

Radioactive waste – a legal aspect of the EU

Nuclear safety legislation in the European Union handles employee protection, public information, storage and transportation of nuclear radioactive waste. **Marko Andrejic, Sonja Ketin, Stanko Bulajic and Vladimir Sinic** present the standards and regulations

THE EURATOM TREATY, SIGNED IN Rome in March 1957, forms the basis of many European Union actions related to radiation protection, nuclear safety and the safe management of radioactive waste and spent fuel, as well as of other activities which use radioactive sources for research, industrial and medical purposes.

It regulates the issues of radiological protection of employees and the public, the supply of uranium for the development of the nuclear sector and the provision of fissile materials, general aspects such as research, dissemination of information, investments, the role of individual community bodies, etc.

On the basis of this treaty, the European Commission has acquired transnational authority in three areas: radiological protection, the supply of nuclear fissionable materials and nuclear safety.

Several international bodies and organisations are involved in activities related to the safe management of radioactive waste in the EU including the International Atomic Energy Agency (IAEA) and the OECD Nuclear Energy Agency (NEA).

Nuclear safety and radioactive waste regulations cover 54 acts of varying nature. Overall EU legislation on nuclear safety and radioactive waste could be grouped into several categories. Those are:

- International conventions in the field of nuclear safety and radioactive waste management; and
- Regulations, directives and other sources of law issued by EU bodies governing specific issues such as: safety of nuclear installations, risk of ionising radiation, cross-border movement, radiological emergencies, etc.

Otherwise, the management of spent fuel and radioactive waste is considered to be one of the issues not fully regulated by the relevant regulations, which is why the Commission prepared a proposal for a new directive in 2010.

International treaties

A number of international treaties are either directly or indirectly related to nuclear safety and radioactive waste. Most international treaties in this area are concluded within or under the auspices of the International Atomic Energy Agency (IAEA) and are of particular importance to the EU and its Member States. Here are the most important conventions:

- Convention on Nuclear Safety;
- Convention on Early Warning of Nuclear Accidents;
- Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency.

It is estimated that the existing regulations do not ensure the functioning of the system as a whole, that is, they do not cover all aspects of spent fuel and radioactive waste management. Directive 2009/71 / Euratom establishing a Community framework for the nuclear safety of nuclear installations covers only waste which is located at the site of a nuclear facility.

At the same time, a number of other regulations in different ways cover only certain aspects of spent fuel and radioactive waste management.

- Joint Convention on the Safety of Used Fuel Management and on the Management of Radioactive Waste Management; and
- Agreement between the European Atomic Energy Community (Euratom) and non-member countries of the European Union on the participation of non-member countries in Community arrangements for the early exchange of information in the event of a radiological emergency (Ecurie).

Convention on Nuclear Safety

The Convention on Nuclear Safety, which entered into force on October 24, 1996, broadly covers the issues of "safety of nuclear installations" (Article 3).

The Convention calls for an obligation to apply the basic principles of the safety of nuclear installations and covers nuclear power plants, including the storage, handling and disposal of radioactive material, as long as it is located at the same site as the nuclear power plant and is directly linked to the operations of nuclear facilities (Article 2).

The main objectives of the Convention are to achieve and maintain a "high level of nuclear safety" through measures taken nationally and internationally, then to create and maintain effective protection against potential radiological hazards in nuclear installations and to prevent accidents with radiological consequences.

This occurs when "all nuclear elements have been permanently removed from the reactor core and safely stored with approved procedures and the dismantling plan

has been approved by the Authority." State Parties have undertaken at national level to take the various legislative, administrative and other necessary measures to attain the objectives of the Convention.

This includes, inter alia, regular submission of reports on measures taken (Article 5); taking of measures to raise the level of security of existing nuclear facilities, or, if this is not possible, their closure (Article 6); establishment and maintenance of adequate legislative and legal framework, a framework for monitoring the safety of a nuclear installation and establishing and appointing a governing body responsible for implementing legislative frameworks (Articles 7 and 8); securing and regulating the responsibilities of a licence holder (Article 9); providing adequate financial resources to maintain the safety of a nuclear installation (Article 11); providing measures with respect to the capabilities and limitations of the human factor throughout the life of the nuclear installation, then providing measures with regard to the quality of work, assessment, monitoring and certification of safety (Articles 12-14); undertaking radiation protection measures (Article 15); preparation of emergency response plans (Article 16); and the implementation of appropriate measures in connection with the design and construction of a nuclear installation, as well as in connection with the startup and subsequent operation of the plant (Article 17-19).

Joint Convention

The Joint Convention on the Safety of Spent Fuel Management and on the Management of Radioactive Waste Management has been open for signature since September 1997. It entered into force on 18 June 2001, according to the IAEA.

It is the first global international legal instrument to regulate spent fuel and radioactive waste management. It relates to spent fuel and radioactive waste arising from civilian nuclear reactors, the use and consumption of fuel and radioactive waste from military and defence programmes, if and when such materials are permanently transferred under civilian programmes or declared as spent fuel or radioactive waste under the Convention.

The Convention also applies to cases of planned and controlled release of liquid or gaseous radioactive materials into the environment.

The obligations of the Contracting Parties are largely based on the principles contained in the 1995 IAEA document "Principles of Radioactive Waste Management". This includes the obligation to establish and maintain legislation in this field, the obligation to ensure that individuals, society and the environment are adequately protected against radiological and other hazards, then obligations regarding the transboundary movement of spent fuel and radioactive waste, and the obligations to take the necessary steps to safely manage unused hermetically sealed sources.

Ecurie agreement

The Ecurie agreement between Euratom and non-member countries of the EU covers early exchange of information in the event of a radiological emergency. It refers to arrangements for the exchange of information in all cases where one of the participating countries decides to take general measures to protect the public in the event of a radiological emergency arising from:

- An accident occurring in its territory at one of the following facilities or within the following activities: any nuclear reactor, wherever located, every other nuclear fuel cycle facility, any radioactive waste treatment, transportation and storage of nuclear fuels or radioactive waste, production, use, storage and transportation of radioisotopes for agricultural, industrial, medical and related scientific and research purposes, use of radioisotopes for energy production in space objects; or
- Any accident resulting from or likely to result in significant discharge of radioactive materials; or
- The discovery, within or outside its territory, of high levels of radioactivity that could be harmful to public health.

The Agreement, after being signed by Euratom, was open for ratification by Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, the Slovak Republic, Switzerland and Turkey (Article 10).

Others

In addition to the conventions, which have been specifically mentioned, nuclear safety and radioactive waste management are also related to:

- Convention on Civil Liability in the Maritime Transport of Nuclear Materials;
- Treaty banning nuclear weapons testing in the atmosphere, space and underwater;
- Paris Convention on Third Party Liability in the Field of Nuclear Energy;
- Brussels Convention on the Paris Convention and
- Non-Proliferation Treaty, etc.

Directives on safety of nuclear installations

The basic regulation relating to the safety of nuclear installations is Council Directive 2009/71 / Euratom establishing a Community framework for nuclear safety of nuclear installations.

The objectives of this Directive are:

- establishing a Community policy framework for maintaining and improving nuclear safety and its rules; ●



Above: Legislation covers the transport of nuclear waste in the European Union

- b) creating conditions for Member States to provide appropriate national mechanisms for a high level of nuclear safety and to protect workers and the public from the dangers arising from ionizing radiation from nuclear installations (Article 1).

The Directive applies to all civilian nuclear installations operating on the basis of permits issued in accordance with Article 3.

Directives on Ionising radiation

The basic regulations governing issues of importance for ionising radiation are:

- Council Directive 96/29 / Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation.
- Council Directive 2003/122 / Euratom on the control of highly active sealed radioactive sources and sources of unknown origin.
- Council Regulation No 1493/93 / Euratom of 8 June 1993 on the supply of radioactive substances between Member States.
- Council Directive 2006/117 / Euratom of 20 December 2006 on the supervision and control of shipments of radioactive waste and spent fuel.

Council Directive 96/29 / Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation refers to all activities involving the risk of ionising radiation arising from artificial or natural radiation sources where natural radionuclides have been processed with regard to their radioactive, fissile and fertile properties.

Council Regulation No 1493/93 / Euratom of 8 June 1993 on the supply of radioactive substances between Member States seeks to establish a system of announcements of shipments of radioactive waste between Member States, following the movement of border controls in the Community from 1 January 1993, to keep competent authorities informed at the same level of information as before 1993. This Regulation applies to shipments of

hermetically sealed and other sources between Member States whenever the quantities and concentrations of new are higher than those laid down in Article 4 (a) and (b) of Directive 80/836 / Euratom. The Regulation also applies to shipments of radioactive waste covered by Directive 92/3 / Euratom already mentioned. In the case of nuclear materials, each State shall carry out all necessary controls within its territory to ensure that each recipient of the material complies with the national provisions implementing Article 3 of Directive 80/836 / Euratom. Council Directive 2006/117 / Euratom of 20 December 2006 on the supervision and control of shipments of radioactive waste and spent fuel is governed by the Community system for the control and control of transboundary shipments of radioactive waste and spent fuel in order to ensure adequate protection of the population.

This Directive shall apply to transboundary shipments of radioactive waste and spent fuel when: (a) it is a country of origin or country of destination or any transit country of the Member States of the Community; and (b) the quantity and concentration of the consignment exceeds the levels laid down in points (a) and (b) of Article 3 (2) of Directive 96/29 / Euratom. An owner who plans to export a shipment of radioactive waste or spent fuel within the Community or who intends to agree on the export of such shipment submits a duly completed application for approval to the competent authorities of the Member State of origin (Article 6). Further procedure, rights and obligations of individual entities are prescribed by certain provisions of the Directive: sending a request to the competent authorities (Article 7), acknowledgment of receipt and request for information (Article 8), consent and refusal (Article 9), approval of the consignment (Article 10), confirmation on receipt of consignment (Article 11), failed consignment (Article 12).

The rules governing consignments outside the Community (Chapter 3) are specifically regulated: imports into the Community, transit through the territory of the Community and exports from the Community (Article 16).

Council Directive 89/618 / Euratom is the basic regulation on informing the public about the health care measures to be applied and the steps to be taken in the event of a radiological emergency. ■



Above: Aerial view of the High Flux Reactor in Petten, Netherlands, which is used for radioisotope production and nuclear research. Photo credit: Aerovista Luchtfotografie/Shutterstock.com

The social costs of plant closure

A report from US-based Nuclear Decommissioning Collaborative examines the socioeconomic impacts of decommissioning on nuclear plant host communities

OPERATION OF A TYPICAL NUCLEAR power plant contributes at least \$400 million annually to its host region, according to *Socioeconomic Impacts from Nuclear Power Plant Closure and Decommissioning: Host Community Experiences, Best Practices and Recommendations*, released in October. As a result, the impacts of reactor closures can be "swift, severe, and lasting," the report finds.

It was prepared by non-profit Nuclear Decommissioning Collaborative, the USA's nuclear decommissioning clearinghouse and was funded by the US Economic Development Administration (EDA) part of the US Department of Commerce.

The report states "over the next several decades, all [US] nuclear power plants that currently operate will close and be decommissioned...with the cost to complete this decommissioning effort estimated to be approximately \$100 billion."

However, despite the large sums of money involved in decommissioning upon closure, the socioeconomic ripple effects to host communities are "swift, severe and widespread," with local public services such as schools and emergency responders tending to suffer significant cutbacks.

While these impacts occur at every nuclear power plant, the effects are felt more deeply in rural communities where most plants are located, the collaborative says.

The report is based on findings from interviews with 27 decommissioning stakeholders, which took place from December 2019 through April of 2020. Interviewees consisted of community leaders, economic development professionals,

industry representatives and local elected officials. They were chosen from nine nuclear plant host communities representing decommissioned (Connecticut Yankee and Maine Yankee), decommissioning (Crystal River, Pilgrim and Zion) and operational reactors (Davis Besse, Diablo Canyon, North Anna and Palisades) in the USA.

As an example, the report cites Maine Yankee, which operated in Wiscasset, Maine from 1972 to 1997. During its operation, the plant employed more than 500 workers, with the majority living within 20 miles of the plant. At the time of its closure, the Maine Yankee nuclear plant contributed \$12 million annually in local taxes, covering 90% of the Wiscasset's municipal budget for schools, fire protection, and other public services.

"These communities continue to face real losses and ongoing hardship," commented Jim Hamilton, founder and executive director of the collaborative. "While there is increased attention being paid to the plight of these communities, economic development planning remains a

challenge and many struggle finding the capacity to be their recovery."

For more than 20 years, plant host communities across the United States have undertaken various attempts at recovery, but efforts have been hampered by various factors including:

- Limited resources for economic development. For example, time, funding and local capacity for economic recovery planning are in short supply once plant closure takes place.
- Steep learning curve. Nuclear plant closure and decommissioning is complex and often seen as a "one-time lifetime experience." Roles and responsibilities of local and state stakeholders are unclear and there are limited opportunities and resources for meaningful community engagement.
- Socioeconomic impacts of operating plants are not well understood.
- The long-term presence of spent nuclear fuel hinder economic development.
- The lack of a coordinated federal framework with limited focus on socioeconomic impacts.

The report finds that emerging efforts (at the local, state and federal levels) would benefit from increased alignment and coordination towards the goal of implementing decommissioning projects that produce outcomes that are of greater benefit to the host community.

From a local perspective it recommends: "Identification of economic development barriers (e.g. presence of spent nuclear fuel, lack of planning resources) and the design of economic recovery plans, well before a plant is scheduled to close.

In parallel with local entities developing economic mitigation plans prior to plant closure, states have a strong incentive to anticipate closure and develop their own policies. "Without prior action in advance of plant closure the role of states is generally limited," the report states.

On a national level, the report notes that the huge sums required to decommission the current nuclear fleet will be derived largely from ratepayers. To ensure that those ratepayers may realize maximum benefit from decommissioning, the report recommends "the improved coordination of federal agencies focusing on additional research, efficient deployment of resources and the provision of planning assistance would be a demonstrable benefit to host communities." It adds that the establishment of a national network of nuclear closure communities would also improve the effectiveness of the federal response.

More info: www.decommissioningcollaborative.org