Review Meeting was postponed from 2021 to 2022 due to the pandemic and took place in June 2022.

1.6. Euratom legislation

The amended Nuclear Safety Directive

The goal of improving the safety of nuclear power plants is to prevent nuclear accidents and, should an accident occur, to mitigate its consequences on the population and minimise the long-term impact off-site.

On 25 June 2009, the EU adopted **Council Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations**, which provides binding legal force to the main international nuclear safety principles. The Directive aims to

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32011L0070
[7] https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32013L0059

maintain and promote the continuous improvement of nuclear safety. It also seeks to ensure that Member States provide for appropriate national arrangements for a high level of nuclear safety to protect workers and the general public against the dangers of ionising radiations from nuclear installations.

The Nuclear Safety Directive was amended and strengthened in 2014 (by Council Directive 2014/87/Euratom) taking into account the lessons learned from the Fukushima nuclear accident and the EU nuclear stress tests[8] carried out in 2011 and 2012 to review the safety of all EU nuclear plants (coordinated by ENSREG). The stress tests specifications were built upon the safety reference levels of the Western European Nuclear Regulators Association (WENRA) and the IAEA safety standards.

The amended Nuclear Safety Directive requires EU Member States to give the highest priority to nuclear safety at all stages of the lifecycle of a nuclear installation. This includes carrying out safety assessments before building new nuclear installations, including nuclear power plants, and identifying and implementing reasonably practicable safety improvements in a timely manner for existing installations. Specifically, the amended Directive:

- strengthens the role of national regulatory authorities by ensuring their effective independence from undue influence in its regulatory decision making. EU Member States must provide the regulators with sufficient legal powers, staff, and financial resources;
- requires EU Member States to perform regular self-assessments and invite international peer reviews of their national programme, national framework and competent regulatory authority at least every 10 years;
- creates a system of topical peer reviews (TPR). EU Member States choose a common nuclear safety topic every 6 years and organise a national safety assessment on it. They then submit their assessment to other countries for review. The findings of these peer reviews are made public;
- requires that the licensee reassesses systematically and regularly at least every 10 years the safety of the nuclear installation;
- increases transparency by requiring operators of nuclear power plants to release information to the public, both in times of normal operation and in the event of incidents.

Moreover, the amended Directive introduces an ambitious EU-wide Nuclear Safety Objective (Articles 8a-c of the amended Directive) for all types of nuclear installations. The new safety objective requires that nuclear installations be designed, sited, constructed, commissioned, operated and decommissioned to prevent accidents and, should an accident occur, to mitigate its consequences and avoid early or large radioactive releases[9]. As for existing nuclear installations, this objective enshrines the principle of continuous improvement of nuclear safety by indicating the need to identify and implement in a timely manner reasonably practicable safety improvements to the nuclear installation.

In 2019, ENSREG adopted guidelines supporting the preparation of the Member States' reports under Article 9.1 of the amended Nuclear Safety Directive[10]. These voluntary guidelines are intended to assist and ease the reporting work performed by the Member States, provide guidance regarding information that may be useful to include in their national reports, and propose a common structure for reporting. These guidelines proved useful in supporting the Member States in the process of drafting their national reports showing the implementation of the obligations laid down in the amended Nuclear Safety Directive.

[8] http://www.ensreg.eu/EU-Stress-Tests

[9] Article 8a(1)(a) and (b). Early radioactive releases are those that would require off-site emergency measures but with insufficient time to implement them; large radioactive releases are those that would require protective measures that could not be limited in area or time.

[10] https://www.ensreg.eu/sites/default/files/attachments/ensreg_reporting_guidelines_on_the_eu_nuclear_safety_directive_0.pdf

As part of this process, Member States submitted national reports on the implementation of the amended Nuclear Safety Directive during 2020, using the reporting guidelines prepared by ENSREG during the previous reporting period. During 2021, the Commission services evaluated the Member States' national reports in conjunction with other sources of information, e.g. national measures taken by the Member States to transpose the Directive, the outcomes of the EU nuclear stress tests and of the first topical peer review exercise, the findings of international peer reviews, issues raised by EU citizens and other EU institutions through complaints, petitions and questions, findings of commissioned studies. As a result, the Commission's second progress report on the implementation of the Directive[11] addressed to the Council and the Parliament was adopted on 21 April 2022.

The Radioactive Waste and Spent Fuel Management Directive

All Member States produce spent fuel and/or radioactive waste when generating nuclear power or from research reactors, or generate radioactive waste in the course of industrial, medical and research activities or when decommissioning nuclear facilities and other facilities involving the clean-up of contaminated facilities or land.

On 19 July 2011, the Council of the EU adopted **Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste**. The Directive applies to all stages of spent fuel management and radioactive waste management when the spent fuel or radioactive waste results from civilian activities. It includes the general policy principles to be applied as well as provisions on the establishment and implementation of national programmes and elements to be included in national legislative, regulatory and organisational frameworks.

The Radioactive Waste and Spent Fuel Management Directive requires that:

- EU Member States have a national policy and framework as well as financial mechanisms and resources for spent fuel and radioactive waste management;
- EU Member States draw up national programmes for the long-term management of all types of spent fuel and radioactive waste (including inventories, cost assessments, key performance indicators). These programmes must include plans for the predisposal and disposal of these materials, e.g. by developing radioactive waste disposal facilities;
- relevant information on the management of radioactive waste and spent fuel be made available to the public, as well as mechanisms for public participation;
- EU Member States perform regular self-assessments and invite international peer reviews of their national programme, national framework and competent regulatory authority at least every 10 years;
- the export of radioactive waste to non-EU countries only be allowed under strict conditions;
- EU Member States have mechanisms for research, development and demonstration (including safety demonstration) and for developing skills and competence on spent fuel and radioactive waste management.

The Directive also requires that Member States meet certain obligations on reporting and transposition[12].

Similar to the provisions in the amended Nuclear Safety Directive, the Directive gives national regulatory authorities a bigger role and more independence and confirms that licence holders have prime responsibility for the safety of spent fuel and radioactive waste management facilities and activities. The Directive also emphasises that each Member State is ultimately responsible for managing the spent fuel and radioactive waste generated on its territory.

[11] EUR-Lex - 52022DC0173 - EN - EUR-Lex (europa.eu)

[12] Article 14 (1) and (2)(a)(b) and Article 15

The Basic Safety Standards Directive

The Euratom legal framework is completed by the Directive laying down basic safety standards for protection against dangers arising from exposure to ionising radiation (2013/59/EURATOM). The so-called 'Basic Safety Standards Directive' lays down basic safety standards for protection against the dangers arising from exposure to ionising radiation. The Directive modernises and consolidates the European radiation protection legislation by taking account of the latest developments in science and technology, covering all relevant radiation sources including natural radiation sources, integrating protection of workers, members of the public, patients and the environment, covering all exposure situations (planned, existing, emergency) and harmonising numerical values with international standards.

1.7. International guidance on nuclear safety and the safe management of radioactive waste and spent fuel

International Atomic Energy Agency

ENSREG's WG1 and WG2 continued to cooperate during 2020-2021 with the IAEA which, in addition to providing the secretariat for the international conventions described above, seeks to promote the safe, secure and peaceful use of nuclear technologies by developing safety standards. These apply inter alia to nuclear installations, radioactive sources, radioactive materials in transport, radioactive waste management and the decommissioning and remediation of contaminated sites. The IAEA promotes the application of international safety standards for managing and regulating activities involving nuclear and radioactive materials.

ENSREG's cooperation with the IAEA focused on Integrated Regulatory Review Service (IRRS)[13] and Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS)[14] peer reviews, in support of the continuous improvement of nuclear safety and management of radioactive waste and spent fuel in Europe, as per the respective Council Directives. Besides the cooperation on the planning of the peer review missions, this work also includes the coordination of the Member States lists of experts for the peer review missions.

Nuclear Energy Agency

Most EU Member States represented in ENSREG are also members of the OECD's NEA. The NEA's mission is to 'assist its member countries in maintaining and further developing, through international cooperation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes.'[15] To achieve this, the NEA provides a forum for sharing information and experience and promoting international cooperation, a centre of excellence that helps its members pool and maintain their technical expertise and acts as a vehicle for facilitating policy analyses and developing consensus based on its technical work.

Western European Nuclear Regulators Association

WENRA comprises, inter alia, the heads and senior staff members of all the national nuclear regulatory authorities of EU Member States with nuclear power plants which are also represented in ENSREG.

The main objectives of WENRA include developing a common approach to nuclear safety and safe management of spent fuel and radioactive waste, providing an independent capability to examine nuclear safety in applicant countries, and constituting a network of chief nuclear safety regulators in Europe exchanging experience and discussing significant safety issues.

[13] https://www.iaea.org/services/review-missions/integrated-regulatory-review-service-irrs
[14] https://www.iaea.org/services/review-missions/integrated-review-service-for-radioactive-waste-and-spent-fuel-management-decommissioning-and-remediation-artemis
[15] https://www.oecd-nea.org/jcms/tro_5705/about-us

Since its creation more than 20 years ago, WENRA has developed among other things:

- safety reference levels for existing nuclear power plants;
- safety objectives for new nuclear reactors; and
- different safety reference levels for radioactive waste and spent fuel management (storage, processing, decommissioning and disposal).

It has also provided extensive technical support to ENSREG, developing for example:

- the technical specifications for the European stress tests after the Fukushima nuclear accident;
- the technical specifications for first topical peer review (TPR-I) and upcoming second topical peer review (TPR-II) under the amended Nuclear Safety Directive;
- a paper on the approaches for reasonably practicable improvements to the nuclear safety of the existing fleet.

1.8. ENSREG's work programme

The period of the current report is covered by two work programmes, 2018-2020 and 2021-2023 respectively[16]. The ENSREG work programmes are largely shaped by the amended Nuclear Safety Directive and the Spent Fuel and Radioactive Waste Directive. A large proportion of ENSREG's work under the work programmes in the reported period involved commencement of the relevant follow-up actions of the TPR-I, followed by the start of preparations for the TPR-II, as well as on-going measures that support the requirements of these Directives and help Member States implement them. ENSREG also continued to facilitate the follow-up of the implementation of the national action plans (NAcPs) following the EU nuclear stress tests.

ENSREG's main activities under the two work programmes concern the following topics:

1. **Supporting the implementation of the amended Nuclear Safety Directive and the Spent Fuel and Radioactive Waste Directive**:

   Whilst it is Member States' responsibility to appropriately transpose and implement the European legislation, ENSREG will continue to play a role in assisting Member States and the Commission in several areas of work under the two Directives. Though no further formal reporting will take place under Article 9 of the amended Nuclear Safety Directive, there will continue to be a focus on implementation of the Directive, in particular of Articles 8a-8c (the Nuclear Safety Objective). In addition, ENSREG will support the Commission and Member States in addressing the findings of the Commission Report to Council and Parliament on the implementation of the amended Nuclear Safety Directive.

   A critical task for ENSREG will be to set out the framework to implement the TPR-II, and in doing so to work closely together with WENRA and to build on the experience of the TPR-I, completed in 2018. TPR-II will address fire protection as decided by ENSREG at its plenary meeting in November 2020. At the same time, those countries that participated in TPR-I on ageing management, will report on the activities identified in their respective national action plans.

   With reference to the implementation of the Spent Fuel and Radioactive Waste Directive, ENSREG will continue to support Member States particularly for the specific aspects of interface between national programmes and national reports. The three-yearly reporting cycle under Article 14 of the Spent Fuel and Radioactive Waste Directive continues as foreseen.

[16] https://www.ensreg.eu/document/ensreg-work-programme-2018-2020 and https://www.ensreg.eu/document/ensreg-work-programme-2021-23

2. **Providing advice to the European Commission and coordination of Member State regulatory bodies,** in particular on matters related to the safety of nuclear installations and/or the management of spent fuel and radioactive waste.

   The Commission asks ENSREG for advice on the revision and implementation of international assistance and technical cooperation programmes, such as those under the European Instrument for International Nuclear Safety Cooperation (EI INSC), which replaces the former EU Instrument for Nuclear Safety Cooperation (INSC).

   The work programme 2018-2020 also introduced a new special item on the issue of counterfeit, fraudulent and suspect items in the supply chain.

3. **Facilitating active participation in IAEA peer reviews within the European Union and oversight of the completion of the EU nuclear stress test National Action Plans:**

   ENSREG will continue to facilitate EU participation in peer reviews via the IAEA's IRRS and ARTEMIS peer review services, thereby supporting the continuous improvement of nuclear safety and management of spent fuel and radioactive waste in Europe. ENSREG will seek to improve the effectiveness of the two peer review programmes together with IAEA, exploiting synergies between the two programmes, where feasible. The long-term goal of a single peer review mission to cover the requirements of the amended Nuclear Safety Directive and the Spent Fuel and Radioactive Waste Directive will be explored.

   ENSREG played a pivotal role in the 2011 EU nuclear stress tests and has since held two workshops to review progress on the national action plans created by Member States. ENSREG, mainly through WG1, will continue to provide oversight through the agreed two-yearly reporting schedule.

   ENSREG will also contribute to the peer review in third states outside of the EU, in particular in the EU neighbourhood, for both initial stress tests and reviews of National Action Plans and their implementation.

4. **Seeking enhanced openness and transparency** throughout ENSREG's activities, including provision of revised guidelines to Member States on reporting and transparency as part of the ENSREG-wide work on reporting under the Directives. ENSREG will develop a communication strategy aimed, among others, at implementing a new approach to the ENSREG website. The ENSREG WG3 also supports the preparations for the ENSREG regulatory conference.

2. MAIN ACTIVITIES OF ENSREG IN 2020-2021

2.1. Response to Covid-19 pandemic

Due to the outbreak of the Covid-19 pandemic at the beginning of 2020, the 40th ENSREG plenary planned for 17 March 2020 was cancelled. ENSREG continued to work on most important issues in written form, and resumed its meetings in virtual format on 9-10 November 2020, which proved to be as efficient as a physical meeting. Two more plenaries took place on 3-4 March and 7 July 2021 in virtual format. The 24 November 2021 meeting was held in hybrid format with a few participants coming to the Commission premises in Brussels. After the outbreak of the pandemic, the working groups continued to hold their meetings during the years 2020-2021 virtually.

From the start of the pandemic, the European Commission and EU Member State authorities, within their respective fields of competence, monitored its impacts on the energy supply and distribution systems, including in the nuclear sector, with a view to taking any necessary mitigating measures.

Various actions were taken at the EU-level, including the issue of guidance documents that impacted the energy sector.

EU-level actions

The European Commission issued a 'Commission Staff Working Document, Energy Security: good practices to address pandemic risks', which took stock of exchanges in the European Electricity, Gas, and Oil Coordination Groups, the European Offshore Authorities Group as well as ENSREG on the lessons learnt from the Covid-19 pandemic. The document highlighted associated risks and challenges to the energy sector, including cyber and hybrid threat preparedness, movement and availability of specialised energy workers, access to protective equipment and medical testing for energy workers, and ensuring emergency response capability at all times. The Commission also adopted guidelines aiming to facilitate the free cross-border movement of critical workers and to ensure the availability of goods during COVID-19 outbreak, which helped to ensure continued smooth cross-border movement of critical staff and critical supplies also in the nuclear sector, despite the Covid-19 related restrictions imposed.

ENSREG activities

At the beginning of the Covid-19 crisis in 2020, the European Commission swiftly launched a survey of ENSREG members and observers on the national steps being taken for preparedness planning to ensure the safety of nuclear installations, and any potential impacts on security of electricity supply. A website discussion forum was set-up to enable continued information update and exchange amongst the ENSREG community. In addition, the Commission services, through JRC, published situation status reports on the measures taken in Europe and beyond based on information from international organisations, regulators and industry. The consolidated replies and collected information were presented to ENSREG and showed that:

- All countries rapidly activated business continuity plans covering both electricity production and installation safety-related activities at national, regulator and licensee levels to support safe and reliable operation of nuclear installations.
- Many countries initially refocused efforts to prioritise facilities essential to the production of electricity. Activities at nuclear installations whose functioning was not vital to electricity production, such as decommissioning work, were initially scaled down but have subsequently resumed. Activities necessary for the functioning of nuclear power plants for fuel supply and removal continued to be maintained.
- Regulatory oversight continued, including through teleworking where appropriate, and all authorities maintained inspection activities at nuclear installations.
- Nuclear installation operating rules typically define the minimum staff presence for

operations and maintenance as set out in licence conditions established by the national competent regulatory authorities, otherwise the installation must be brought to safe shutdown conditions. There had been no reported difficulties to comply with such requirements.

- Some countries reported that in certain plants, scheduled outages for refuelling and maintenance which require a large site presence of itinerant workers, were likely to pose logistical challenges to carry out the planned activities whilst respecting physical distancing and infection control practices. It was reported that some licensees in conjunction with the electricity grid operator had either rescheduled, shortened or postponed some of the outages activities to minimise impacts subject to regulatory agreements.

There were no reports of unplanned disruption of nuclear power plant operations in the EU, and no significant safety issues were reported.

The Commission services were monitoring the possible impacts on energy security (critical operations, maintenance, supply chains, markets and investments). Discussions in the energy coordination groups indicated that some measures are being re-introduced during the current phase of the pandemic based on best practices and lessons learnt during the first wave. Continued attention was given to the availabilities of all electricity generating power plants due to postponed maintenance, although the situation remained under control.

2.2. EU topical peer reviews

The amended Nuclear Safety Directive introduced a system of topical peer reviews to provide a mechanism for Member States to examine topics of importance to nuclear safety, exchange experiences and identify opportunities to strengthen nuclear safety, and included the obligation for Member States to start the first topical peer review in 2017; subsequent reviews should take place at least every 6 years. The process also enables EU neighbouring countries and other non-EU countries to participate in nuclear safety peer review exercises on a voluntary basis. During the Seventh Review Meeting of the Contracting Parties to the Convention on Nuclear Safety in 2017, the International Atomic Energy Agency recognised this first topical peer review as one of the four good practices identified by the Review Meeting.

First Topical Peer Review on Ageing Management

The details of the implementation and outcome of the first topical peer review on ageing management are described in the 6th ENSREG Report[17]. During this reporting period, the TPR-I entered the follow-up phase, with the submission of the NAcPs in September 2019 and the adoption of the ENSREG Action Plan in November 2019[18].

In 2021, Member States and other participating countries reported on the implementation of their NAcPs, submitting updated NAcPs or closure reports, as appropriate. ENSREG WG1 prepared a summary report on the implementation of the 2019 ENSREG Action Plan, taking into account the updated NAcPs and progress on the EU-level actions from the Action Plan. The report was adopted by ENSREG and published in November 2021[19]. Many actions were already completed and the remaining ones appeared to progress well, with most of them due to be finalised within a couple of years. Those countries that have not yet completed the implementation actions under their NAcP will report again by the end of 2023, and ENSREG WG1 will prepare a further summary report on implementation status in early 2024. At this time ENSREG will decide on further follow-up reporting.

[17] https://www.ensreg.eu/document/6th-ensreg-activity-report
[18] https://www.ensreg.eu/sites/default/files/attachments/first_tpr_action_plan.pdf
[19] status_report.pdf (ensreg.eu)

Second Topical Peer Review on Fire Protection

The chair and vice-chair for the Board for the second topical peer review were appointed in October 2020. Calls for team leaders to join the board and rapporteurs and experts to participate were subsequently launched and appointments made.

WENRA had started work on **the selection of the topic** of TPR-II in 2019, consulting a range of stakeholders including ENSREG WG1, ENISS[20] and the Commission. In addition, the proposed topics were reviewed against seven selection criteria proposed by the Commission and set by ENSREG WG1. Finally, ENSREG chose fire protection as the topic for TPR-II, noting the importance of the topic to nuclear power plant safety and recommendation by WENRA to include a broad range of nuclear installations in the scope of TPR-II. TPR-II relates to different types of installations, including nuclear power plants, research reactors and other nuclear installations. The scope of TPR-II will also include waste storage facilities on the sites of nuclear installations, spent fuel storage facilities as well as decommissioning activities.

A subgroup of WG1 started preparatory work on TPR-II by issuing a questionnaire to Member States that participated in TPR-I to obtain feedback from the overall TPR process, as well as suggestions for topics for the next TPR. The findings of the questionnaire were detailed in the **'lessons learnt' document** prepared by ENSREG WG1. In parallel the subgroup prepared the **TPR-II overall process document**, which outlined the main responsibilities and the main steps of the overall process and ensured that the 6-yearly interval between consecutive TPR's, as foreseen in Article 8e of the amended Nuclear Safety Directive, was respected. The process document was approved by ENSREG in November 2020. The TPR subgroup, including representatives of WG2 and WG3 developed the **terms of reference for TPR-II**, in cooperation with the TPR-II Board.

WENRA subsequently started work on the **technical specifications of TPR-II** that will form the content of the national assessment reports, which those participating countries with relevant nuclear installations should start to prepare from July 2022.

ENSREG WG3 prepared a draft **stakeholder engagement plan**. The aim of that plan is to inform the public and engage with stakeholders on the EU topical peer review process. It provides a framework for stakeholder participation and encourages their active involvement in TPR-II.

The stakeholder engagement plan identifies activities to strengthen engagement with all stakeholders including the public, industry, regulatory authorities, government bodies and other interested parties, such as NGOs and expert groups. Full transparency and proactive information for the public will raise awareness amongst European citizens of the EU TPR process.

The stakeholder engagement plan covers the full period of TPR-II. As a general principle, it follows an integrated strategy for stakeholder involvement and public information. It is flexible, can be adapted depending on circumstances and takes into account the broad scope of the exercise.

In order to improve information about the TPR process, **factsheets** were produced. Three different factsheets provide information on the TPR process in general, illustrate main aspects and results of TPR-I and outline the expectations for TPR-II. Translation into all official EU languages in early 2022 will allow ENSREG and the European nuclear safety regulators to use the factsheets for communication purposes.

[20] The European Nuclear Installations Safety Standards Initiative ENISS represents nuclear installation licence holders from 16 European countries with nuclear power units, fuel reprocessing plants or large waste storage facilities. ENISS provides the nuclear industry with a platform to exchange information on national and European regulatory activities, to express its views and provide expert input on all aspects related to international safety standards. ENISS is the common channel through which European nuclear licence holders interact with WENRA, the European Institutions and the IAEA. (https://www.eniss.eu/about/)

A first **stakeholder meeting** was organised on 22 June 2021. The meeting was attended by close to 150 persons, including speakers, panellists, organisers and 128 participants. More than 102 persons connected to the web-stream to follow the meeting online. While the majority of participants were from EU Member States, a number of participants from various countries outside the EU also attended. The meeting was divided into two sessions. The first session covered the background, the objectives, the overall experiences and the value of peer reviews in general and the European topical peer review in particular. The second session focussed on the topic chosen for TPR-II. At the end of each session panellists representing regulators, industry, international organisation, NGO's and other stakeholders discussed the topics presented and reacted to the comments and questions from participants. The different comments, proposals and views expressed during the meeting will help to further enhance the procedures, the specifications and the general conduct of TPR-II. Another public meeting will be organised during the peer review phase of TPR-II.

The WG3 started developing terms of reference for a standing **TPR Focus Group** to enable different stakeholders to more closely follow TPR activities and to be consulted and provide input on a regular basis.

2.3. Follow-up on implementing post-Fukushima national action plans

In the aftermath of the Fukushima nuclear accident, all EU nuclear power plants were reviewed on the basis of a comprehensive and transparent risk and safety assessment ('stress tests'), drawing on the lessons learnt from the accident.

NAcPs describing measures to improve nuclear safety were prepared by each country participating in these stress tests. The NAcPs included the safety improvements planned and implemented, and their schedule for completion. These NAcPs were reviewed at the first workshop organised by ENSREG in spring 2013 and were again updated by 15 Member States operating nuclear power plants (plus Switzerland and Ukraine) at the end of 2014 and peer reviewed. WG1 developed the peer review approach and associated terms of reference for the second workshop, and ENSREG endorsed them. The second ENSREG National Action Plan Workshop was conducted in April 2015. It found that a large number of measures listed in the national action plans were completed under the supervision of the respective national regulatory authorities and concluded that most of the countries are making suitable progress in implementing their national action plans. All participating countries are committed to fully implementing the improvement measures identified in their respective national action plans under the supervision of the regulatory authorities. Despite the overall progress noted, ENSREG issued a statement on this topic[21] in November 2015 where it voiced its concerns 'that the rate of safety upgrade implementation should be strengthened to target agreed implementation deadlines, taking into account other safety priorities and quality requirements.'

ENSREG members agreed to follow up on implementation of the pending measures contained in the national action plans. They committed to updating and publishing periodically (every 2 years starting from 2017) a status report from each country on the implementation of its national action plan until completion. Updates were provided by each participating country by the end of 2017 and published on the ENSREG website[22].

In respect of the post-Fukushima stress tests, ENSREG WG1 prepared a summary report, based on the updated NAcPs submitted at the end of 2019 / early 2020. It was adopted by ENSREG in November 2020[23]. Relevant Member States submitted a further updated NAcP at the end of 2021.

[21] http://www.ensreg.eu/document/ensreg-statement-progress-implementation-post-fukushima-national-action-plans-nacps

[22] http://www.ensreg.eu/EU-Stress-Tests/Country-Specific-Reports

[23] post-fukushima_nacp-status_report_2019.pdf (ensreg.eu)

As part of the NAcP follow-up by ENSREG WG1, when Member States issue their final (closure) report, a closure presentation is made to WG1, allowing members the opportunity to review the report and ask questions on the actions carried out.

By the end of 2021, a few actions from the post-Fukushima stress tests remained to be implemented in five participating Member States, a very low proportion of the original NAcP actions. Most were finalised by the end of 2022, with a few extended to 2023 or 2024. Those Member States concerned will report again on implementation by the end of 2023, if they have not issued a closure report beforehand. The next summary report will be prepared and published in early 2024.

As noted above, ENSREG WG1 reviewed the overall progress in implementing the planned measures in the NAcPs with each bi-annual 'cycle' of updates. While noting that most actions had been completed, delays compared to the original schedule were also reported for several Member States. Analysis of the reasons behind the delays gave several possible reasons, including:

- The measure cannot be applied, new solution to be found.
- New difficulties are identified during the implementation which delay the finalisation of the measure.
- Difficulty in identifying a competent supplier or the supplier cannot deliver in a timely manner.
- Delays during the regulatory assessment - the regulator has requested additional information / analysis.
- In case of a complex project the implementation is influenced by administrative procedures.
- Other plant modifications improving overall safety of the plant and using for example the same design resources are prioritised.
- Implementation only possible during refuelling /reactor outage:
    - Small delays in preparation leads to delay to next reactor outage
    - Event with major impact may lead to rescheduling of the reactor outages
- The time demands and rules of public procurement procedures.

As previously reported, the national regulators determine the acceptability of delays versus the overall safety improvement activities that are ongoing, e.g., from periodic safety reviews, and a prudent implementation of the measures is considered more important than rapid implementation alone, thus ensuring that nuclear safety is not compromised.

Nevertheless, ENSREG recognises the importance of the completion of the small number of remaining safety related activities, both in terms of the credibility of the overall stress tests process, and the significance of some of the remaining measures, which include major upgrades to buildings related to emergency response on the power plant sites or assuring structural integrity of the reactor containment.

2.4. IRRS and ARTEMIS missions to EU Member States: programme and pool of experts

To meet the obligations and in keeping with the spirit of Article 8e(1) of the amended Nuclear Safety Directive and Article 14(3) of the Radioactive Waste and Spent Fuel Management Directive on self-assessments and international peer reviews, Member States use the IRRS and ARTEMIS peer review services of the IAEA.

In particular, Article 8e(1) of the amended Nuclear Safety Directive requires that Member States ‘shall, at least once every 10 years, arrange for periodic self-assessments of their national framework and competent regulatory authorities and invite an international peer

review of relevant segments of their national framework and competent regulatory authorities with the aim of continuously improving nuclear safety.'

Article 14(3) of the Radioactive Waste and Spent Fuel Management Directive that Member States 'shall periodically, and at least every 10 years, arrange for self-assessments of their national framework, competent regulatory authority, national programme and its implementation, and invite international peer review of their national framework, competent regulatory authority and/or national programme with the aim of ensuring that high safety standards are achieved in the safe management of spent fuel and radioactive waste.'

The ENSREG working groups make use of the international services provided by the IAEA: the EU IRRS programme is coordinated by WG1 and the EU ARTEMIS programme by WG2.

ENSREG's WG1 and WG2 fulfil this coordination role by maintaining an up-to-date schedule of peer reviews, a pool of EU experts available for peer review missions, and a list of national contact points. The ARTEMIS and IRRS indicative programmes are presented together to give the best overview and ensure coordination of the two peer reviews, as appropriate. The pool of suitable experts guarantees the availability of experts for implementing the EU IRRS and ARTEMIS programme. This ensures an effective level of Member State participation in the programme both within the EU and worldwide and helps harmonise EU regulatory practices. ENSREG ensures that the pool of experts is maintained, noting also which modules individual experts can review. IAEA organised a virtual training course to the pool of ARTEMIS experts from 30 November to 4 December 2020. As of January 2022, 299 experts are available, subject to an ongoing review and update by ENSREG and IAEA.

Activities in the current reporting period were severely affected by the Covid-19 pandemic. Hence, during 2020-2021 only one of the planned initial IRRS missions was conducted, in Denmark, and only one ARTEMIS mission was conducted, in Ireland. One IRRS peer review remained outstanding to complete the first 10-year cycle of peer reviews. Follow-up visits usually take place 3-4 years after the initial IRRS mission and were conducted in Malta and Lithuania, the last one being conducted entirely virtually.

The sub-group looking at synergies between the IRRS and ARTEMIS peer review programmes has continued its work, with representatives from nine Member States, from both ENSREG WG1 and WG2. The initial focus is on 'back to back' missions i.e. IRRS and ARTEMIS missions held close together within a window of few months, so as to avoid overlap between the scope of the respective missions. The subgroup has also held meetings with IAEA, to agree a common approach and to share relevant information. The ultimate goal of the subgroup remains a single integrated mission, covering the international peer review requirements of both the Nuclear Safety Directive and the Radioactive Waste and Spent Fuel Management Directive, where individual Member States see this as appropriate to their needs.

For its part the IAEA established a task force in 2021 to optimise delivery of IRRS and ARTEMIS missions and to cooperate with the ENSREG subgroup. Draft supplementary guidelines on the conduct of 'back to back' IRRS and ARTEMIS mission have been prepared and will be applied for the first time in early 2022. Following an extensive gap analysis the IAEA expects to start revision of the self-assessment guidelines during 2022.

In recognition of the IRRS's and ARTEMIS roles in allowing Member States to carry out the peer review required under Article 8e(1) of the Nuclear Safety Directive and Article 14(3) of the Radioactive Waste and Spent Fuel Management Directive, the Commission supports the IRRS and ARTEMIS programmes financially. For the current reporting period this support was through a delegation agreement, which ran from November 2016 to November 2020 providing up to €1 million to support the IRRS programme and December 2014 to December 2020 providing €1.2 million to support the ARTEMIS programme. This was succeeded by a new contribution agreement, signed in December 2020 for a further 3 years. This new agreement provides financial support up to €1.35 million, for the IRRS and ARTEMIS peer review programmes. Part of the support (€30,000) is reserved for activities that explore the synergies

between the two peer review programmes, taking into account the work carried out by ENSREG in this area, as appropriate.

Due to the pandemic, no workshops on the experience of IRRS missions could be held during the reporting period. However, the IAEA should organise a workshop under the terms of the contribution agreement during the period of the contribution agreement, i.e. by the end of 2023. In addition the ENSREG work programme foresees a summary report reviewing the experience of all Member States, after the first cycle of peer reviews, which could be incorporated into the IAEA workshop.

2.5. International cooperation in nuclear safety: stress tests in non-EU countries

The events in Fukushima underlined the importance of nuclear safety, which should be addressed by the EU and its neighbouring countries as a key policy priority.

Following a meeting on 23 June 2011 with Energy Commissioner Oettinger[24], deputy energy ministers and senior representatives of energy ministries and national authorities responsible for nuclear energy in Armenia, Belarus, Croatia, Russia, Switzerland, Türkiye and Ukraine, in cooperation with the EU, have decided to:

- *Confirm their willingness to undertake (if this has not yet been done) on a voluntary basis comprehensive risk and safety assessments ('stress tests'), taking into account the specifications agreed by the European Commission and the European Nuclear Safety Regulators Group (ENSREG) on 24 May 2011. The need for a consistent approach towards nuclear safety by all countries making use of nuclear energy is reinforced by today's shared vision that highlights the potential cross-border nature of nuclear accidents;*
- *Agree to commit nuclear operators to self-assessments of their nuclear power plants, as well as to invite national regulatory bodies to present national reports, and to make use of a transparent peer-review system enhancing credibility and accountability of the comprehensive risk and safety assessments;*
- *Agree to engage on a multilateral level and with the IAEA a discussion for strong and common safety standards as well as international peer reviews.*

Switzerland and Ukraine directly participated in the entire stress test process with the other EU Member States in 2012 and in the national action plan peer reviews in 2013 and 2015. Ukraine continues to regularly report on the implementation of its stress test carried out together with the EU in 2012 with the last update received in November 2021[25].

Armenia, Belarus and Türkiye also expressed their interest in following the same peer review process, however, were not ready at that time to join and submit a report. Stress tests were therefore initiated later with these countries.

Armenia

Based on this commitment, Armenia submitted its national stress test report in 2015, with the peer review organised in 2016. The fully transparent peer review was performed by a group of EU experts nominated by ENSREG members. In 2017, the Armenian Nuclear Regulatory Authority (ANRA) prepared a national action plan translating the recommendations of their national report and the stress test peer review report into concrete actions for the enhancement of safety together with a timeline for their implementation. In October 2019, ANRA submitted an updated NAcP, including information on progress in implementing the recommendations for the Metsamor nuclear power plant. A team of eight ENSREG experts reviewed the NAcP in November 2019 and prepared a report that was endorsed by ENSREG in February 2020

[24] https://ec.europa.eu/energy/sites/ener/files/documents/20110623_stress_test_joint_declaration_eu_neighbouring_countries.pdf

[25] https://www.ensreg.eu/document/updated-national-action-plan-ukraine-2021

and published on the ENSREG website[26]. All reports related to this peer review are available on the ENSREG website[27].

Belarus

Belarus submitted its national stress test report to ENSREG for peer review in October 2017. The peer review mission to Belarus took place in March 2018 by a team of seventeen ENSREG experts, accompanied by observers from the IAEA and the national nuclear regulators of Iran and the Russian Federation. The final report from the peer review was published on the ENSREG website in June 2018[28].

In August 2019, the Belarusian nuclear regulator, Gosatomnadzor, published on its website and subsequently submitted to ENSREG for peer review, in the Russian language only, the Belarus national action plan to address the recommendations arising from the overall stress test process, including the recommendations made in the report of the ENSREG peer review.

The peer review of the NAcP was initiated in 2020 after the submission of the first update of the NAcP. The review was carried out by a team of experts that was subsequently expanded from 12 to 16 persons, in order to ensure sufficient expertise at all stages of the process, against the background of the Covid-19 pandemic. Due to the pandemic, all preparatory meetings and discussion were held on-line. Moreover, the review was split into two phases, both of which included a fact-finding mission to the Astravets nuclear power plant. The first phase focused on priority items and, due to restrictions related to the pandemic, a team of seven experts participated in the first fact-finding mission. The preliminary report covering the first phase was endorsed by ENSREG and published in March 2021[29]. During the second phase, all remaining items were addressed, first in preparatory technical discussions, and subsequently during the mission to site the nuclear power plant. While covering all issues not addressed in the first phase, the second fact-finding mission also allowed the full extended expert team to perform an on-site review. The final peer review report was endorsed by ENSREG and published in November 2021[30].

The peer review team recognised significant progress in the implementation of the NAcP. The team underlined that all recommendations formulated in the 2018 Stress Test Peer Review Report are important and encouraged GAN to continue implementing remaining actions in a timely manner. Having identified some areas where further safety enhancement could be achieved, the team encouraged GAN, in the spirit of continuous safety improvement, openness and transparency, to incorporate these measures into the updated NAcP and publish regular reports on its status of implementation.

Türkiye

In June 2019, Türkiye submitted an update of the Stress Test National Report for Türkiye, covering developments regarding the Akkuyu nuclear power project. At the end of 2019, discussions started with Türkiye on the terms for carrying out an ENSREG peer review of its National Report.

On the basis of these report, ENSREG launched the stress tests at the end of 2021. The Commission carried out a public consultation on the National Report in late 2021 and a set of written technical questions was submitted to the Turkish Nuclear Regulatory Authority. A document review and a site visit at the Akkuyu nuclear power plant were scheduled for 2022 and an initial visit took place in May 2022. A full peer review is now scheduled to take place in 2023, subject to the progress of the construction of the nuclear power plant.

[26] https://www.ensreg.eu/document/armenia-nacp-peer-review-report

[27] http://www.ensreg.eu/armenia

[28] http://www.ensreg.eu/EU-Stress-Tests/Country-Specific-Reports/EU-Neighbouring-Countries/Belarus

[29] https://www.ensreg.eu/document/preliminary-peer-review-report-belarus-stress-test-national-action-plan

[30] https://www.ensreg.eu/document/belarus-final-eu-peer-review-report

ENSREG Board for Stress Tests in Third Countries

The 39th ENSREG plenary of 14 November 2019 decided to set up a permanent board to supervise all stress test peer review exercises in neighbouring countries. As due to the breakout of Covid-19 pandemic, the 40th ENSREG plenary planned for 17 March 2020 was cancelled, ENSREG appointed the Board members by silence written procedure via emails. The ENSREG Board for Stress Tests in Third Countries came into force on 1 September 2020.

The terms of reference of the Board were approved by the 41st ENSREG taking place virtually on 9-10 November 2020. The Board is composed by a chairperson, a representative from a nuclear and a non-nuclear EU Member State, and a Commission representative. If needed, ENSREG may appoint one or more additional members bringing additional specific knowledge or experience. Peer review team leaders are invited to participate to meetings organised by the Board, if the agenda includes peer reviews for which they are responsible.

The Board had its first virtual meeting on 29 September 2020. Since then, it is meeting virtually and regularly to support the leader and its team of the ongoing peer reviews and to discuss the possibility of the future peer reviews in neighbouring countries. Five meetings took place during the year 2020 and six – during the year 2021, where the Board, *inter alia*, mainly focused on the finalisation of the Belarus peer review and the start of the Türkiye peer review. In addition to the follow up on the above peer reviews, the Board monitors the progress with regard to Iran's submission of its stress test report on the Bushehr Nuclear Power Plant as well as the potential interest of Egypt and United Arab Emirates in participating in a stress test in the future.

3. OTHER ACTIVITIES RELATED TO SAFETY OF NUCLEAR INSTALLATIONS

3.1. Member State reports under Article 9(1) of the amended Nuclear Safety Directive

As explained in the 6th ENSREG Report, under Council Directive 2014/87, the reporting requirements for Member States were amended. It specified that Member States should submit a report 'on the implementation of this Directive […] by 22 July 2020', i.e. there would be no further reporting on implementation of the Directive. Based on the reports communicated by the Member States to the Commission in 2020, the Commission adopted its report to the European Parliament and the Council on the progress made with the implementation of the Directive on 21 April 2022.

3.2. Initiative on counterfeit, fraudulent and suspect items (CFSI)

Following its inclusion in the ENSREG work programme for 2018-2020, ENSREG's WG1 established a sub-group under the leadership of France to address the issue of counterfeit, fraudulent and suspect items in the supply chain with the focus on inspection practices. The sub-group intended to hold a workshop for its participating members, where regulators can share their practices. The workshop would also consider practices in other industrial sectors. Due to delays caused by the pandemic and Brexit, the work on CFSI has been included in the 2021-2023 work programme. WG1 will decide on the resumption or suspension of the action in 2023.

4. OTHER SAFE MANAGEMENT OF SPENT FUEL AND RADIOACTIVE WASTE RELATED ACTIVITIES

4.1. Key Performance Indicators

A subgroup within WG2 has been created to prepare a technical position on the use of key performance indicators (KPIs) in monitoring the implementation of national programmes. The subgroup was tasked to explore the following: (i) the purpose and meaning of a key performance indicator in relation to monitoring progress towards implementation of national programmes; (ii) the link to elements of a national programme; (iv) examples from Member States; (v) a summary of issues and difficulties; (vi) propose a way forward. In this process, special focus is given to defining and implementing key performance indicators.

In relation to the study launched in 2020 by the Commission on Key Performance Indicators, WG2 decided to issue the current position on KPIs as an interim technical position on progress towards the implementation of national programmes and KPIs. The Interim report was issued in March 2020.

WG2 provided feedback on a questionnaire sent to Member States for the Commission study on KPI's, and actively participated to a Workshop organised in February 2021 to discuss the preliminary findings of the study.

The outcomes of the EC study were published in 2022[31].

4.2. End state of decommissioning

During the fifth ENSREG nuclear safety conference in June 2019[32], the importance of standardising decommissioning approaches was stressed as a means to ensure the most benefit in terms of safety, timing and costs from the first successful projects already ongoing in Europe. The conference recalled also the importance of defining what is considered as the 'decommissioning end state' of a nuclear installation in order to have homogenous cost evaluations.

To address these issues, ENSREG included in its Work Programme 2021-2023 a task for the WG2 to carry out an exploratory review of Member States' approaches to characterising the starting point and defining the end state of decommissioning.

In 2021, a subgroup appointed within the WG2 prepared a specific questionnaire to be circulated within ENSREG.

4.3. Management of non-nuclear power related waste

The EC Cancer Action Plan was adopted in early 2021. Associated to it is the SAMIRA programme, evaluating the extent to which nuclear and radiation technologies can contribute to cancer diagnosis and cure. Under the SAMIRA action plan, an ENSREG position on best practices in national management systems for radioactive waste generated from non-power use of nuclear and radiation technology has been envisaged.

In order to review the approaches in regulation and management of radioactive waste arising from non-energy uses of nuclear and radiation technologies, a subgroup has been appointed within WG2 in 2021.

5. OTHER OPENNESS AND TRANSPARENCY RELATED ACTIVITIES

5.1. ENSREG Website[33]

The ENSREG website was launched in January 2010. Since then, it has been one of the main tools for ENSREG for informing the public and other nuclear safety stakeholders. At the same time, it ensures transparency and access to information. On several occasions (e.g. stress tests and follow-up, topical peer review on ageing management), the website has also been used as a platform for consulting stakeholders.

The information on the website is updated regularly. The ENSREG secretariat publishes documents as they become available and, when appropriate, posts news items.

ENSREG's WG3 is supporting the overall management of the website. Until June 2018, the ENSREG secretariat had contracts with external providers to maintain the website and to provide occasional assistance. However, several years of experience showed that this solution was not optimal, and the secretariat decided to insource the maintenance and support. Working arrangements were concluded with the relevant Commission departments, and

[31] https://ec.europa.eu/newsroom/ener/items/754466

[32] http://ensreg.eu/sites/default/files/attachments/summary_report_0.pdf

[33] http://www.ensreg.eu

support has been operational since May 2019. Among other things, the website has been modified to comply with data protection rules.

5.2. ENSREG Conference on Nuclear Safety

Due to Covid-19 related restrictions, ENSREG postponed to 2022 its sixth biennial conference that in accordance with the usual schedule would have been held in 2021.

5.3. Survey of ENSREG member organisations on application of the ENSREG principles for openness and transparency

From June 2018 to August 2019, ENSREG WG3 conducted a survey of ENSREG member organisations on the set of principles 'Guidance for National Regulatory Organisations, Principles for Openness and Transparency', adopted by ENSREG in 2011. The updated principles were approved by ENSREG in November 2019[34]. The results of the survey were published in February 2021[35].

The revised 'Guidance on Openness and Transparency for European Nuclear Safety Regulators' provides general guidance to the regulators for ensuring openness and transparency in their effective communication activities. The guidance goes beyond the legal obligations set out in Article 8 of the Nuclear Safety Directive, Article 10 of the Waste Directive and the relevant articles of the Basic Safety Standards Directive. It is generic in nature and may need to be adapted to the organisational structures of Member States, taking into account the financial and personnel feasibilities of each regulator. Therefore, the guidance should be implemented following a graded approach in order to take into account different infrastructures, situations and requirements. As an overarching model, the regulators must commit themselves to the principles of openness and transparency and to the mission of striving for continuous improvement.

5.4. Specific communication plans for ENSREG activities

In November 2020, ENSREG adopted its communication policy. It was made public in January 2021[36]. The document is a high-level policy text and serves as a basis for ENSREG's communication with the public and stakeholders. The development of a communication policy is a next step towards ENSREG's ambition for open, effective and transparent communication in the areas of nuclear safety of nuclear installations and the safe management of spent fuel and radioactive waste.

6. CONCLUSIONS

During the reporting period, ENSREG continued to demonstrate its efficiency in improving and promoting (in multilateral fora) nuclear safety and the management of spent fuel and radioactive waste and its regulation, in accordance with the amended Nuclear Safety Directive, the Spent Fuel and Radioactive Waste Directive and the Basic Safety Standards Directive. Thanks to these efforts, ENSREG was successful in:

- responding to the outbreak of Covid-19 pandemic by monitoring the preparedness planning in the Member States to ensure the safety of nuclear installations;
- continuing the planned follow-up of the first topical peer review on ageing management and feeding the lessons learned into the development of the second topical peer review on fire protection;
- following up on the implementation of post-Fukushima stress tests national action plans (preparation of summary reports based on the Member States' updated national action plans submitted at the end of 2019 and 2021);

[34] guidance_for_regulators_on_openness_and_transparency_0.pdf (ensreg.eu)
[35] https://www.ensreg.eu/document/report-transparency-principles-survey
[36] ensreg_communications_policy.pdf

- supporting IRRS and ARTEMIS peer reviews in coordination with the IAEA to review the sound implementation of amended Nuclear Safety Directive and the Spent Fuel and Radioactive Waste Directive in the EU;
- following up on stress tests in the EU neighbouring countries, in particular, in finalising the peer review for the Astravets nuclear power plant in Belarus and starting the peer review for the Akkuyu nuclear power plant in Türkiye.

Due to Covid-19 outbreak the sixth ENSREG conference was postponed and took place on 20-21 June 2022 as a successful event with the participation of a broad range of stakeholders.

During the next reporting period, ENSREG will continue to play a central role in improving nuclear safety and the management and regulation of radioactive waste and spent fuel through a range of activities that include:

- continuation of the follow-up of the first topical peer review, as required by the amended Nuclear Safety Directive at both EU and Member State level, based on the ENSREG Action Plan for the Topical Peer Review;
- completion of the preparations for the second topical peer review, which should lead to Member States submitting their national assessment reports for desktop review in 2023;
- review of the stress tests and their implementation in non-EU countries, as required;
- providing advice to the Commission and helping to coordinate efforts between regulatory bodies on key topics relevant to securing high standards of nuclear safety in Europe;
- providing support to the implementation of the findings of the Commission's second progress report on the implementation of the amended Nuclear Safety Directive.

ENSREG will also continue to promote openness and transparency in the above-mentioned areas.

7. REFERENCES

All documents made publicly available by ENSREG can be downloaded from the ENSREG website http://www.ensreg.eu/documents.