Basic information

2010/0306(NLE) NLE - Non-legislative enactments Directive	Procedure completed
Management of spent fuel and radioactive waste: EU legal framework **Subject** 3.60.04 Nuclear energy, industry and safety 3.70.08 Radioactive pollution 3.70.13 Dangerous substances, toxic and radioactive wastes (storage, transport)	

Key players

European Parliament

Committee responsible	Rapporteur	Appointed
ITRE Industry, Research and Energy	JORDAN Romana (PPE)	09/12/2010
	Shadow rapporteur HERCZOG Edit (S&D) HALL Fiona (ALDE) HARMS Rebecca (Verts /ALE) TOŠENOVSKÝ Evžen (ECR) RANSDORF Miloslav (GUE /NGL)	

Committee for opinion	Rapporteur for opinion	Appointed
EMPL Employment and Social Affairs	LAMBERT Jean (Verts/ALE)	25/11/2010
ENVI Environment, Public Health and Food Safety	POC Pavel (S&D)	01/12/2010

Committee for opinion on the legal basis	Rapporteur for opinion	Appointed
JURI Legal Affairs	The committee decided not to give an opinion.	01/12/2010

Council of the European Union

Council configuration	Meetings	Date
Agriculture and Fisheries	3108	2011-07-19

European Commission	Commission DG: Energy — Commissioner: OETTINGER Günther
European Committee of the Regions	

Key events

Date	Event	Reference	Summary
03/11/2010	Legislative proposal published	COM(2010)0618	Summary
25/11/2010	Committee referral announced in Parliament		
26/05/2011	Vote in committee		Summary
01/06/2011	Committee report tabled for plenary, 1st reading/single reading	A7-0214/2011	
22/06/2011	Debate in Parliament		
23/06/2011	Decision by Parliament	T7-0295/2011	Summary
23/06/2011	Results of vote in Parliament		
19/07/2011	Act adopted by Council after consultation of Parliament		
19/07/2011	End of procedure in Parliament		
02/08/2011	Final act published in Official Journal		

Technical information

Procedure reference	2010/0306(NLE)
Procedure type	NLE - Non-legislative enactments
Procedure subtype	Consultation of Parliament
Legislative instrument	Directive
Legal basis	Euratom Treaty A 032 Euratom Treaty A 031
Mandatory consultation of other institutions	European Committee of the Regions
Stage reached in procedure	Procedure completed
Committee dossier	ITRE/7/04422

Documentation gateway

European Parliament

Document type	Committee	Reference	Date	Summary
Committee draft report		PE460.863	15/03/2011	

Committee opinion	ENVI	PE460.611	14/04/2011	
Committee opinion	EMPL	PE456.851	15/04/2011	
Amendments tabled in committee		PE462.870	15/04/2011	
Amendments tabled in committee		PE462.874	26/04/2011	
Committee report tabled for plenary, 1st reading/single reading		A7-0214/2011	01/06/2011	
Text adopted by Parliament, 1st reading/single reading		T7-0295/2011	23/06/2011	Summary

European Commission

Document type	Reference	Date	Summary
Legislative proposal	COM(2010)0618	03/11/2010	Summary
Document attached to the procedure	SEC(2010)1289	03/11/2010	
Document attached to the procedure	SEC(2010)1290	03/11/2010	
Commission response to text adopted in plenary	SP(2011)6334	14/07/2011	
Follow-up document	SEC(2011)1007	22/08/2011	Summary
Follow-up document	COM(2017)0236	15/05/2017	Summary
Follow-up document	SWD(2017)0159	15/05/2017	
Follow-up document	SWD(2017)0161	15/05/2017	
Follow-up document	COM(2019)0632	17/12/2019	Summary
Follow-up document	SWD(2019)0435	17/12/2019	Summary
Follow-up document	SWD(2019)0436	17/12/2019	Summary
Follow-up document	COM(2024)0197	22/05/2024	
Follow-up document	SWD(2024)0123	22/05/2024	
Follow-up document	SWD(2024)0127	22/05/2024	
Follow-up document	COM(2026)0512	29/09/2026	
Follow-up document	SWD(2026)0285	29/09/2026	
	SWD(2026)0286		

Follow-up document		29/09/2026	

National parliaments

Document type	Parliament /Chamber	Reference	Date	Summary
Contribution	CZ_SENATE	COM(2010)0618	17/03/2011	
Contribution	RO_SENATE	COM(2010)0618	17/03/2011	

Other institutions and bodies

Institution/body	Document type	Reference	Date	Summary
EESC	Economic and Social Committee: opinion, report	CES0817/2011	04/05/2011	

Additional information

Source	Document	Date
National parliaments	IPEX	
European Commission	EUR-Lex	

Final act

Directive 2011/0070
OJ L 199 02.08.2011, p. 0048 Summary

Management of spent fuel and radioactive waste: EU legal framework

2010/0306(NLE) - 23/06/2011 - Text adopted by Parliament, 1st reading/single reading

The European Parliament adopted by 489 votes to 52, with 75 abstentions, a legislative resolution on the proposal for a Council directive on the management of spent fuel and radioactive waste.

The main amendments made to the proposal are as follows:

Objective: Parliament wants to specify that the Directive also relates to the **protection of the natural environment** and that it ensures the provision of necessary public information and participation in relation to spent fuel and radioactive waste management. The directive defines the **minimum standards** for the Member States, but they must be free to impose stricter standards in relation to the management of spent fuel and radioactive waste.

Scope: the directive applies to all stages of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors or is managed within civilian activities on EU territory, **including the spent fuel originating from military defence programmes** if and when such spent fuel is permanently transferred to and managed in the context of exclusively civilian activities.

Disposal: this is defined as the emplacement of spent fuel or radioactive waste in a potentially definitive manner in an authorised facility with due regard for the **reversibility principle**.

Furthermore, spent fuel must be defined as waste, unless it is clear that it can be reprocessed in the near term without further impact on the environment.

General principles: the management of spent fuel and radioactive waste should remain, as a last resort, the responsibility of the Member States on whose territory they were produced. National policies on the management of spent fuel and radioactive waste should be implemented through a well-

founded and documented stepwise decision-making process having regard to long-term safety. According to Members, national policies should be based on the following principles:

- the generation of radioactive waste is kept to the minimum practicable, respecting the 'as low as reasonably achievable' (ALARA) principle;
- spent fuel and radioactive waste are safely managed for as long as they are hazardous to people and the environment;
- exposure of workers, the public and the environment to spent fuel and radioactive waste is avoided;
- measures are taken to cover the future health and environmental risks for exposed workers and the general public;
- the costs of managing radioactive waste, including spent fuels, are borne by those who have generated such waste;
- the financial reserves which the originators of the waste have to provide so as to cover all the costs arising from the management of spent fuels und radioactive waste are administered in a State-controlled fund, in order to ensure that they are available for use in connection with permanent safe disposal;
- competent national bodies are involved in supervising the availability of adequate financial resources.

Spent fuel pools: since spent fuel pools involve major risks, especially when they are uncovered, all spent fuels shall therefore be moved out of pools and into dry storage as soon as possible. As part of that process, priority shall be given to the oldest of the spent fuel pools.

Establishment of regional disposal facilities: on a voluntary basis, Member States may decide to establish a joint or regional disposal facility in cooperation with other Member States or a third country in order to utilise the favourable geological or technical advantages of a particular site and to share the financial burden of the joint project.

Before launching such a project through an intergovernmental agreement, the Member States concerned shall ensure that the initiative fulfils a number of requirements including public acceptance and support in all the Member States concerned throughout all phases of the project development and the lifetime of the disposal.

Exportation: the text stipulates that in no circumstances may radioactive waste be exported to non-EU countries; shipment of spent fuel outside the EU should be allowed under the condition of its subsequent import back into the EU after recycling.

Seismic regions or coastal areas: all nuclear waste facilities in seismic regions or coastal areas at significant risk of rising sea levels or of tsunamis shall be prohibited

National framework for the management of used fuels and radioactive waste: this needs to include, among other things:

- a national programme, respecting subsidiarity, for implementation of the policy on spent fuel and radioactive waste management which ensures that all radioactive waste producers have access to safe disposal of radioactive waste under the same conditions;
- national requirements for the **health and safety, education and training of workers**;
- a system of licensing of spent fuel and radioactive waste management activities and facilities, including prohibition of the operation of a spent fuel or radioactive waste management facility without a licence, and ensuring that all radioactive waste, regardless of who produces it, is managed on a non-discriminatory basis;
- a system of appropriate institutional control, regulatory inspections, documentation and reporting, as well as the requisite training for the workers involved in the whole process, in order to secure and maintain their occupational safety and health;
- measures to guarantee **adequate financial resources** in the long term for activities and facilities relating to spent fuel and radioactive waste management;
- measures to ensure that the funding required for the management of spent fuel and radioactive waste and for emplacement is set by the competent regulatory authority on the basis of a transparent process which is regularly reviewed and in which all interested stakeholders are regularly consulted.

Safety evaluation: the competent regulatory authority shall have the powers and resources to regularly carry out nuclear safety assessments, investigations and controls, and where necessary to take enforcement action in facilities, even during the decommissioning process. The health and safety of workers, including any sub-contractors, as well as staff levels and training, shall form part of those assessments. The competent regulatory authority shall have the power to order that certain activities cease where the assessments have shown that they are not safe. Those and all other assessments by the competent regulatory authority shall be made public.

Safety case: Member States shall ensure that a safety case and a supporting safety assessment are prepared as part of the application for a licence to carry on a radioactive waste management activity or to operate a disposal facility located on EU territory. The safety case was originally the purpose of Article 8, the provisions of which are now dispersed in the relevant articles.

Licence-holders: licence-holders are required to inform cross-border regional and local authorities at the earliest possible date of their plans to establish a waste management facility, if the distance of such a facility from the national border is such that it is likely to have cross-border effects during the building or operation of the facility or after its abandonment, or in the event of an accident or incident related to the facility.

Marking and documentation: Member States shall ensure that licence holders mark containers and document the disposal of spent fuel and radioactive waste in a form not subject to weathering. The documentation shall comprise both the chemical, toxicological and radiological composition of the inventory and an indication whether it is solid, liquid or gaseous.

Recording and tracking, especially with regard to the health and safety of workers: Members want to oblige Member States to establish a recording and tracking system in the field of used fuels and radioactive waste. Information regarding workers who have been exposed in the course of their working life must be kept either by the licence-holder or by a state body, so as to enable work-related diseases to be followed up in the long term.

Sanctions:sanctions that are effective, dissuasive and proportionate in relation to the seriousness of the offence, are applicable in the event of infringement of the obligations arising from this Directive.

Expertise and qualifications: Members consider that particular attention needs to be paid to parties indirectly involved on-site and shall ensure that they are offered up-to-date appropriate education and training before the operations involving radioactive waste and spent fuel are carried out. Education and training for workers shall comply with internationally recognised standards, so as to strengthen overall responsibility for health and safety in the nuclear industry.

Financial resources: in Parliament's view, the proposal should guarantee that **sufficient financial resources are available** when needed to cover all necessary expenses related to decommissioning and the management of spent fuel and radioactive waste, thereby fully respecting the responsibility of radioactive waste producers according to the 'polluter-pays' principle and avoiding any recourse to State aid.

The amendments adopted by Members lay down **more restrictive obligations on Members States**, in accordance with their national procedures: i) an assessment of the costs related to the waste management; ii) reserves to be established to cover future decommissioning or waste management activities and the necessary assets to cover these reserves; iii) appropriate monitoring of the adequacy of the reserves and the management of the assets; iv) the costs of disposal shall be transparently set out and published by the Member States and reassessed each year; v) a national body capable of providing an expert judgment on the management of funds and decommissioning costs; vi) regular communications from Member States to the Commission.

Civil responsibility: Member States shall ensure that full third party liability in respect of any damage caused by accidents and long-term radioactive waste management, including damage to the terrestrial, water and marine environments, is borne by the **licence holders**.

Transparency: Member States shall ensure that all information on the management of spent fuel and radioactive waste which is necessary in order to preserve the health, safety and security of workers and the general public is available on a regular basis. This obligation includes ensuring that the competent regulatory authority informs the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, in particular the Aarhus Convention. Information directly relevant to the health and safety of workers and the public, in particular concerning radioactive and toxic emissions and exposure to such emissions, shall be made public, irrespective of the circumstances.

Public participation: Member States shall ensure that members of the public are given early opportunities to participate effectively in the preparation or review of national programmes for the management of spent fuel and radioactive waste needing to be drawn up pursuant to Article 13, and that members of the public have access to them once they have been drawn up. They shall place the programmes on a publicly available website.

Member States shall inform cross-border regional and local authorities of their national programmes at the earliest possible date, if the implementation thereof is likely to have cross-border effects.

Review: the Commission shall, no later than two years after peer reviews by Member States have taken place as provided for in the directive, submit a report to the European Parliament and the Council which focuses on a reassessment of the concept of the management of spent fuel and radioactive waste. The report shall, if necessary, be followed by a revision of this Directive.

Management of spent fuel and radioactive waste: EU legal framework

2010/0306(NLE) - 03/11/2010 - Legislative proposal

PURPOSE: to set out an EU legal framework for spent fuel and radioactive waste management.

PROPOSED ACT: Council Directive.

BACKGROUND: all Member States have radioactive waste. It is generated by many beneficial activities, such as electricity production in nuclear power plants and a range of radioisotope applications in medicine, industry, agriculture, research and education.

Radioactive wastes are classified into low-, intermediate-, and high-level waste depending on their level of activity. In the EU, more than 85% of the generated volume of radioactive waste constitutes short lived LILW, about 5% long lived LILW and less than 10% HLW, which includes both vitrified waste from reprocessing and spent fuel considered as waste. For High Level Waste (HLW), by contrast, there is a world-wide scientific and technical consensus that deep geological disposal represents the safest and most sustainable option. Whatever the future of nuclear power and non-power applications, the implementation of disposal as the end point in the management of existing and future radioactive waste is needed in order to assure safety in the long term.

Ultimate responsibility for the management of spent fuel and radioactive waste rests with the States. However, **most countries have yet to take key decisions regarding the management of spent fuel and radioactive waste**. The consequences of the delay are that burdens will be passed on to future generations, both to implement disposal as well as maintaining interim storage options.

The general objective of this proposal is therefore to set up an EU legal framework for the management of spent fuel and radioactive waste as an integral part of the safe use of nuclear energy for electricity production and of the ionizing radiation in medicine, industry, agriculture, research and education.

IMPACT ASSESSMENT: a thorough impact assessment concluded that the lack of binding EU legislation is likely to lead to postponement of taking key decisions, with potentially adverse environmental, economic and social impacts, including undue burdens on future generations and possibly distortion of competition in the electricity market. In contrast, binding EU legislation would result in a uniformly high level of safety of spent fuel and radioactive waste management EU-wide in the long term, without imposing undue burdens on future generations or compromising the ability of future generations to meet their own needs.

LEGAL BASIS: **Articles 31 and 32 of the Treaty establishing the European Atomic Energy Community**.

Community competences regarding spent fuel and radioactive waste arising from civil nuclear activities fall under the framework of the Euratom Treaty. The issue of spent fuel and radioactive waste management is clearly an area where national legislation has to be supplemented by legislation at EU level owing to the cross-border aspect of safety. At the same time the internal market requires the Commission to ensure a level-playing field to avoid distortion of competition.

The recently adopted Council Directive establishing a Community framework for the nuclear safety of nuclear installations only covers spent fuel storage facilities and other storage facilities for radioactive waste that are on the same site as and are directly related to nuclear installations. However, it states that it is also important to ensure the safe management of spent fuel and radioactive waste, including at storage and disposal facilities. Thus, the proposed Directive on the management of spent fuel and radioactive waste is a logical next step after the Nuclear Safety Directive.

CONTENT: the proposed Directive's objective is the **establishment of a Community framework for responsible management of spent fuel and radioactive waste**, ensuring that Member States make appropriate national arrangements for a high level of safety and maintain and promote public information and participation.Its scope covers **all stages** of the management of civilian spent fuel and radioactive waste from generation to disposal, but not the management of specific types of waste, such as authorised releases and waste from extractive industries which may be radioactive, as already covered by existing European legislation.

Special attention was paid to ensuring the Directive is consistent with existing European legislation while **making internationally accepted principles and requirements**, laid down in the IAEA Safety Standards and the Joint Convention, **legally binding and enforceable in the EU**.

Obligations associated with the application of the general principles include:

- a national framework for spent fuel and radioactive waste management in the long term;
- a competent regulatory authority in the field of safety of spent fuel and radioactive waste management;
- license holders having the prime responsibility for safety;
- education and training to obtain the expertise and skills required;
- transparency in decision-making on spent fuel and radioactive waste management.

Owing to the specificity of radioactive waste management, **specific obligations** are also introduced:

- setting out the approach to safety, including requirements for a safety case and a supporting safety assessment of facilities and activities relating to the management of spent fuel and radioactive waste;
- addressing the need to ensure that sufficient financial resources are available for spent fuel and radioactive waste management when needed, in accordance with the 'polluter-pays-principle';
- seeking to ensure an appropriate quality of the safety.

A conditional set of requirements in respect of the **national programmes** for radioactive waste and spent fuel management, needed to fulfil objectives and satisfy requirements, are included. (i) the basic requirements for national programmes; (ii) the content of a national programme; (iii) the notification of the national programmes to the Commission.

Lastly, the proposal provides that the Member States:

- will **report** to the Commission on the implementation of the proposed Directive, taking advantage of the reporting cycles under the Joint Convention. On the basis of the Member States′ reports, the Commission will submit a progress report to the Council and the European Parliament;
- will invite **international peer review** of their national frameworks and national programmes with the aim of achieving the required high standards in the management of spent fuel and radioactive waste. The outcomes of any peer review will be reported to the Member States and the Commission.

BUDGETARY IMPLICATIONS: this proposal has no implications for the EU budget.

Management of spent fuel and radioactive waste: EU legal framework

2010/0306(NLE) - 19/07/2011 - Final act

PURPOSE: to set out an EU legal framework for spent fuel and radioactive waste management.

NON-LEGISLATIVE ACT: Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.

CONTENT: the Council adopted a directive establishing a **Community framework for the responsible and safe management of spent fuel and radioactive waste** in order to avoid imposing undue burdens on future generations. The Austrian, Luxembourg and Swedish delegations abstained from voting.

Scope: the Directive shall apply to all stages of spent fuel management when the spent fuel results from civilian activities and radioactive waste management, from generation to disposal, when the radioactive waste results from civilian activities.

High level of safety: the directive ensures that Member States provide for national arrangements for a high level of safety in spent fuel and radioactive waste management to protect workers and the general public against the dangers arising from ionizing radiation and sets out key principles on which national policies should be based.

To this end, Member States will establish and maintain a national framework addressing the setting of **national programmes** for the management of fuel and waste, licensing, control and inspections, enforcement actions such as suspension of activities, allocations of responsibilities, public information and consultation and financing. In addition, each Member State will establish and maintain a regulatory authority for spent fuel and radioactive waste management, with certain conditions set to ensure their independence.

Member States shall ensure that the national framework require licence holders to provide for and **maintain adequate financial and human resources** to fulfil their obligations with respect to the safety of spent fuel and radioactive waste management.

Competent regulatory authority: each Member State shall establish and maintain a competent regulatory authority in the field of safety of spent fuel and radioactive waste management. Member States shall ensure that the competent regulatory authority is functionally separate from any other body or organisation concerned with the promotion or utilisation of nuclear energy or radioactive material, including electricity production and radioisotope applications, or with the management of spent fuel and radioactive waste, in order to ensure effective **independence** from undue influence on its regulatory function.

General principles: Member States shall establish and maintain national policies on spent fuel and radioactive waste management. Each Member State shall have ultimate responsibility for management of the spent fuel and radioactive waste generated in it.

National policies shall be based on all of the following principles:

(a) the generation of radioactive waste shall be kept to the minimum which is reasonably practicable, both in terms of activity and volume, by means of appropriate design measures and of operating and decommissioning practices, including the recycling and reuse of materials;

(b) the **interdependencies between all steps in spent fuel and radioactive waste generation** and management shall be taken into account;

(c) spent fuel and radioactive waste shall be **safely managed, including in the long term** with passive safety features;

(d) implementation of measures shall follow a **graded approach**;

(e) the **costs for the management** of spent fuel and radioactive waste shall be borne by those who generated those materials;

(f) an **evidence-based and documented decision-making process** shall be applied with regard to all stages of the management of spent fuel and radioactive waste.

Transparency: Member States shall ensure that necessary information on the management of spent fuel and radioactive waste be made available to workers and the general public. This obligation includes ensuring that the competent regulatory authority informs the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations.

Reports: Member States shall submit a report to the Commission on the implementation of this Directive for the first time by 23 August 2015, and every 3 years thereafter, taking advantage of the review and reporting under the Joint Convention. On the basis of the Member States' reports, the Commission shall submit to the European Parliament and the Council the following: (a) a report on progress made with the implementation of this Directive; and (b) an inventory of radioactive waste and spent fuel present in the Community's territory and the future prospects.

ENTRY INTO FORCE: 22/08/2011.

TRANSPOSITION: 23/08/2013.

Management of spent fuel and radioactive waste: EU legal framework

2010/0306(NLE) - 22/08/2011 - Follow-up document

The Commission presents the seventh situation report on radioactive waste management in the EU. It presents the status concerning waste generation, inventories and disposal capacities in the EU Member States, mainly in tabular form. The reference date for generation and inventories is end 2007, in line with the data available in the latest national reports provided by Member States.

The report states that annual generation of High Level Waste (HLW) / Spent Fuel, which generally depends on the size of the nuclear power programme, remains broadly constant, but some increases are seen or expected due to decommissioning activities.

Quantities of waste in storage have increased, especially HLW and long-lived low and intermediate level radioactive waste (LILW-LL) as there are as yet no disposal facilities in operation available.

In the case of Very Low Level Waste (VLLW) and short-lived low and intermediate level radioactive waste (LILW-SL) it is likely that almost all Member States with nuclear power programmes (and some 'non-nuclear power' States) will implement disposal solutions in the medium term i.e. by 2020. However, for HLW and spent fuel (for direct disposal) only a few Member States, i.e. those actively pursuing repository developments, can be said to have definitive policies in place.

The same situation exists for LILW-LL, since for these wastes also the preferred solution is geological disposal, whether in the same repository as HLW /spent fuel or separately. It is expected that Member States will take concrete decisions for the safe long-term management of spent fuel and radioactive waste, in implementing the Council Directive.

Management of spent fuel and radioactive waste: EU legal framework

2010/0306(NLE) - 17/12/2019 - Follow-up document

Under Council Directive 2011/70/Euratom on the responsible and safe management of spent fuel and radioactive waste, the Commission is required to submit to the European Parliament and Council, every three years, a progress report on the implementation of this Directive and an inventory of radioactive waste and spent fuel present in the Community's territory, with a view to future developments.

The first report presented a comprehensive overview of the situation, which covered a reporting period until August 2015 with a reference date of December 2013.

The present report provides an update of progress accomplished by Member States in implementing the Directive, in particular on the measures put in place to ensure that workers and the general public are protected against dangers arising from ionising radiation now and in the future, through the highest safety standards for radioactive waste and spent fuel management, and to avoid imposing undue burdens on future generations.

Situation in the EU

The report noted that all Member States generate radioactive waste through various activities ranging from medical applications to electricity generation. 21 Member States also manage spent nuclear fuel on their territory. Owing to its radiological properties and the potential hazard it poses to workers, the general public, and the environment, the safe management of such material from generation to disposal must be ensured.

Each Member State defines its own electricity generation mix and as of the reporting date nuclear power plants are in operations in 14 countries. Two other Member States, Lithuania and Italy, have terminated their nuclear power programmes and are decommissioning their nuclear installations. These 16 Member States with nuclear power programmes together account for 99.7% in volume of the radioactive waste inventory in the EU.

At the time of reporting, 126 nuclear power reactors were in operation, with a total capacity of about 119 GWe, 90 nuclear power reactors were shut-down, and 3 were decommissioned. In addition, there were 82 research reactors in 19 Member States either in operation, long-term shutdown, or under decommissioning.

Inventory estimates and trends

The estimated total inventory of radioactive waste on the EU territory at the end of 2016 was 3 466 000 m3 (4.6 % increase over three years), corresponding to an average of about 7 liters per-capita in the EU. On average the amount of the radioactive waste in storage (983 000 m3) did not significantly change in comparison to 2013. Low-level waste dominates EU radioactive waste inventory. Intermediate-level waste and high-level waste are generated and stored predominantly in the Member States with nuclear power programmes. At the end of 2016, approximately 58 000 tHM of spent fuel was stored in the EU, (7% increase over three years).

According to the Commission, by 2030 very-low-level waste amounts are expected to double, while the other waste classes are expected to increase by 20-50%. Therefore, attention should be paid to the minimisation of radioactive waste at the origin, development and implementation of predisposal options to reduce waste volumes and the development of new storage or disposal facilities.

Measures taken by the Member States

The report noted that in the last three years Member States have made a number of steps towards demonstrating that they have been taking reasonable actions to ensure that no undue burden is passed to future generations and that radioactive waste and spent fuel is managed safely. Member States need to further accelerate in addressing key challenges.

The Commission encourages Member States, which have not yet done so, to take a swift decision on their policies, concepts and plans for the disposal of radioactive waste, in particular intermediate-level waste and high-level waste. Member States that consider shared solutions, should cluster up and take practical measures, including site-specific matters. Another key challenge remains ensuring that adequate funds will be available for the costs of national programmes.

National Programmes

The Commission noted different stages of implementation of the national programmes. Several Member States reported a few years' delays in the implementation of programmes, including for the first geological disposal facilities. In most Member States, further work is needed in developing and implementing clear key performance indicators to monitor progress in effective and transparent ways, and to ensure timely accomplishments.

Further efforts are also needed to:

- improve the inventory projections for the scope of the national programmes, including decommissioning waste, institutional waste and waste from remediation activities, and the demonstration of sufficient capacities for storage and disposal;

- specify, demonstrate or guarantee the functional independence of the competent regulatory authority;

establish adequate arrangements requiring sufficient human and financial resources for the competent national authorities;

- share the outcomes of self-assessments and international peer reviews, engage in a transparent dialogue with stakeholders and facilitate the exchange of good practice and knowledge at Union level;

- continue research, development and training which play an important role in defining long-term solutions for the management of intermediate and high-level waste and spent fuel;

- to improve the quality of the national reports which they notify to the Commission.

The Commission intends to follow up on the infringement procedures and legal actions initiated in the previous reporting cycle and will continue to assist Member States in fully implementing the legislation.

Management of spent fuel and radioactive waste: EU legal framework

2010/0306(NLE) - 17/12/2019 - Follow-up document

This Commission staff working document lays down the progress of implementation of Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.

This document is primarily based on the information provided in Member States' national programmes for the management of spent fuel and radioactive waste and national reports on the implementation of the Directive, as notified to the Commission by March 2019.

It provides background information related to the main findings, progress, challenges, and trends with a view to improving the quality of reporting.

The document noted that all Member States submitted their second national reports to the Commission by March 2019 and a few Member States also notified to the Commission their final or updated national programmes during the reporting period.

In the previous reporting cycle in 2015 most of the EU Member States notified their national programmes for the first time and submitted national reports on the implementation of the Directive at the same time. In most of the cases Member States focused in their national reports on national policies and principles, national frameworks, national programmes and their implementation. As this is the second time that Member States report on the implementation of the Directive, particular attention was given by the Commission to the progress made during the reporting period by the Member States in implementing the Directive.

In most areas, progress is very little, or insufficiently reported to the Commission. The next Member States reports to be submitted to the Commission are due by 23 August 2021, when the Commission expects a significant improvement of the quality of reporting.

Management of spent fuel and radioactive waste: EU legal framework

2010/0306(NLE) - 17/12/2019 - Follow-up document

This Commission staff working document provides an inventory of radioactive waste and spent fuel present in the Community's territory and the future prospects.

This document is based on the information provided in the second national reports of EU Member States on the implementation of Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste. Its inventory reference date is end of 2016, although more than half of the Member States reported inventory as of end of 2017 or 2018.

The main findings of this document are as follows:

EU radioactive waste inventory

The estimated total inventory of radioactive waste on EU territory at the end of 2016 is 3 466 000 m3. Of this waste, 71.6% is already disposed of (2 483 000 m3) and 28% (983 000 m3) is in storage and will have to be managed in the future. Compared to the 2013 radioactive waste inventory, this is a 4.6% increase of total radioactive waste volumes.

Currently, thirteen Member States have radioactive waste disposal facilities either in operation or closed (nuclear power programme countries: Czech Republic, Finland, France, Germany, Hungary, Romania, Slovakia, Spain, Sweden, UK; non-nuclear programme countries: Latvia, Poland and Portugal) although based on the information from the national programmes and reports it is expected that more repositories will be built in the coming years.

A number of Member States (both with and without nuclear power plants) have dedicated disposal sites for institutional radioactive waste. In some cases, the disposal of waste undertaken in the past at several sites is now being reconsidered and there are plans for the retrieval of the waste disposed of several decades ago.

France and UK have by far the highest share with 44.5% and 36% respectively. The next Member State with the highest share is Germany with 6.5%.

Spent fuel inventory

Based on the Member State strategy, spent fuel is stored pending either disposal or reprocessing. During reprocessing, uranium and plutonium are recovered and separated from fission products, which are radioactive waste.

At the end of 2016 approximately 58 000 tHM of spent fuel was stored in the EU (7% increase from 2013 and 29% increase since 2007) and around 900 tHM of spent fuel (about 1.5 %) was sent for reprocessing outside the EU with the expected returns of resulting radioactive waste from reprocessing. These amounts include both spent fuel coming from power and non-power (e.g. research, isotope production) reactors.

Future estimations

With regards to spent fuel, an increase from present 58 000 tHM to 76 000 tHM in 2030 is estimated. It has to be noted, that the majority of Member States have not reported inventories from planned new build nuclear power plants. It is expected that by 2030 the spent fuel inventory will increase by approximately 10%. As some Member States proceed with spent fuel reprocessing, the actual increase does not represent the actual amount of spent fuel discharged from the reactors.

Management of spent fuel and radioactive waste: EU legal framework

2010/0306(NLE) - 15/05/2017 - Follow-up document

The Commission presented a report on the progress of the 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.

As part of the implementation of Directive 2011/70/Euratom, Member States are required to report to the Commission their inventory of all radioactive waste and spent fuel, clearly indicating the location and amount in accordance with an appropriate classification.

Moreover, Member States' reports should include estimates of future quantities, including those from decommissioning, and they should provide an update of their inventory and projections every three years.

Estimated inventory: according to the report, the estimated total inventory of **radioactive waste** on the EU territory is 3 313 000 m3, of which about 70% has been disposed of (2 316 000 m3) and about 30% is in storage (997 000 m3).

At the end of 2013, more than 54 000 tonnes of **spent fuel** was stored in the EU. More than 800 tonnes of spent fuel (about 1.5% of the total inventory) was stored in a third country pending reprocessing.

The majority of Member States operating nuclear power plants intend to dispose of their spent fuel in deep geological facilities without reprocessing in the future. This is expected to lead to an increase in the volume of high level waste for storage and disposal. Moreover, decommissioning of nuclear power plants will become an increasingly important activity for the European nuclear industry in the coming years.

Several Member States have **not provided detailed estimates** of their future inventory of spent fuel and/or radioactive waste, as most of them use their own classification system and the Directive does not provide for a harmonised approach. In addition, a number of Member States have not reported on all types of radioactive waste, particularly radioactive waste originating from decommissioning and new builds, future forecasts and institutional waste. The Commission is therefore **not in a position to make forecasts on the future total EU inventories**.

National policies and programmes: the Directive requires Member States to put in place: (i) **national policies**, which broadly describe the approach Member States are taking for all steps of radioactive waste and spent fuel management; (ii) **national programmes**, which translate the national policies into concrete plans of action, in order to ensure progress is made, and to enable monitoring thereof; (iii) **national legislative, regulatory and organisational frameworks** to enable the implementation of the national policies and programmes.

After examining national policies, frameworks and programmes, the Commission concluded that the legislative and regulatory framework at national level is broadly in line with the Directive. It noted that all but one Member State have reported to the Commission their national policies. Most Member States have established **clear ultimate responsibility** of the State for spent fuel and radioactive waste management in line with the Directive.

The most important outstanding issue in a large number of Member States with regard to national policies is the decision on the long-term management of intermediate level waste, high level waste and spent fuel, and specifically their disposal. Moreover, half of Member States are considering the possibility of shared solutions for disposal.

While the Directive allows shared disposal solutions to be developed, a policy based only on this option, without a clear path towards implementation, cannot be regarded as being in line with the aims of the Directive. The Commission sees **important challenges in putting shared solutions into practice**.

The Commission will continue supporting Member States in addressing the relevant challenges as follows:

- assist Member States in the next reporting cycle (in 2018) to **improve radioactive waste inventory data**, for example by providing a clear definition of the different sources of radioactive waste and their origins;
- **carry out additional work** with the aim of compiling a comprehensive overview of the total costs for spent fuel and waste management and how Member States ensure that these are financed according to the principle that all generators are to cover the costs of the management of spent fuel and radioactive waste (from generation to disposal);
- **discussion on options for radioactive waste and spent fuel disposal**, including shared solutions and the role of public participation in the decision-making process. The Commission stands ready to support the Member States in assessing the economic, legal and social impacts of shared repositories.

In addition, the Commission, in consultation with Member States and the European Nuclear Safety Regulators Group, will continue **working together with international organisations** (e.g. the IAEA and the OECD Nuclear Energy Agency) on exploring the possibilities for harmonising and facilitating reporting requirements for Member States' inventories for spent fuel and radioactive waste.

In this regard, the periodic international peer reviews of the national programmes, frameworks and competent regulatory authorities are of high importance in building stakeholders' trust and confidence in the management of these materials in the EU. The Commission will continue to promote an **open and transparent dialogue** and facilitate the exchange of good practices and knowledge.