Report of the
European Nuclear Safety Regulators Group

ENSREG

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CONTENTS

EXECUTIVE SUMMARY

The fifth report from the European Nuclear Safety Regulators Group (ENSREG) covers the period June 2015–October 2017.

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

During the period covered by the present report, the various ENSREG working groups on nuclear safety, waste management and communication and transparency have carried out in-depth work to improve nuclear safety. This includes:

- Developing and implementing the first Topical Peer Review (TPR) on ageing management, building on the Directive 2014/87/Euratom and helping to identify best practices among regulators and licence holders on this topic and areas for improvement. During the Seventh Review Meeting of the Contracting Parties to the Convention on Nuclear Safety, the International Atomic Energy Agency (IAEA) recognised the first topical peer review as one of the four good practices.
- Following up on the implementation of updated post-Fukushima national action plans after the peer review conducted in 2015.
- Lending impetus to the ARTEMIS[1] reviews in coordination with IAEA: 17 Member States have plans for ARTEMIS peer reviews[2], and Poland hosted the first ARTEMIS review from 1–10 October 2017.
- Holding its fourth ENSREG conference in Brussels in June 2017. France headed up the organising committee and brought together around 300 delegates, including national regulators, non-governmental organisations (NGOs), nuclear operators and academics. The conference focused on upcoming challenges such as long-term operation or supply chain control.

[1] Integrated review service for radioactive waste and spent fuel management, decommissioning and remediation programmes (https://www.iaea.org/artemis).

[2] Defined schedule for Bulgaria, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Spain and Sweden; tentative schedule for Belgium, Cyprus, Hungary and Slovakia.

1. INTRODUCTION

1.1. Background

This is the fifth report on ENSREG's activities since it was established in May 2007. Issued every 2 years[3], these reports are meant to inform the Council 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.

1.2. 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.

A high level group was established by a Commission Decision in July 2007[4] under the name ENSREG (European Nuclear Safety Regulators Group).

ENSREG is an expert advisory group of senior representatives from each Member State with competence in the areas covered by ENSREG.

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 adequate safety policy. This is based on the knowledge and the experience gained from the Fukushima Daiichi accident as well as the use of the latest technologies to serve this goal.

ENSREG is committed to encouraging initiatives to improve nuclear safety, spent fuel and radioactive waste management across the EU where these initiatives add value to activities already undertaken at national and international level. As an expert advisory group to the Commission, ENSREG also focuses its work on developing proposals to improve:

- cooperation and openness between Member States;
- overall transparency on issues relating to the safety of nuclear power plants and other nuclear installations;
- the effective long-term safe management of spent fuel and radioactive waste within their jurisdiction.

ENSREG also provides a platform to share best practice and technological improvements.

1.3. ENSREG — purpose and structure

All Member States that operate nuclear installations follow the basic international principles for ensuring nuclear safety and the safe management of radioactive waste and spent fuel. These principles are established in the Convention on Nuclear Safety and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

[3]The aim is to update the Council and the Parliament on ENSREG's work since mid-2015. ENSREG's earlier work is described in previous reports submitted in July 2009, July 2011 and July 2013. The last report was submitted in February 2016.
[4]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

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

- improve cooperation between Member States on nuclear safety and radioactive waste/spent fuel management issues and to improve the related safety level;
- improve the overall openness and transparency on nuclear safety, spent fuel and radioactive waste issues;
- advise the Commission on additional mandatory EU regulation in the fields of nuclear safety and safe management of spent fuel and radioactive waste.

ENSREG established four working groups to carry out its work programme:

- **Working Group 1 (WG1)** — Improving nuclear safety arrangements;
- **Working Group 2 (WG2)** — Improving radioactive waste management, spent fuel and decommissioning arrangements;
- **Working Group 3 (WG3)** — Improving transparency arrangements;
- **Working Group 4 (WG4)** — International cooperation.

To improve the coordination of international cooperation, the former WG4 was merged with WG1 in 2016. It now acts as a task group that mainly provides advice on how to manage the Instrument for Nuclear Safety Cooperation.

These working groups meet whenever necessary and report back to ENSREG, which meets at least twice a year.

1.4. 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. Currently, 14 out of 28 Member States use nuclear energy to generate power.

There are 129 nuclear power reactors in operation in the EU (June 2017). Some reactors are being decommissioned, while the lifetime of others is being extended. Several new units are planned or are under construction. In addition to power reactors, a full range of fuel cycle plants (from enrichment to radioactive waste storage and recycling) are in operation in the EU.

Many Member States also operate research reactors and all use radioactive sources in medicine and 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, the establishment of disposal facilities for intermediate, high-level and long-lived waste remains a major challenge for the future. This is also based on the first industrial projects run by some Member States.

Nuclear safety is of the utmost importance to the EU and its people. It is therefore essential for society and the economy to avoid any nuclear accidents in the EU by ensuring the

highest possible quality of regulatory oversight and standards of nuclear spent fuel and radioactive waste safety in each and every Member State, as well as promoting high nuclear safety standards outside the EU.

1.4.1. National responsibility

Nuclear safety is a national responsibility exercised where appropriate in an EU (Euratom) framework defined in coordination with the competent regulatory authorities and the Commission. Decisions on safety measures and the supervision of nuclear installations lie solely with the operators and national authorities.

The national nuclear safety regulators of each of the EU countries are listed on the ENSREG website[5].The standards applied in each country are developed on the basis of EU law, international requirements and guidance on best practices.

1.4.2. International safety conventions

All Member States and the Commission are signatories to the Convention on Nuclear Safety (CNS) and the Joint Convention.

The CNS was adopted in Vienna on 17 June 1994 and entered into force on 24 October 1996. Its aim is to 'legally commit participating States operating land-based nuclear power plants to maintain a high level of safety by setting international benchmarks to which States would subscribe.'

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 Seventh Review Meeting of the CNS was held at the IAEA in Vienna in March-April 2017. It provided the possibility to insert a reference to the Vienna Declaration on Nuclear Safety in the guidelines and to reflect upon the need for additional analysis on how to improve the safety standards for the existing fleet based upon the safety level achieved by Generation III Nuclear Power Plants. The goal of improving the safety of nuclear power plants is to prevent nuclear accidents and, should an accident occur, to mitigate their consequences on the population and reduce long-term off-site contamination. The latest EU Directive on Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations strengthens nuclear safety requirements in a binding and enforceable framework. It is a strong driver for promoting such a policy at international level by virtue of the IAEA.

The Joint Convention entered into force on 18 June 2001. It applies to spent fuel and radioactive waste resulting from civilian nuclear reactors and civilian applications and to spent fuel and radioactive waste from military or defence programmes. However, it only applies 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 (NORM) waste from the nuclear fuel cycle. As in the case of the CNS, the Joint Convention requires

[5] List of nuclear regulators in EU countries: http://www.ensreg.eu/members-glance/national-regulators.

participating states to submit reports on the implementation of their obligations for 'peer review' at a meeting held by the IAEA every 3 years. The Fifth Review Meeting was held by the IAEA in Vienna in May 2015. Major issues discussed at the Joint Convention Topical Meeting of 2016 included international solutions for disposal. The Sixth Review Meeting is scheduled for May 2018.

1.4.3. EU legislation

On 25 June 2009, the Council 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 maintain and promote the continuous improvement of nuclear safety.

The EU amended its Nuclear Safety Directive in 2014 (Council Directive 2014/87/Euratom) on the basis of nuclear stress tests[6] carried out in 2011 and 2012, in light of the lessons learned from the Fukushima nuclear accident and in accordance with the safety requirements of the Western European Nuclear Regulators Association (WENRA) and the IAEA.

The amended Directive requires EU countries 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 for existing installations. Specifically, the Directive:

- Strengthens the role of national regulatory authorities by ensuring their independence from national governments. EU countries must provide the regulators with sufficient legal powers, staff, and financial resources.
- Creates a system of topical peer reviews. EU countries 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 a safety re-evaluation for all nuclear power plants to be conducted at least once every 10 years.
- 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.

An ambitious EU-wide safety objective for all types of nuclear installations has been introduced in this amended Directive. 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[7]. 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.

Based on this objective, ENSREG invited WENRA to develop a paper on this concept of 'timely implementation of reasonably practicable safety improvements to existing nuclear power plants'. ENSREG approved this paper in June 2017. The paper[8] proposes three types

[6] EU stress tests: http://ec.europa.eu/energy/node/102, http://www.ensreg.eu/EU-Stress-Tests.

[7] 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.

[8] .'The concept of reasonable practicability is directly analogous to the ALARA principle applied in radiological protection, but it is broader in that it applies to all aspects of nuclear safety. In many cases adopting modern standards and practices in the nuclear field will be

of situations involving the implementation of safety improvements for operating nuclear power plants:

- where implementation of safety standards stemming from new reactors is practicable and should be implemented;
- where implementation of some other safety improvements is not reasonably practicable, but an alternative solution can be implemented; and
- where the remaining standards from new reactors are not reasonably practicable and would require a related justification.

Being at the heart of the continuous safety improvement approach in this area, these safety objectives are expected to be implemented as part of the new Directive. The Commission received the reports from the Member States on the implementation of Council Directive 2009/71/Euratom in August 2015. In addition, ENSREG, with the support of WENRA, will reflect upon the concept of 'timely implementation of reasonably practicable safety improvements to existing nuclear power plants'. This work will also be supported by other expert bodies such as the European Commission Joint Research Centre.

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

On 19 July 2011, the Council 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 (Council Directive 2011/70/Euratom) requires that:

- EU countries have a national policy and framework as well as financial mechanisms and resources for spent fuel and radioactive waste management.
- EU countries 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 countries 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.

sufficient to show achievement of what is 'reasonably practicable'. For existing reactors, where a modern standard or good practice associated with new reactors is not directly applicable, or cannot be fully implemented, alternative safety or risk reduction measures (design and/or operation) to prevent or mitigate radioactive releases should be sought and implemented unless the utility is able to demonstrate that the efforts to implement them are disproportionate to the safety benefit they would confer. The degree of rigour and confidence in the outcome of such a demonstration should take account of nature and scale of the shortfall to modern standards that the measure would have addressed.'.

- EU countries 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[9].

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

As indicated above, two of the main influences on the development of requirements for national nuclear safety and the management of radioactive waste and spent fuel are the international legally binding safety conventions and EU legislation.

Another key influence is the international guidance and regulatory methodologies developed under the auspices of international bodies such as the IAEA and the OECD's Nuclear Energy Agency (NEA) and other groups such as WENRA (safety reference levels).

International Atomic Energy Agency (IAEA)

In addition to providing the secretariat for the international conventions described above, the IAEA seeks to build and strengthen the international safety and security regime by developing international advisory safety standards, codes and guides. These apply 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 has provided the IAEA with contributions such as the concept paper on the 'timely implementation of reasonably practicable safety improvements to existing nuclear power plants'. The IAEA also participated in the 2017 ENSREG Conference on Nuclear Safety.

Nuclear Energy Agency (NEA)

Most Member States 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 co-operation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes.' 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)

WENRA is a non-governmental organisation set up in 1999. It comprises the heads and senior staff members of all the national nuclear regulatory authorities of EU countries with nuclear power plants.

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

Since its creation in 1999, WENRA has developed among other things:

- 347 Safety Reference Levels (SRLs) for existing nuclear power plants;
- Safety Objectives for new nuclear reactors.

[9] *Article 14 (1) and (2)(a)(b) and Article 15 of Council Directive 2011/70/*

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

- the technical specifications for the stress test after the Fukushima disaster;
- the technical specifications for the first topical peer review under the amended Nuclear Safety Directive;
- a paper on the approaches for reasonable practicable improvements to the nuclear safety of the existing fleet.

1.5. ENSREG 2016-2019 work programme

ENSREG's mission is to strive for continuous improvements in nuclear safety and the management and regulation of radioactive waste and spent fuel and to promote openness and transparency in these areas.

At the 28th ENSREG meeting, a reflection group was formed to consider ENSREG practices. It recommended revising the structure of the work programme. At the 30th ENSREG meeting, the group was asked to draw up a new work programme for 2016-2019. The reflection group and the working group chairs produced the new programme, and it was presented and discussed during the 31st ENSREG meeting in November 2015. The revised work programme, which implemented the changes requested by ENSREG members, was approved in January 2016.

ENSREG's 2016-2019 work programme was shaped by recent EU legislative changes, in particular Council Directive 2014/87/Euratom (the amended Nuclear Safety Directive) and Council Directive 2011/70/Euratom (the Spent Fuel and Radioactive Waste Directive). A large proportion of ENSREG's work during this period therefore involves implementing the first topical peer review and taking measures that support the safety objectives of these Directives and help Member States implement them. For 2016-2019, ENSREG continues to facilitate the follow-up of the implementation of the national action plans following the EU stress tests. This work programme also includes a number of specific areas where ENSREG will advise the Commission upon request on matters such as nuclear safety cooperation, long-term operation of nuclear plants, decommissioning and emergency planning and response.

ENSREG's main activities in 2016-19 include:

1. Supporting implementation of the Nuclear Safety Directive and the Spent Fuel and Radioactive Waste Directive: While Member States are responsible for transposing and implementing EU legislation, ENSREG helps them with a number of work areas such as technical guidance to assist with reporting requirements (in particular those under Article 9 of the Nuclear Safety Directive and Article 14(1) and Article 14(3) of the Spent Fuel and Radioactive Waste Directive). A key task for ENSREG during this period, together with WENRA, is to provide a mechanism for implementing the first topical peer review as required by the amended Nuclear Safety Directive. This review will focus on ageing management for nuclear power plants.

2. Providing advice to the Commission and helping Member State regulatory bodies coordinate the safety of nuclear installations and the management of radioactive waste and spent fuel. The Commission has asked ENSREG to provide advice on emergency preparedness and response and the transport of radioactive material in order to improve safety standards and facilitate harmonisation within the EU. On the long-term operation of nuclear power plants, the Commission has also asked ENSREG to work on a statement outlining the use of 'best available' versus 'best applicable' technologies and to propose a way forward to ensure an effective, constructive public consultation in the decision-making process on long-term operation.

More generally, ENSREG will consider what activities could be put in place to initiate or strengthen collaboration between regulatory bodies. The aim is to support harmonisation at EU level of licensing processes for long-term operation, new build and decommissioning and to increase standardisation in the nuclear industry and encourage convergence of codes and standards across the EU.

3. Facilitating active participation in peer reviews within the EU and overseeing the completion of the 'national action plan' stress test. ENSREG played a pivotal role in the 2011 EU stress tests and has since held two workshops to review progress on the Member States' national action plans. ENSREG will continue to provide oversight in this area by putting in place an agreed reporting schedule. It will also contribute to the peer review of national action plans from three non-EU countries. During this period, ENSREG will continue to facilitate EU participation in peer reviews through the IAEA's Integrated Regulatory Review Service (IRRS) and ARTEMIS peer review services. This will therefore support the continuous improvement of nuclear safety and management of radioactive waste in Europe.

4. Seeking greater openness and transparency in ENSREG's activities, including the provision of revised guidelines to Member States on reporting and transparency as part of ENSREG's work on reporting under Directives, developing a communication plan for ENSREG that implements a new approach to the ENSREG website and holding ENSREG conferences in 2017 and 2019.

2017-2020 work programme

While the current work programme aimed to set out the key areas of work in 2016-2019, there was a need to make amendments in 2017 to align the wording of the ongoing activities with the final terms of reference for the upcoming topical peer review and to include the latest ENSREG decisions and outputs from the 2017 conference on this process. ENSREG was mandated to revise the work programme at its 32nd meeting in June 2017. The revised version of the work programme, was supposed to be endorsed by ENSREG during the plenary meeting the 20 December 2017, covers the period between 2018. However, due to other priorities, this was not achieved during this meeting and the final decision regarding the revised version of the work programme was postponed to mid of 2018.

2. SAFETY OF NUCLEAR INSTALLATIONS

2.1. Activities to support the effective implementation of the Nuclear Safety Directive

Council Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations, amended by Council Directive 2014/87/Euratom, aims to maintain and promote the continuous improvement of nuclear safety and its regulation. 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.

Taking into account the Directive's principles and obligations, ENSREG has included various activities in its work programme to continuously improvement nuclear safety. These consist in:

- conducting technical discussions on the application of the Nuclear Safety Directive, such as the reporting obligations under Article 9(1), or how best to support a harmonised implementation of the nuclear safety objectives for nuclear installations under Article (8)(a);
- continuing to follow up on the indicative programme and pool of experts for conducting IRRS and ARTEMIS peer review missions in Member States in cooperation with IAEA and sharing lessons learned and experiences gained from these missions;
- developing the terms of reference for the first topical peer review under the Nuclear Safety Directive, which officially started in February 2017;
- following up on the implementation of updated post-Fukushima national action plans after the 2015 peer review;
- advising the Commission on the safety of nuclear installations and the management of radioactive waste, and supporting the revision and implementation of assistance and technical cooperation programmes such as those under the Instrument for Nuclear Safety Cooperation.

ENSREG has a permanent working group on nuclear safety and international cooperation (WG1). WG1 consists of designated representatives from many ENSREG members and the Commission secretariat. The working group meets at least twice a year, and its Chairman reports to ENSREG during each plenary meeting. WG1 advises and prepares proposals for endorsement by the ENSREG plenary and coordinates several ENSREG activities. Its work programme is based on the previous activities and is reviewed periodically to ensure that it carries out any requests or tasks issued by ENSREG. WG1 works together with other working groups devoted to spent fuel and waste management (WG2) and transparency arrangements (WG3). At its 32nd meeting in June 2016, ENSREG decided to merge the functions assigned to the working group on international cooperation (previously WG4) with WG1 to ensure better coordination of these ENSREG activities within and outside the EU.

In specific cases, WG1 ensures technical coordination with representatives from other international organisations or associations such as the IAEA or WENRA (mainly with WENRA's Reactor Harmonisation Working Group).

This chapter describes the main activities on nuclear safety that ENSREG has carried out since the last ENSREG report in November 2015.

2.2. Member States' reports under Article 9(1) of the Nuclear Safety Directive

Member States produced their first national reports as required under Article 9(1) of Council Directive 2009/71/Euratom and submitted them to the Commission by July 2014. These reports depict how the Member States are addressing the objectives of the Directive by fulfilling their obligations under the Directive and highlight their approaches. On the basis of these reports, the Commission published a report in 2015 on the progress made in EU countries on implementing the Nuclear Safety Directive. Overall, the report found a good level of compliance with the rules. The next national reports will be submitted in 2020.

To prepare the first set of national reports, ENSREG provided Member States with guidance on the type of information and material to include in the reports. It then produced the 'ENSREG guidelines regarding Member States reports as required under Article 9.1. of Council Directive 2009/71/Euratom'. ENSREG should revisit these guidelines to incorporate experiences gained from the first national reports.

2.3. IRRS missions to EU countries: indicative programme and pool of experts

To meet the obligations and in keeping with the spirit of Article 8e(1) of the Nuclear Safety Directive and Article 14(3) of the Radioactive Waste and Spent Fuel Management Directive on self-assessments and international peer reviews, ENSREG believes that the best way forward is to use IRRS and ARTEMIS peer reviews.

In particular, Article 8e(1) of the 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.'

The ENSREG working groups make use of international services provided by the IAEA to meet the requirements of both Directives. These include the EU IRRS programme coordinated by WG1 and the EU ARTEMIS programme coordinated by WG2.

To provide ENSREG, the IAEA and the Commission with an overview of the planned EU peer reviews required under Article 8e(1) of the Safety Directive and under Article 14(3) of the the Radioactive Waste and Spent Fuel Management Directive and to help organise them, WG1 and WG2 maintain an up-to-date schedule of peer reviews, a pool of Member State experts available for peer review missions and a list of national contact points. The ARTEMIS and IRRS indicative programmes are being combined in a single programme.

WG1 will continuously review and update the full indicative EU IRRS programme until 2026. The programme includes schedules for Member States to carry out self-assessments and IRRS missions for a 10-year period. Based on this programme, IRRS missions have been conducted in Croatia, Cyprus, Estonia, Hungary, Ireland, Italy, Lithuania and Malta from 2015 to 2017.

To guarantee the availability of experts for implementing the EU IRRS programme, a pool of suitable EU experts has also been established. This ensures an effective level of Member State participation in the IRRS programme both within the EU and worldwide, and helps harmonise EU regulatory practices. The pool of experts available for IRRS missions keeps growing. As of 2017, close to 260 experts are available.

2.4. EU topical peer review on ageing management

Directive 2014/87/Euratom introduces a system of topical peer reviews to provide a mechanism for Member States to examine topics of strategic importance to nuclear safety, exchange experiences and identify opportunities to strengthen nuclear safety. The revised Nuclear Safety Directive includes the obligation for Member States to conduct the first topical peer review in 2017; subsequent reviews should take place at least every 6 years. The process will also enable EU neighbouring countries to participate in nuclear power peer review exercises on a voluntary basis,.

WENRA's Reactor Harmonisation Working Group (RHWG) drew up a list of possible topics for the first topical peer review, which served as a basis for ENSREG to select the 'Ageing management' topic. ENSREG selected it at its 30th meeting in recognition of the average age of the European reactor fleet and the current trends on life extension.

WG1 developed a proposal for the scope and methodology of the first topical peer review. This was carried out in close coordination with WENRA RHWG, which drafted the technical specifications and guidance on the structure of national reports. The final versions of the technical specifications for the first topical peer review, terms of reference and stakeholder engagement plan were approved by ENSREG members and published on the ENSREG website in January 2017, thereby launching the peer review process.

The first topical peer review as envisaged by ENSREG will consist of three phases:

- **National assessment**: Nuclear safety regulators will prepare national assessment reports based on the format and content described in the technical specifications. These are due by the end of 2017.
- **Peer review**: This will include the exchange of comments and questions on national assessment reports, a peer review workshop, the publication of a summary report setting out the overall findings and ENSREG's proposed follow-up activities up to mid-2018.
- **Follow-up**: Definition and implementation of measures to address relevant findings from national assessments and peer reviews.

The process will examine how these ageing management programmes are applied to the following systems, structures and components:

- electrical cables;
- concealed pipework;
- reactor pressure vessels (or equivalent structures);
- concrete containment structures.

WG1 coordinated preparatory activities on the topical peer review process until a topical peer review board was appointed. The board was established at ENSREG's 32nd meeting in June 2017 to provide appropriate leadership and to supervise the peer review process until it ends.

2.5. Follow-up on the implementation of post-Fukushima national action plans

In the aftermath of the nuclear accident at the Fukushima Daiichi nuclear power plant in Japan on 11 March 2011, 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 learned from the accident.

National Action Plans (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 2nd 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 adequate 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 these positive improvements, ENSREG issued a statement on this topic[10] in November 2015. In it, 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. An updated national action plan report for each participating country is therefore due by the end of 2017 and will be published on the ENSREG website.

2.6. Stress tests in EU neighbouring countries

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

Following a meeting on 23 June 2011 with Energy Commissioner Oettinger[11], deputy energy ministers and senior representatives from energy ministries and national authorities responsible for nuclear energy from Armenia, Belarus, Croatia, Russia, Switzerland, Turkey and Ukraine, in cooperation with the EU:

- *"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 a 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 countries in 2012 and in the national action plan peer reviews in 2013 and 2015.

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

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

Some neighbouring countries like Armenia, Belarus and Turkey expressed their interest in following the same peer review process. However, they were not ready to join and submit a report right away. ENSREG has always indicated its willingness to support the peer review process in collaboration with the Commission when the countries are ready.

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. All reports related to this peer review are available on the ENSREG website[12].

Following the same approach, Belarus submitted its national stress test report for peer review in October 2017. The peer review mission to Belarus will take place in March 2018, with the final version of the peer review report to be presented in June 2018. Based on the principle of transparency, the Belarus national stress test report, a key part of the upcoming peer review, was published on the ENSREG website for public consultation from 13 November 2017 to 13 January 2018[13].

2.7. Cooperation (ENSREG/WG1, WG2 and WG3, IAEA, WENRA/RHWG)

At its 32nd meeting in June 2017, ENSREG commissioned WG1 to coordinate the revision of the ENSREG work programme by gathering contributions from its working groups. WG1's contribution to this revision includes changes linked to decisions and measures that have been officially taken by ENSREG and linked to the deletion of activities that had already been or would have been completed by the previous programme. Some changes have been included to ensure consistency with the latest version of the terms of reference for the first topical peer review. Other changes refer to the integration of activities from the former WG4 into WG1 and the ongoing measures on the interpretation of Article 8a of the Nuclear Safety Directive. WG1 gathered contributions from the other working groups and with the aim to approve the revised ENSREG work programme for 2018-2019 during the ENSREG plenary meeting the 20 December 2017. . However, due to other priorities, this was not achieved during this meeting and the final decision regarding the revised version of the work programme was postponed to mid of 2018.

WG1 and WG2 continued to cooperate in 2016, working closely on planning IRRS and ARTEMIS peer reviews. This therefore supports the continuous improvement of nuclear safety and management of radioactive waste and spent fuel in Europe. ENSREG and the IAEA have established subsequent memoranda of understanding to formalise their cooperation.

In parallel to the terms of reference for the first topical peer review, WG1 coordinated with WG3, which is responsible for defining stakeholder engagement throughout the process.

WG1 helps maintain and update the ENSREG website together with WG2 and WG3.

ENSREG exchanges information and cooperates where necessary with WENRA and in particular with RHWG. WG1 is working on the WENRA approaches and activities to update the WENRA safety reference levels. At the 2015 peer review workshop on national action plans, discussions were centred on the revision of WENRA safety reference levels for nuclear power plants, which have been shared with RHWG. Together with RHWG, WG1 also developed a proposal for the topical peer review process required under the revised Nuclear Safety Directive. RHWG developed the technical specifications and WG1 prepared the terms of reference for the review process, while WG3 developed the stakeholder engagement plan.

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

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

2.8. International cooperation on nuclear safety

As mentioned in the previous ENSREG activity report, a working group (WG4) was created to focus on international cooperation. More specifically, the ENSREG terms of reference for WG4 were finalised in May 2013. This marked the official start of the coordination activities on implementation of the Instrument for Nuclear Safety Cooperation.

The Instrument for Nuclear Safety Cooperation requires the European Atomic Energy Community (Euratom) to 'finance measures to support the promotion of a high level of nuclear safety, radiation protection and the application of efficient and effective safeguards of nuclear material in third countries.' This cooperation includes promoting an effective nuclear safety culture at all levels, mainly by offering support to regulatory bodies and technical support organisations, and strengthening the regulatory framework. It also includes support for the safe management of radioactive waste and spent nuclear fuel.

The Instrument for Nuclear Safety Cooperation has been deployed under two subsequent regulations so far: INSC-I (2007-2013) and INSC-II (2014-2020). While both programmes support nuclear safety, there are differences in geographical and thematic scope.

WG4's first priority was to advise the Commission on high-level policy and define its cooperation activities with regulatory bodies in non-EU countries.

In 2016, the ENSREG plenary took the decision to merge WG4 with WG1 (nuclear safety). During the 26th WG1 meeting held in Brussels in October 2016, a task group was created within WG1 to handle the activities previously carried out by WG4. Since its inception, the task group has reviewed and evaluated the following:

- **Mid-term report 2014-2017**

  The task group followed the external and independent evaluation of INSC-II, which helped provide input for a mid-term review report covering nine External Financing Instruments of the EU.

  Several meetings were held to examine the key draft documents prepared by the contractor.

  The task group identified some issues, such as the need to develop an approach in which criteria for the selection process need to be better documented, to increase the focus on results and measurability of the programme and to further promote transparency and public communication.

- **Multiannual indicative programme 2018-2020**

  Under Article 6 of Council Regulation (Euratom) No 237/2014, 'Multiannual indicative programmes shall be drawn up on the basis of the strategy paper and shall cover a period of 2 to 4 years'. The current multiannual indicative programme covers 2014-2017.

  As stated in recital 12 of Council Regulation (Euratom) No 237/2014, consulting ENSREG prior to preparing and adopting the strategy paper and multiannual indicative programmes is therefore a legal commitment. As a result, the Commission (DG DEVCO and the European External Action Service) asked the WG1 task group on international cooperation to review the draft version of the 2018-2020 multiannual indicative programme.

  The Commission took any comments and recommendations provided by the task group into consideration, and the multiannual indicative programme was modified accordingly.

  The 34th ENSREG plenary meeting held in June 2017 endorsed ENSREG's views on the 2018-2020 multiannual indicative programme for the Instrument for Nuclear

Safety Cooperation. Its views were delivered in due time to allow the Commission to finalise the multiannual indicative programme.

ENSREG highlighted the importance of maintaining such an instrument beyond 2020 as it helps disseminate the best EU safety standards and in so doing helps develop a strong safety culture. ENSREG also took note of the new budget allocation, recalling that its priority for the budget is still to support the regulatory authorities and help develop the regulatory framework. ENSREG stressed the need to use the results of the peer review missions as performance indicators to monitor the results and assess the impact of projects.

3. SAFETY OF MANAGEMENT OF SPENT FUEL AND RADIOACTIVE WASTE

3.1. Activities to support the effective implementation of Council Directive 2011/70/Euratom

3.1.1 General framework

On 19 July 2011, the Council of the EU (Council) adopted Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (the 'Directive').

The Directive's overall objective is to ensure responsible and safe management of spent fuel and radioactive waste in order to avoid imposing undue burdens on future generations. The Directive also seeks to ensure the public is informed about spent fuel and radioactive waste management and that mechanisms are in place for public participation.

Similar to the provisions in the Nuclear Safety Directive (2009/71/Euratom as amended by 2014/87/Euratom), 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. Member States are required to provide for a national framework with national arrangements for a high level of safety in spent fuel and radioactive waste management, integrating all stages in spent fuel and radioactive waste management from generation to disposal, i.e. 'cradle-to-grave' approach. The national framework must provide for the establishment of a national programme for the implementation of spent fuel and radioactive waste management policies. National programmes have to be reviewed and updated on a regular basis.

Member States had to transpose the Directive by 23 August 2013. Pursuant to Articles 13(1) and 15(4) of the Directive, Member States had to notify the Commission of the contents of their national programme for the management of spent fuel and radioactive waste for the first time by 23 August 2015. Member States also have to notify the Commission whenever there are any subsequent significant changes to their programmes.

Most Member States formalised their national programme as required under Article 12 of the Directive and notified the Commission of this by August 2015, as required by Article 13(1). To date, 4 Member States have notified the Commission of a preliminary programme, as they were unable to conclude the formal adoption procedure of their national programme before that date.

Article 14(1) of the Directive also requires that Member States submit a national report to the Commission on the implementation of this Directive for the first time by 23 August 2015, and every three years after that.

All Member States produced their first national reports as required under Article 14(1) of the Directive and submitted them to the Commission. These reports demonstrate how the Member States are addressing the Directive's objectives by fulfilling their obligations under the Directive and illustrate their national approaches. Future reporting will serve as up-to-date reports on the implementation of national programmes.

On the basis of the Member States' reports and Art. 14(2) of the Directive, the Commission adopted a report to the Council and the European Parliament on 15 May 2017 on progress made with the implementation of the Directive (COM(2017) 236)[14].

Article 14(3) of the Directive also requires that Member States periodically, and at least every 10 years, arrange for self-assessments and invite international peer reviews of the national framework, competent authorities and/or national programme. The outcomes of such peer reviews should be reported to the Commission and other Member States and made available to the public.

3.2. ENSREG activities

Considering the Directive's obligations to continuously improve the safe and responsible management of spent fuel and radioactive waste, ENSREG included the following activities in its 2016-2019 work programme:

- organisation of a workshop on experiences with notification of the national programme (Article 13(1)) and the Member State reports under Article 14(1) of the Directive, the purpose being to support the revision of the ENSREG guidelines (2014)[15] and to ensure that at the Commission event on the Directive's implementation Member States could give a coordinated response to the lessons they have learned and express any concerns they may have;

- revision of ENSREG guidelines (2014) on the production of national reports pursuant to Article 14(1) of the Directive;

- contribution to the development of a coordinated approach for indicative time schedules and pool of experts for IAEA, IRRS[16] and ARTEMIS peer review missions in the Member States, the aim being to ensure active participation and improve the support process based on lessons learned and follow-up;

- identification and/or setting-up of links and initiating collaboration with the Decommission Funding Group (DFG) on financial issues related to decommissioning, spent fuel and waste management.

ENSREG has set up a working group on Improving Radioactive Waste Management, Spent Fuel and Decommissioning arrangements (Working Group 2, WG2). The group is currently composed of designated representatives from Member States[17] and the Commission secretariat. Two international organisations (IAEA and OECD-NEA) participate as observers. The group meets when necessary but at least twice a year as required, and its chairman reports to ENSREG in every plenary meeting. WG2 advises and prepares proposals for endorsement by the ENSREG plenary. WG2 interacts as required and when necessary with the other ENSREG working groups on nuclear safety arrangements (WG1) and on transparency arrangements (WG3).

[14] Report from the Commission to the Council and the European Parliament on progress of implementation of Council Directive 2011/70/Euratom and an inventory of radioactive waste and spent fuel present in the Community's territory and the future prospects + 2 Staff Working Document Support.
[15] HLG_p(2014-27)_137, ENSREG Final Guidelines for Member State Reports to the Waste Directive.
[16] Integrated Regulatory Review Service.
[17] [17] Austria, Belgium, Czech Rep, Germany, Denmark, Spain, Finland, France, Hungary, Italy, Lithuania, the Netherlands, Poland, Romania, Slovenia, Slovak Rep, Sweden and the UK.

The following sections describe the main activities carried out by ENSREG to improve the management and decommissioning of radioactive waste and spent fuel since the previous ENSREG report to the Council and Parliament in 2015[18].

3.3. ENSREG WG2 workshop on experiences with notification of national programmes (Article 13(1)) and Member State reports under Article 14(1) of the Directive

ENSREG WG2 organised a workshop on the lessons Member States have learned from notification of their national programmes and submission of national reports under EU Directive 2011/70/Euratom. The workshop was held in the UK in Oldbury Technical Centre, Oldbury Power Station on 26-27 October 2016 and was hosted by the UK nuclear regulatory authority, ONR. The workshop was attended by 37 participants from 18 Member States (Austria, Belgium, Cyprus, the Czech Republic, Germany, Denmark, Spain, Finland, France, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Slovakia, Sweden and the UK), 2 participants from the Commission, 1 observer from the IAEA and 1 observer from the OECD-NEA.

The workshop indicated that the guidelines were useful and applied by most Member States. The summary report concludes that the outcome from the workshop provides a good basis to assist ENSREG WG2 in revising the guidelines. It was also concluded that the outcome from the workshop would serve as constructive input for the Commission event being organised in Brussels on 7-8 November 2017 on lessons learned from the Directive's implementation .

3.4. Revision of the ENSREG Guidelines after Member States' first reports

ENSREG considered early on that it would be appropriate to help Member States prepare their report on the Directive's implementation by providing guidance on the type of information and material that could be useful to include in the reports. ENSREG therefore produced guidelines for such reports and endorsed them in May 2014 so that Member States could use them to prepare their first report.

The guidelines have no legal status, nor do they claim to interpret, modify or extend the Directive's obligations. The guidelines are voluntary, and Member States may submit their national reports in any format, length or structure they believe necessary to describe how they comply with the obligations under the Directive.

ENSREG also noted that the guidelines should be revisited to incorporate experience after the first Member States' reports have been submitted.

A sub-group was formed within WG2 to take the lead in revising the guidelines. A start-up meeting was held in Brussels in January 2017 to establish the basic principles for the revision work and agree on a time schedule for completing the work. This was followed by two meetings in Rome in May and September 2017. ENSREG endorsed the revised guidelines in January 2018.

[18] HLG_p(2015-31)_145, ENSREG_REPORT_2015.

3.5. IRRS and ARTEMIS peer review missions in the Member States — Article 14(3) of the Radioactive Waste and Spent Fuel Directive

Article 14(3) of the Directive requires that Member States 'shall at least every 10 years invite an 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.'

By the time the Directive entered into force, ENSREG had already agreed that establishing an EU IRRS programme of the IAEA would be the best way to satisfactorily meet the corresponding obligation for peer reviews in the Nuclear Safety Directive. ENSREG and IAEA signed a memorandum of understanding in 2011 for this purpose.

In 2014, IAEA launched a new peer review service called ARTEMIS. Anchored in the IAEA safety standards, ARTEMIS aimed to provide for a comprehensive integrated review service for the management of radioactive waste and spent fuel, decommissioning and the remediation programme. The memorandum of understanding between ENSREG and IAEA was therefore revised to allow Member States to optimise their responsibilities in peer reviews under both Directives.

Working Group 2, together with Working Group 1, continues its work on establishing and maintaining a comprehensive tentative schedule for Member State peer reviews and its work on setting up a comprehensive pool of experts to help the IAEA carry out the EU peer review programme.

On the date of this ENSREG report, 17 Member States had reported plans for ARTEMIS peer reviews[19]. The first Member State to host a peer review was Poland (1-10 October 2017).

3.6. Identify and/or set up links and initiate collaboration with the Decommissioning Funding Group (DFG) on financial issues for decommissioning and management of spent fuel and waste

This was introduced in the ENSREG work programme upon a proposal from the Commission. As a first step in addressing this task, and to avoid any duplication of efforts, ENSREG WG2 invited representatives from the IAEA and the OECD-NEA to present their activities on the financing of decommissioning and management of spent fuel and waste. Based on the outcome of the discussions, it was decided to develop a non-paper to consolidate the situation and propose a way forward. The WG2 also collected feedback from its members on regulators' experience in cost assessment and the financing of spent fuel and radioactive waste management. In the course of its work, it was recognised that the proposed task was very broad and needed to be better defined and that DFG's rules of procedure and two-year work plan had been adopted. ENSREG therefore decided to temporarily postpone the start of collaboration between WG2 and the DFG until the situation was clarified.

[19] See footnote 2.

4. OPENNESS AND TRANSPARENCY

4.1. ENSREG website[20]

The ENSREG website was launched in January 2010. Since then, it has been ENSREG's main tool 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 worked as a platform for consulting stakeholders. The information on the website is updated regularly.

In spring 2016, an update of the website layout and its technical infrastructure was completed. Based on a more user-friendly layout, the website enables visitors to navigate through the following thematic areas:

- ENSREG at a glance
- Nuclear safety
- Safe management of spent fuel and radioactive waste
- Nuclear safety and waste regulation
- Transparency and public involvement
- ENSREG conferences
- EU stress tests
- EU topical peer review (added in 2017)

Arrangements are in place to update the website with 'news' and 'documents' as they become available. These features make the navigation and the quick search easier. Maintenance of the website has also been improved. According to web statistics that are gathered regularly, the average number of visitors remains stable. The figures also show that the rate of new visitors is relatively high.

To further improve the site, ENSREG has decided to conduct a survey and collect feedback from website visitors; in the beginning of 2017, an online survey feature was added on the website's homepage.

The website is managed by a task group, with representatives from WG1, WG2 and the Commission, and is coordinated by the WG3 Chairman.

4.2. Fourth ENSREG Conference on Nuclear Safety

ENSREG held its fourth conference in Brussels on 28-29 June 2017. The conference was organised by a steering committee chaired by ASN(France) and comprising representatives from regulators (AT, UK, FI, ES) and the Commission.

The event brought together more than 270 delegates from 32 countries, including national regulators, nuclear operators, NGOs, industry (including from the aerospace field), academics and representatives from EU institutions and national competent authorities.

ENSREG's first conference in 2011 had mainly dealt with the work done by the regulators' group, its achievements and perspectives. The second conference in 2013 had focused largely on the Fukushima accident and the lessons learned from it. In 2015, the conference

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

focused on the legal framework for nuclear safety and Europe's proactive role in improving nuclear safety.

The 2017 event was based on the 2011 EU Directive on radioactive waste management and the 2014 Revised Directive on Nuclear Safety and dealt with issues such as long-term operation, licensing or supply chain control.

The conference, chaired by Mr Petteri Tiippana (director-general of Finnish regulator STUK), was opened by Commission Vice-President Maroš Šefčovič . He stressed the Commission's priority for nuclear energy, which is to ensure that nuclear energy is used only with the highest standards of safety. He also praised the advice ENSREG has provided over recent years and its active role in cooperating with regulators from neighbouring countries. The President of the conference as well as ENSREG, IAEA and industry representatives all delivered opening remarks.

In the four topical sessions, many key issues emerged from the presentations by invited speakers and panellists and from the discussions with the audience.

In the session on **spent fuel and radioactive waste management**, participants stressed the need to balance timely political decision-making with transparency and effectiveness. Developing the most appropriate approaches takes time and requires discussion with the operators and the public. It also requires a strong trust in the regulators. The issue of regional disposals solutions was mentioned, but mostly in a theoretical way, as regulators stressed the need (and requirement in most countries) to secure national waste management solutions. The importance of knowledge and experience retention, as well as the need to ensure funding for long-term solutions, were also emphasised. Interim storage facilities were also part of the discussion, but many participants underlined the fact that the construction of such facilities can only be considered if they are part of a more general approach comprising final solutions. Finally, radioactive waste management must also take into consideration dismantling and decommissioning issues.

In the session on **licensing**, regulators and vendors stressed that there needs to be more cooperative effort (and associated benchmarking) for codes and standards and national processes for licensing, for instance for new designs such as Small Modular Reactors (SMRs). All parties have to make the best of existing cooperative frameworks such as the multinational design evaluation programme, which enables regulators and licence holders to share operating experience on existing Generation 3 nuclear power plants. On the licensing process, there was a strong desire for public engagement to discuss the best safety standards. Finally, it was recognised that lessons learned in design and construction must include the supply chain and its control.

In the session on **Long-Term Operation (LTO)**, the participants agreed that the first responsibility lies with the licence holders. If they wish to extend the operation of an installation, they must notify the regulator in order to initiate an assessment process for potential approval. They must also take into consideration that investments are needed to ensure the continuous improvement of nuclear safety and must inform the regulators of the scope and nature of the investments they intend to make. The general approach must be all-encompassing, taking into account safety and risks: in that sense, the current debate on the 'timely implementation of reasonably practicable safety improvements' to decrease risk, as stated in the 2014 Nuclear Safety Directive, is pivotal. The issue of effective and constructive public engagement in the decision-making process on long-term operation was raised. The need to complete the topical peer review on ageing management is also essential and will be a major input to upcoming discussions on long-term operation.

In the session on **supply chain control**, the French regulator shared the lessons it has learned on carbon segregation issues, both on technical anomalies and on supply chain irregularities. On the issue of supply chain irregularities, which was the main focus of the debate, participants discussed ways to prevent such irregularities. They stressed the need to promote a safety culture — in particular a questioning attitude — in the supply chain,

especially among workers, foremen and line managers who have to be aware of the final use of the equipment and therefore what is ultimately at stake. A programme supporting potential whistleblowers and transparency on detected events must also be encouraged. Moreover, there is a need to ensure the integrity of data management. On the detection of irregularities, the session highlighted the importance of reinforced inspector training, changes in inspection methodology and scope and independent audits.

The conference was closed by its president who noted that it had been a special moment of interaction within the global nuclear community and needed to be as fruitful as possible. In conclusion, he left the participants with three questions to ponder: what did we all learn? Did we manage to build trust among members of the community? And finally, did we actually find ways to enhance safety or decrease risk?

The ENSREG conference illustrated the consensus on the need to continuously improve nuclear safety, a priority shared by many stakeholders, and the need for effective communication and public participation. The conference also allowed all participants to contribute to the debate and share their expectations of nuclear safety.

The conference was streamed on the ENSREG website. The presentations, speeches, photos and video recordings are also available on the website.

4.3. Topical peer review — stakeholder engagement plan

Pursuant to the terms of reference of the topical peer review on ageing management and the Guidance for National Regulatory Organisations — Principles for Openness and Transparency , a stakeholder engagement plan has been developed[21]. The stakeholder engagement plan identifies activities to increase engagement with all stakeholders, including the public, industry and governments. The publication of national assessment reports and the organisation of two public meetings and press activities are among the measures included in the plan, which is available on the ENSREG website.

4.4. Other activities

- A working paper on an ENSREG communication strategy has been developed.
- A questionnaire is being prepared on implementation of the ENSREG Principles for Openness and Transparency as contained in the document 'Guidance for National Regulatory Organisations on Principles for Openness and Transparency'[22]. It will be addressed to the national regulatory organisations. The outcome will be used to update this guidance document, if necessary.

[21] http://www.ensreg.eu/sites/default/files/attachments/ensreg_tpr_stakeholders_plan_-_january_2017_1.pdf .

[22] Document 'Guidance for National Regulatory Organisations — Principles for Openess and Transparency' (HLG_p(2011-14)_57), http://www.ensreg.eu/node/1320 .

5. CONCLUSION AND FUTURE ACTIVITIES

During the reporting period, ENSREG demonstrated its efficiency to improve and promote (in multilateral fora) nuclear safety and the management of spent fuel and radioactive waste and its regulation, in accordance with the Directives. Thanks to these efforts, ENSREG was successful in:

- conducting technical discussions on the application of the 2014 Nuclear Safety Directive, and especially on how to efficiently support a harmonised implementation of the nuclear safety objective for nuclear installations under Article 8a-8c;
- developing and initiating implementation of the first topical peer review on ageing management, building on the 2014 Directive and helping to benchmark and identify best practices among regulators and licence holders. Such a topical peer review will provide important input to the more general issue of the long-term operation of nuclear power plants;
- monitoring the implementation of updated post-Fukushima national action plans after the peer review conducted in 2015: regulators were asked to deliver their updated report by the end of 2017 in order to be presented to the WG1;
- providing analysis and advice to the Commission on the EU's Instrument for Nuclear Safety Cooperation, ie. both on the mid-term review of the Instrument but also on the programming issues covering the last period of financing;
- providing an impetus to the ARTEMIS peer reviews in coordination with IAEA to ensure that all Member States fulfil the requirements of Article 14(3) of the Directive and have international peer reviews organised by August 2023;
- Having the implementation of the first topical peer review being recognised for one good practice by the Contracting Parties to the Convention on Nuclear Safety at the Seventh Review Meeting of the Convention on Nuclear Safety;
- holding its fourth conference in Brussels in June 2017. France chaired the organising committee and brought together around 270 delegates, including national regulators, NGOs, nuclear operators and academics. This successful conference opened the floor to upcoming challenges such as long-term operation and supply chain control.

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. It will also continue to promote openness and transparency in those areas through a range of activities that include:

- conducting the workshop of the first topical peer review, as required by the amended Nuclear Safety Directive. The outcomes of this workshop, based on the national reports of licence holders and regulators and taking into account an effective public engagement, will help to identify best practices to be shared and adopted for the long-term operation of nuclear power plants;
- leading the stress tests in Belarus, in line with the stress tests programme in neighbouring countries. Belarus submitted its national stress test report in October 2017 for a peer review. This peer review mission to Belarus will take place in March 2018, and the final version of the peer review report will be presented in June 2018. In accordance with the principle of transparency, the Belarus national stress test report was published on the ENSREG website and open for public consultation from Monday 13 November 2017 to Saturday 13 January 2018. This report is a core part of the upcoming peer review.

- developing, in close cooperation with WENRA and other technical bodies such as the Commission's Joint Research Centre, guidance for the implementation aspects of the revised safety objective of the 2014 Directive, and organising before 2020 benchmarking exercises between EU countries on specific safety improvements to support a converging implementation of the safety objective;
- reviewing the ENSREG guidance on reporting on implementation of the Nuclear Safety Directive and the Spent Fuel and Radioactive Waste Directive, drawing on the lessons learned from the first reports to assist in future reporting;
- 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.

ENSREG will set out in further detail its key activities in a new work programme for 2017-2019.

6. REFERENCES

All documents made publicly available by ENSREG can be obtained from the site https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp or from the ENSREG website http://www.ensreg.eu/documents