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Opinion of the European Economic and Social Committee

Radioactive waste management: a civil society perspective

(own-initiative opinion)

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1. Conclusions and recommendations

1.1. Council Directive 2011/70/Euratom ([1]) (hereinafter the 'Radioactive Waste Directive') on the responsible and safe management of spent fuel and radioactive waste has been a clear step forward as it set minimum standards for planning and managing radioactive waste across the EU Member States. The EESC is pleased that all Member States have their national programmes in place. However, it notes that the application of the directive is uneven in the Members States, resulting in a lack of comparable data and, in some Member States, low involvement of civil society in radioactive waste management (hereinafter 'RWM').

1.2. As the annual generation of radioactive waste will increase over the next decade and beyond, the Member States should facilitate inclusive engagement, openness and transparency with civil society, including current host communities and potentially interested host communities, in all areas of RWM. Available funding should be used to increase the capacity of civil society groups, particularly local communities close to nuclear installations, to participate independently in projects and studies to assess participation and transparency practices in RWM.

1.3. The EESC calls on the Member States to ensure the monitoring and regular disclosure of the environmental, public health and socio-economic development in areas surrounding RWM.

([1]) Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (OJ L 199, 2.8.2011, p. 48).

1.4. The EESC stresses that concerns remain regarding the lack of defined steps forward for the disposal of spent fuel and/or high-level waste in most countries and regarding the dates for the commissioning of the repositories, which are in the 2050s to the 2070s in the majority of countries, and in some even later. Extending storage of high-level waste for more than a century might increase risks and costs and will be a burden to future generations. The EESC strongly encourages Member States in identifying and implementing permanent disposal solutions or engaging in shared solutions, while always looking for a possibility of recycling to seek minimal amounts of waste for disposal, employing circular economy strategies. Assuming responsibility and not leaving a burden to future generations requires a broad dialogue and consideration of a variety of perspectives in the RWM project.

1.5. In order to reduce the amount of radioactive waste generated, a broad public debate should be launched on the advantages, disadvantages and availability of relevant technical processing technologies, such as reprocessing or transmutation, in order to enable civil society to gain a comprehensive picture and understand all the arguments for and against. This also includes the dialogue on the new facilities producing radioactive waste.

1.6. The Member States should ensure that cost assessments for decommissioning and for radioactive waste and spent fuel management take into account cost increases over time and that the funding is sufficient to cover the actual costs. The EESC suggests that the Member States improve the use of Key Performance Indicators (KPIs) in monitoring and reporting on the progress made in implementing the directive.

1.7. The EESC urges the Member States to assume all their responsibilities so as not to leave future generations with the burden of processing nuclear waste, whatever its nature, lifespan and hazard level. The development of shared solutions, including but not limited to multinational radioactive waste repositories, could be of interest to some EU Member States, particularly countries with small or medium-sized inventories. The EESC calls on the EU Member States to explore how to implement such shared pre-disposal and disposal solutions.

1.8. The EESC considers it vital to address R&D in RWM in an integrated and interdisciplinary manner. To ensure better understanding and effectively address society's expectations, needs and concerns as regards RWM, the European Joint Programme on Radioactive Waste Management (EURAD) and the Implementing Geological Disposal of Radioactive Waste Technology Platform (IGD-TP) should interact with the SHARE (social sciences and humanities in ionising radiation research) platform and with representatives of civil society organisations, striving to ensure inclusivity. In addition, financial resources should be allocated in such a way as to ensure that interested local and national civil society organisations are appropriately involved in this programme.

1.9. The EESC highlights the need to continue supporting the education and training of professionals and scientists in RWM. Additionally, innovative tools, such as software-controlled robots, should be developed and used to perform various RWM tasks in order to improve health and safety and protect workers.

2. **Background**

2.1. All EU Member States generate radioactive waste, either from generating electricity in nuclear power plants or decommissioning nuclear facilities or from the non-power-related use of radioactive materials, such as medical, research, industrial and agricultural applications. The safe management of some of this waste requires it to be contained and isolated from humans and the living environment over thousands of years.

2.2. EU Member States use different radioactive waste classification schemes. However, for EU inventory aggregation purposes and in order to make inventories comparable among different Member States, the International Atomic Energy Agency (IAEA) General Safety Standard GSG-1 ([2]) classification scheme was chosen. Broadly speaking, radioactive waste is classified depending on its level of radioactivity into:

— high-level waste, which may be the spent fuel removed from reactors or the waste from its reprocessing. It requires disposal in deep, stable geological formations that are several hundred metres or more below the surface;

([2]) Classification of Radioactive Waste, IAEA Safety Standards No. GSG-1, 2009, Vienna.

— intermediate-level waste, which requires disposal at depths in the range of tens of metres to a few hundred metres; and

— low-level waste, which contains relatively low levels of radioactivity and is suitable for disposal in engineered near-surface facilities. Worldwide it comprises 90 % of the volume but only 1 % of the radioactivity of all radioactive waste.

Low-level and very low-level waste comprise 90,7 % of the total waste volume, intermediate-level waste accounts for 9,1 % and high-level waste constitutes 0,2 %. The latter two comprise more than 90 % of total radioactivity ([3]). Progress has been made in safely disposing of low-level waste in the EU. However, long-term management solutions for intermediate-level waste, high-level waste and spent fuel are lacking in most EU Member States. Storage of radioactive waste is also used in Member States to allow time for the development of innovative breakthroughs.

2.3. The estimated total inventory of radioactive waste in the EU at the end of 2019 was 2 334 000 m^3. Approximately 66 % of this waste had already been disposed of and 34 % was still in storage and would have to be managed in the future. Spent fuel is stored pending either disposal or reprocessing, depending on the RWM strategy of the Member State in question. The current estimated inventory projections do not go beyond 2030 and are not comprehensive as some data are missing and Member States' plans for new builds or lifetime extensions are not considered.

2.4. Due to the planned shutdown, decommissioning and deployment of new nuclear facilities in various European countries, the yearly rate of waste generation will increase significantly over the next decades. While the data reported to and by the Commission clearly point to an increase in waste generation over the next decade and beyond, the quality of the projections is not sufficient yet to identify needs and devise plans coherently and transparently.

2.5. Several Member States must store spent fuel for prolonged periods either because of their current lack of disposal facilities or because of their limited reprocessing, which would allow them to recycle fissile materials and reduce the amount of high-level waste. This is compensated by building interim storage facilities outside reactor buildings, either within or outside plant boundaries. In order to reduce the amount of radioactive waste, a broad public debate should be launched on the advantages, disadvantages and availability of technical processing technologies, such as reprocessing or transmutation, in order to enable civil society to gain a comprehensive picture and understand all the arguments for and against. This also includes the dialogue on the new facilities producing radioactive waste.

2.6. The Radioactive Waste Directive on the responsible and safe management of spent fuel and radioactive waste aims to ensure the responsible and safe management of spent fuel and radioactive waste to 'avoid imposing undue burdens on future generations'. To this end, Member States must establish a national legislative, regulatory and organisational framework which includes adopting a national programme to manage these materials, ensuring the health, safety and security of people and protecting the environment. International commitments, under the auspices of the IAEA, entail requirements to ensure all radioactive waste is managed safely for generations to come.

2.7. Pursuant to Article 10(2) of the Radioactive Waste Directive, Member States must ensure that the public are given the necessary opportunities to participate effectively in the decision-making process regarding spent fuel and RWM in accordance with national legislation and international obligations. This rule is not evenly applied in some Member States.

2.8. Countries are at different stages of managing their radioactive waste. While most EU Member States have near-surface and intermediate-depth disposal facilities to safely dispose of very low, low and intermediate-level waste, only Finland, France and Sweden have selected sites for the deep geological disposal of spent fuel and high-level waste. The first deep geological repository is likely to be operational in Finland by 2025, followed by ones in France and Sweden – expected to be operational as of 2035 – and then by others in Germany and Belgium – expected to be operational as of 2050. Other Member States have signalled that they would need much longer to put such repositories in place. For example, Spain as of 2060, Czechia and Slovakia as of 2065 and the Netherlands not even before 2130 ([4]).

([3]) IAEA (2022), *Status and trends in spent fuel and radioactive waste management*, IAEA Nuclear Energy Series No. NW-T-1.14.
([4]) COM(2024) 197 final.

2.9. In most countries, the development of long-term management solutions for intermediate and high-level radioactive waste has met with huge delays, mostly due to political inaction and societal opposition. These delays raise concerns for civil society regarding the safety and capacity of storage for existing radioactive waste and waste produced in the future.

2.10. Member States have to submit their assessment of the implementation of the Radioactive Waste Directive in their national reports. In its last progress report ([5]), the Commission considers that radioactive waste and spent fuel were managed safely in the EU. The progress report further states that the national programmes put in place across the EU have generally been established in a transparent and participative manner. However, it also notes that 'several Member States [have] still... not further define[ed] national policies for the long-term management of all their radioactive waste, particularly intermediate-level waste and high-level waste. Furthermore, the targets set in some national programmes are not sufficiently ambitious and envisage long implementation periods that risk burdening future generations'. The main issues to be addressed are programmes' control and funding. The Commission is of the opinion that Member States should accelerate reviews of and updates to their national programmes, taking into account the outcomes of self-assessments and international peer reviews.

2.11. The EU and its 27 Member States are all parties to the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. This international agreement on environmental democracy guarantees the public three key rights concerning environmental issues. At EU level, the Access to Environmental Information Directive (2003/4/EC) ([6]) and the Public Participation Directive (2003/35/EC) ([7]) include access to justice provisions. The provisions of the Aarhus Convention and the EU Directives apply in full to nuclear activities, including management of radioactive waste. During the process of siting disposal facilities, there has been a tendency towards public engagement.

2.12. Member States use different radioactive waste classification schemes based on their country-specific conditions, without following the Commission recommendation exactly, while still complying with Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste. These differences might raise a problem for communication with regard to similar waste being treated or disposed of differently in different Member States or in terms of cross-border cooperation among Member States ([8]).

3. **General comments**

3.1. The EESC highlights the importance for society of the diverse role played by nuclear science and technology in important sectors (e.g. medical, research, agricultural, industrial), thus playing a decisive role in the EU's strategic autonomy, industrial leadership, research, education and job creation. While radioactive waste and spent fuel are a small proportion of total hazardous waste, an integrated approach to managing radioactive waste is required to protect human health and the environment.

3.2. Guaranteeing the highest levels of nuclear safety and radiation protection when dismantling nuclear power plants, in line with the aforementioned EU Directives, is crucial. The EESC stresses the need to comply with the legal framework laying down the highest safety standards for workers involved in RWM. Safety for workers, people and the environment is a priority issue and, in many countries, the regulatory authority serves as an integral source of information and expertise on the safety of the RWM project developed by the implementing organisation. The EESC supports the European Nuclear Safety Regulators Group's activities dedicated to improving the arrangements for transparency on matters of nuclear safety in the Member States.

([5]) COM(2024) 197 final.

([6]) Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC (OJ L 41, 14.2.2003, p. 26).

([7]) Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC - Statement by the Commission (OJ L 156, 25.6.2003, p. 17).

([8]) IDOM Consulting and BGE TECHNOLOGY (2022), *Study on radioactive waste classification schemes in the European Union*, final report, ENER/2021/NUCL/SI2.853676.

3.3. The EESC stresses that concerns remain regarding the lack of defined steps forward for the disposal of spent fuel and/or high-level waste in most countries and regarding the dates for the commissioning of the repositories, which are in the 2050s to the 2070s in the majority of countries, and in some even later. Extending storage of high-level waste for more than a century will increase risks and costs and will be a burden to future generations. The EESC strongly encourages Member States in identifying and implementing permanent disposal solutions or engaging in shared solutions, while always looking for a possibility of recycling. Assuming responsibility and not leaving a burden to future generations requires a broad dialogue and consideration of a variety of perspectives in the RWM project.

3.4. With an increase in waste forecast, the EESC recommends that the Member States invest in R&D in order to recycle materials as much as possible. According to the IAEA, up to 96 % of spent fuel can be recycled and, therefore, less natural uranium would be needed to operate nuclear plants ([9]).

3.5. Transparent two-way communication regarding RWM from all actors is vital to build trust and to support greater informed decision-making. The EESC calls for the necessary conditions to be created for an improved and effective dialogue among representatives of civil society and the traditional public and private stakeholders of RWM in all Member States. It also calls for better transparency of all the actors involved, i.e. the source of financing for entities involved in consultation and in the management structure. Civil society organisations involved in RWM should not be funded directly by the polluting entity responsible for RWM, but by an independent trust fund or through other entity ensuring objectivity.

3.6. The decision-making process regarding spent fuel and RWM requires a participatory process which takes into account the informed opinions of civil society after a thorough deliberative process. Engaging in a transparent dialogue with local communities, civil society organisations and media early on in the decision-making process remains of high importance in building trust and confidence in the institutions responsible for managing radioactive waste and in the decision-making process. Transparent dialogue helps to remove doubts, address concerns and also inform about socio-economic and employment impacts linked to the project for the construction of radioactive waste repositories.

3.7. The polluter-pays principle creates a legal obligation for spent fuel and waste generators to bear the costs of RWM. However, the limited information provided regarding available funding for carrying out national programmes raise concerns over the timely implementation of radioactive waste and spent fuel management activities. In the process of developing and deploying new technologies such as advanced modular reactors and small modular reactors, waste management and financial aspects related to lifetime operation and decommissioning should be known at an early stage.

3.8. Current participation practices in RWM in most EU Member States include local information commissions, local safety committees, local government associations and community partnerships whose role is to gather information about a project, organise broader discussions with the public and monitor and oversee various aspects of the facility in question, e.g. transport and storage. The EESC recommends that Member States report on the actual practices of public participation in the RWM decision-making process as well as the implementation of transparency.

3.9. The number of qualified personnel required for the safe and efficient management and disposal of radioactive waste in Europe will increase in the coming years. Developing and maintaining expertise and skills and educating and training staff in RWM remains a challenge in many countries. It is crucial to continue supporting the education and training of professionals and scientists in RWM and to highlight the importance of considering RWM a 'socio-technical' challenge and proposing 'socio-technical approaches' towards radioactive waste. Additionally, innovative tools, such as software-controlled robots, should be developed and used to perform various RWM tasks in order to improve health and safety and protect workers.

([9]) IAEA (2019), *Management of Spent Fuel from Nuclear Power Reactors – Learning from the Past, Enabling the Future*, IAEA Bulletin, Vienna.

3.10. In line with the obligations under Article 3(2), (3) and (4) of the Aarhus Convention, the EESC proposes providing funds to enhance civil society engagement in the management of radioactive waste, including in future research and training. Integrating societal viewpoints can not only foster innovation in RWM safety, in knowledge management, in monitoring and in the design and implementation of nuclear technologies, which are a necessary part of the scientific and engineering process, it can also ensure a just and socially fair transition to climate neutrality.

3.11. The EESC calls on the European Commission to systematically monitor the extent to which dialogue and interaction between the national and regional tiers of government and the local level as well as civil society organisations, including local communities, is actually implemented in practice in the Member States. Such monitoring could lead to an assessment where necessary to clarify the role of public participation in the various steps of the political decision-making process and to foster better coordination between national, regional and local levels, particularly in siting issues, where local interests are naturally significant.

3.12. The development of shared solutions such as multinational repositories for RWM could be of interest to some EU Member States, particularly countries with small or medium-sized inventories. However, their feasibility depends upon many different aspects, including civil society considerations.

4. **Specific comments**

4.1. The EESC supports coordinated research efforts in the technical and scientific domains, such as EURAD and the work of the IGD-TP in facilitating the timely implementation of safe deep geological disposal in Europe and fostering mutual understanding between Member States. The lack of meaningful civil society involvement in this research effort underpins the tendency for implementers, regulators and techno-scientists to work on RWM without taking into account the society stakeholders concerned, such as members of the public in potential host communities who have relevant knowledge and are interested in participating in the technical debate. The active participation of stakeholders from the local communities affected by disposal and storage facilities through participatory processes and structures is crucial to engendering a sense of shared ownership in the process.

4.2. The EESC calls for the application of appropriate key performance indicators to monitor progress towards implementing the Radioactive Waste Directive, particularly in the next reporting cycle. Key performance indicators are not only crucial for reporting to the European Commission every 3 years but are also a useful mechanism for ensuring transparency for the public.

Brussels, 23 October 2024.

The President
of the European Economic and Social Committee
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