REPORT OF THE EUROPEAN ATOMIC ENERGY COMMUNITY

On the implementation of the obligations under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

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Fifth Review Meeting of Contracting Parties
Vienna, May 2015

Forward

The European Atomic Energy Community (henceforth referred to as "Euratom" or "Community") is a regional organisation within the meaning of Article 39(4) of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management[1]. Euratom has been Contracting Party to this Convention (henceforth referred to as "Joint Convention") since January 2, 2006.

Euratom was established by a Treaty signed in Rome on 25 March 1957, under the general objective to tackle with the general shortage of conventional energy in the 1950s. The founding States looked to nuclear energy as a means of achieving energy independence and ensuring security of supply. At the same time, the Treaty foresees the adoption by the Community of basic safety standards for the protection of workers and the general public, while it also provides for a safeguards system which prevents nuclear materials from being diverted from their intended uses. The powers of Euratom are limited to civil applications of nuclear energy[2].

Euratom is linked to the European Union. Euratom and the Union share common institutions, procedural rules and financial structures. Moreover, they are composed of the same Member States, which currently count twenty eight (28) European countries[3]. Nevertheless, although the present Report uses in certain cases the terms Euratom and European Union interchangeably, it must be observed that Euratom is legally distinct from the Union, as well as that the Euratom Treaty and its derived legislation is lex specialis and prevails in case of conflict with rules under the European Union Treaties.

Each Member State can decide whether it wants to include nuclear power in its energy mix. In Euratom, nuclear power plants generate about 27% of the electricity produced[4], making nuclear energy the principal low-carbon source of electricity. The sector represents approximately 700 million tons CO_2 per year that otherwise might be emitted to the

1 INFCIRC/546 of 24 December 1997.

2 Thus, they do not cover spent fuel or radioactive waste within military or defence programmes.

3 Representing a combined population of approximately 507 million inhabitants and occupying a large portion of Europe covering over 4,270,000 km^2.

4 There are currently one hundred thirty two (132) nuclear reactors in operation, in fourteen (14) member countries.

atmosphere[5]. Nuclear power, therefore, plays a key role in limiting carbon emissions within Euratom.

On the other hand, Euratom does not possess neither operate itself nuclear power plants. However, other types of nuclear facilities (mainly research facilities) are located at sites of Euratom's Joint Research Centre, in: Ispra (Italy), Geel (Belgium), Karlsruhe (Germany) and Petten (Netherlands). In 1999, a Decommissioning and Waste Management Programme was launched, with respect to obsolete nuclear facilities. As these installations are located in the territory of Member States, all safety and environmental considerations are those of the countries concerned. This is in accordance with the principle that nuclear facilities in the territories of Member States are licenced and supervised at the national level[6]. Nevertheless, in addition to the National Reports of the countries concerned, the present Report includes relevant information on the practices followed in the Joint Research Centre installations and the inventories of radioactive waste and/or spent fuel thereof.

All Member States of Euratom handle radioactive waste. It is generated by various beneficial activities, such as electricity production in nuclear power plants and a range of radioisotope applications in medicine, industry, agriculture, research and education. In total, more than 110.000 m^3 of radioactive waste are produced annually in Euratom, mainly very low and low and intermediate level waste. The annual production of spent fuel amounts to 3.200 tonnes (Heavy Metal) approximately, of which about one third can currently be considered as being placed in storage for possible direct disposal as waste. It should be clarified that it comes within the discretion of each Member State to define its own fuel cycle policy, considering spent fuel as a valuable resource that may be reprocessed or as waste destined for disposal.

The management of radioactive waste and spent fuel has been addressed at Community level through various legal instruments adopted under the Euratom Treaty. Council Directive 2011/70/Euratom, establishing a Community framework for such responsible and safe management, is the central legislation in this field. The Fourth Review Meeting of Contracting Parties acknowledged the adoption of this legislative tool and noted that its provisions have close reference to Articles of the Joint Convention[7]. The directive aims at

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5 Based on a representative mix of alternative sources.

6 As observed in the Fourth Review Meeting of Contracting Parties (Country Group 2 - Coordinator's Report), all facilities operated within the Euratom umbrella are operated under national legislation and national regulatory supervision in the Member State where the activity takes place.

7 Summary Report, at paragraph 24.

ensuring responsible and safe management of radioactive waste and spent fuel to avoid undue burdens on future generations. It reaffirms the principles of prime responsibility of licence holders for the safety of this management, under the supervision of the national competent regulatory authority, and of ultimate responsibility of Member States for the management of the radioactive waste and spent fuel generated in them. Member States are required to establish and maintain an appropriate national policy and a national programme for its implementation, as well as a framework which amongst other provides for coordination between national bodies. Further, there are provisions in the directive which lay down obligations regarding the periodical conduct of self-assessments and international peer reviews, with the aim of ensuring that high safety standards are achieved in the radioactive waste and spent fuel management.

The present Report indicates in its respective chapters several developments and initiatives taken by Euratom since the last Review Meeting. Regulatory initiatives include the adoption of Council Directive 2013/59/Euratom laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation, as well as the revision of Council Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations. At the international level, Euratom has entered into a Memorandum of Understanding with the International Atomic Energy Agency (IAEA), in 2013, for a partnership between them on nuclear safety cooperation, which could encompass possible synergies in the area of radioactive waste and spent fuel management. At the same time, collaboration continued in the context of European fora such as the European Nuclear Safety Regulators Group and the European Nuclear Energy Forum; following the adoption of Council Directive 2011/70/Euratom, emphasis has been given to the provision of guidance for the successful implementation of national plans pertinent to the management of radioactive waste and spent fuel. Euratom research in the field of nuclear energy also progressed, under an extension of the seventh Euratom Framework Programme for the years 2012 and 2013, and the Horizon 2020 - Framework Programme for Research and Innovation which will cover Euratom nuclear research from 2014 to 2018. A number of other notable initiatives are additionally mentioned in this Report, such as the work done in the area of emergency preparedness and the post-Fukushima actions aimed at enhancing nuclear safety in Europe.

This Report has taken into account the recent developments concerning the structure and content of National Reports. Therefore, it includes references related to issues which Contracting Parties agreed in the previous (Fourth) Review Meeting to consider in their national reporting, for example international cooperation with regard to -long term- management and disposal of radioactive waste or spent fuel.

Furthermore, Euratom has considered the conclusions of the recent Extraordinary Meeting of Contracting Parties that took place in 12-13 May 2014, as concerns the revision of the *Guidelines regarding the Form and Structure of National Reports* (INFCIRC/604). It was agreeable to all Contracting Parties that, for the Fifth Review Meeting, they may continue to apply the previous practice concerning the preparation and structure of National Reports (i.e. INFCIRC/604/Rev.2), or to use the newly established procedures (i.e. INFCIRC/604/Rev.3)[8]. Euratom has chosen the latter option, in order to progressively align its Report with the new requirements and to allow for a robust and thorough reporting. Accordingly, the present Report refers to additional aspects of Euratom's framework which reflect IAEA Fundamental Safety Principles or are relevant to international peer review missions and to the means by which the effective independence of the regulatory bodies is enforced and transparency is promoted.

In addition, the Report sets out the conclusions drawn from the discussion of the last Euratom reporting at the Fourth Review Meeting of Contracting Parties and outlines positive features in recent Community actions and practices.

Due to the need to follow lengthy internal procedures for its adoption, between June and September 2014, the present Report cites the status of implementation of the obligations arising under the Joint Convention, in Euratom, as it stood on June 2014.

Euratom avails itself of this opportunity to express its compliments for a fruitful and constructive Fifth peer-Review Meeting of Contracting Parties.

[8] President's Report, at paragraph 31.

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Section A

INTRODUCTION

A.1 MAIN THEMES AND STRUCTURE OF THE REPORT

This Report is submitted in compliance with Articles 30 and 32 of the Joint Convention, in view of the forthcoming Fifth Review Meeting of the Contracting Parties, to be held in Vienna, in May 2015.

It is based on the previous Report submitted by Euratom, on October 2011, to the Fourth Review Meeting of Contracting Parties to the Joint Convention (held in May 2012), which has now been revised and updated. Updated information is highlighted in ***bold italics*** font.

The Report has taken account of the developments that took place in the past three years in the framework of the Joint Convention. For instance, it displays Euratom actions that are relevant to the following themes, which according to the conclusions of the Fourth Review Meeting of Contracting Parties should be considered by latter National Reports:

- safety implications of very long storage periods and delayed disposal of spent fuel and radioactive waste;
- international cooperation in finding solutions for the long-term management and disposal of different types of radioactive waste and/or spent fuel;
- progress on lessons learned from the Fukushima accident.

Moreover, the present Report follows the structure of the recently revised *Guidelines regarding the Form and Structure of National Reports* (INFCIRC/604/Rev.3 – hereinafter "Guidelines"). This revision was agreed upon by Contracting Parties in their second Extraordinary Meeting (hereinafter "EM"), in May 2014, and is aimed at ensuring a more effective reporting, by means of encouraging the inclusion in National Reports of additional information relating to the following topics:

- utilization of IAEA Safety Standards;
- effective independence of the regulatory body;
- international peer review missions;
- enhancement of openness and transparency.

Therefore, the above topics are covered by this Report.

In addition, the Report has been revised so as to ensure a better understanding of Euratom's legal system. It contains information on the Euratom Treaty and the Community itself, the legal measures which can be adopted by Euratom, their effect on national law and the respective obligations of Member States[9].

[9] See Sections A.2 and E below.

An overview matrix, in accordance with paragraph 12 of the Guidelines, is also included[10].

The Report covers the regulatory obligations of Euratom under the Joint Convention. It furthermore provides information on the nuclear installations located at sites of its Joint Research Centre (JRC), in: Ispra (Italy), Geel (Belgium), Karlsruhe (Germany) and Petten (Netherlands). Further details on these installations, as regards safety obligations arising under the Joint Convention, can be found in the respective National Reports of the above Member States, in whose territories the installations are located. As the Rapporteur's Report noted in the Fourth Review Meeting of Contracting Parties, nuclear installations at JRC sites are subject to the regulatory framework and supervision in the country of each site[11]. Nevertheless, for clarity reasons and with a view to ensure a more comprehensive reporting, the present Report gives account of the nuclear facilities at JRC sites and the decommissioning and waste management programme for the obsolete installations[12].

The structure of the Report is as follows:

- in addition to the foregoing, the present Section (A) includes an introduction to Euratom and the Euratom Treaty, the institutional structure and country composition of Euratom and the Euratom competences in the framework of the Joint Convention;

- general Euratom policies in the field of radioactive waste and spent fuel management, as well as relevant practices in the framework of the JRC, are set out in Section B, while Section D reports on the inventories in the nuclear installations at JRC sites;

- Section C is linked with Article 3 of the Joint Convention (scope of application);

- Section E presents Euratom's legal system and regulatory framework, and cites all main legislative measures in force;

- Sections F to J follow an article-by-article review of the implementation of the Joint Convention, citing several measures adopted by Euratom with regard to general safety provisions and requirements (such as those relating to siting and operation, or the safety assessment of nuclear facilities), transboundary movement of radioactive waste and spent fuel, and the management of disused sources;

- Section K mentions various complementary actions aimed, inter alia, at enhancing nuclear safety at both Euratom and international level (such as the conclusion and follow up of "stress tests" at European nuclear power plants) and advancing research in the field of radioactive waste management.

  Moreover, in accordance with the revised Guidelines (INFCIRC/604/Rev.3), this Section:

  - recalls Euratom provisions relating to international peer reviews and transparency matters,

[10] See Section B.2.2 below.

[11] Accordingly, licenses are issued by the competent authorities of the Member States and the monitoring of the safety of nuclear facilities and activities takes place at national level.

[12] This information is available at Sections B.2 and D of the Report.

- mentions the conclusions drawn from the discussion of Euratom's reporting at the previous (Fourth) Review Meeting of Contracting Parties and measures taken to address the identified challenges,
- summarises strong features in recent Euratom actions and foresees future challenges and priorities;

– the Report closes with *Appendices I* (additional information on Euratom research initiatives, implemented through multi-annual Framework Programmes) *and II* (quoting the text of Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste).

A.2 INTRODUCTION TO EURATOM AND ITS ACCESSION TO THE JOINT CONVENTION

A.2.1 The Euratom Treaty vis-à-vis the Treaties establishing the European Community and the European Union: history and evolution

Today, twenty eight (28) European countries enjoy an economic and political partnership, based on a number of Treaties whose time-line expands from the aftermath of the Second World War to recent years. The Treaties which founded this far-reaching partnership are the following:

- The Treaty establishing the European Coal and Steel Community (1951)[13],
- The Treaty establishing the European Atomic Energy Community (1957)[14],
- The Treaty establishing the European Economic Community (1957)[15],
- The Single European Act (1986)[16],
- The Treaty on European Union (or "Treaty of Maastricht") (1992)[17],
- The Treaty of Amsterdam (1997)[18],
- The Treaty of Nice (2001)[19],
- The Treaty of Lisbon (2007)[20].

Since its entry into force in 1958, the Treaty establishing the European Atomic Energy Community[21] (hereinafter "Euratom Treaty" or simply "Treaty") has not faced extensive amendments. By contrast, the European Coal and Steel Community ceased to exist when the Treaty establishing it[22] expired on 23 July 2002; it was decided that the coal and steel trade would thenceforth be governed by the rules of the Treaty establishing the European Economic Community. By that time, the latter (i.e. the European Economic Community) had already been renamed to "European Community", by virtue of the Treaty on European Union[23].

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13 Entered into force: 23 July 1952.
14 Entered into force: 1 January 1958.
15 Entered into force: 1 January 1958.
16 Entered into force: 1 July 1987.
17 Entered into force: 1 November 1993.
18 Entered into force: 1 May 1999.
19 Entered into force: 1 February 2003.
20 Entered into force: 1 December 2009.
21 Treaty establishing the European Atomic Energy Community (consolidated version) (Official Journal of the European Union) C84/1 of 30 March 2010.
22 Signed on 18 April 1951.
23 Signed on 7 February 1992.

Further, following the entry into force of the Treaty of Lisbon in 2009, the European Community was dissolved into the European Union (hereinafter "EU") and the 1957 Treaty establishing the European (Economic) Community was thus renamed "Treaty on the Functioning of the European Union" (hereinafter "TFEU")[24]. On the other hand, Euratom has not been dissolved into the EU and it therefore maintains to date its separate legal personality. Article 184 of the Euratom Treaty states: *"The Community shall have legal personality"*.

However, Euratom is closely associated with the EU. More specifically, the Treaty of Lisbon recalls in its Protocol No. 2 that the provisions of the Euratom Treaty shall continue to have full legal effect, yet certain amendments are made to this latter Treaty. These amendments for the most part concern institutional and financial aspects, with respect to which Euratom is interlinked with the EU. Accordingly, the new Article 106a(1) of the Euratom Treaty lists up all those provisions of the EU Treaties (i.e. the TEU[25] and the TFEU[26]) that shall also apply to the Euratom Treaty, the majority of which are provisions concerning the institutions, legislative procedures and financial matters[27].

However, Article 106a(3) of the Euratom Treaty lays down a basic rule, according to which this Treaty is lex specialis and prevails in case of conflicting rules between the provisions of the EU Treaties and its own provisions[28].

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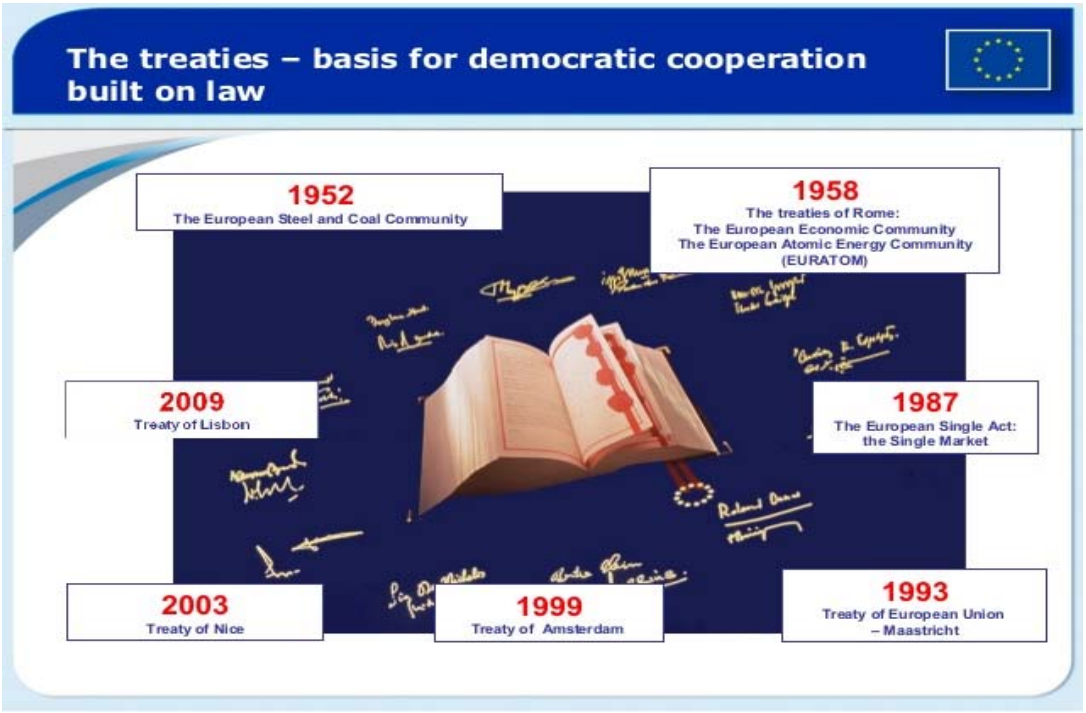
[24] The current text of the "Treaty on European Union" (TEU) states that the EU *"shall replace and succeed the European Community"* and *"shall be founded on the present Treaty (TEU) and the Treaty on the Functioning of the European Union (TFEU)"*); Article 1 TEU.

[25] OJ C83/13 of 30 March 2010.

[26] OJ C115/1 of 9 May 2008.

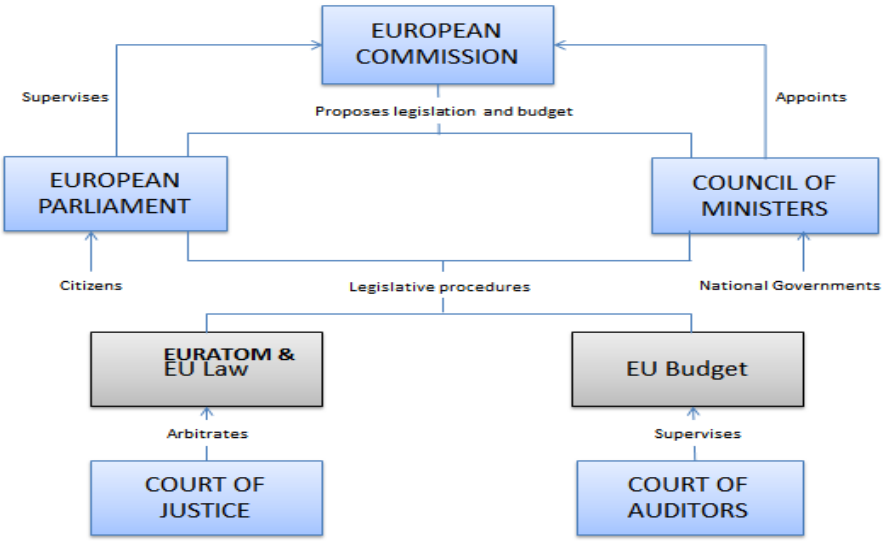
[27] Article 106a(1) provides: *"Article 7, Articles 13 to 19, Article 48(2) to (5), and Articles 49 and 50 of the Treaty on European Union, and Article 15, Articles 223 to 236, Articles 237 to 244, Article 245, Articles 246 to 270, Article 272, 273 and 274, Articles 277 to 281, Articles 285 to 304, Articles 310 to 320, Articles 322 to 325 and Articles 336, 342 and 344 of the Treaty on the Functioning of the European Union, and the Protocol on Transitional Provisions, shall apply to this Treaty"*.

[28] Article 106a(3) provides: *"The provisions of the Treaty on European Union and of the Treaty on the Functioning of the European Union shall not derogate from the provisions of this Treaty"*.



A.2.2 The institutional structure of Euratom

As noted above, the institutional structure of Euratom is linked with that of the EU. Thus, the fulfillment of the tasks entrusted to Euratom is ensured by the Council (of Ministers), the European Parliament, the European Commission, the Court of Justice and the Court of Auditors, which are all institutional organs of the EU too. Each of these institutions acts within the limits of the powers conferred on it by the common institutional framework organised by the Euratom Treaty, the TEU and the TFEU[29].



[29] Respectively: Articles 106a, 134, 135, 144, 145, 157 and 164 of the Euratom Treaty; Articles 13 to 19 TEU; and Articles 223 to 270, 272 to 274, 277 to 281 and 285 to 287 TFEU.

The institutions of Euratom and the EU work intensively, along their respective competences, in ensuring the coordination and coherence of their action vis-à-vis external partners. As an example: in order to ensure better visibility of joint activities in all areas, senior officials of Euratom and the EU, on the one hand, and the IAEA, on the other, met in Brussels on 25 January 2013, to discuss enhanced cooperation between the institutions of these organisations.

Further information on these institutions, as well as on other operational services and bodies, is cited below:

The Council (of Ministers)

The Council is the main decision-making institution, but it also exercises budgetary as well as policy-making and coordinating functions. Each Member State presides over the Council for a six-months period.

The European Parliament

The European Parliament represents the citizens of the Member States. The members of the European Parliament are elected by direct universal suffrage. Together with the Council it exercises legislative and budgetary functions. In the framework of the Euratom Treaty, the European Parliament has a consultative role in the legislative process.

The European Commission (also referred to herein as the "Commission")

The Commission promotes the general interest of Euratom and the EU, and takes appropriate initiatives to that end, including the preparation and making of legislative proposals. In principle, legislative acts in the field of nuclear energy may only be adopted (by the Council) upon the basis of a Commission proposal. The Commission also ensures the application of the Treaties and of measures adopted pursuant to them and it can initiate judicial proceedings before the Court of Justice of the EU for non-compliance with this law. In addition, the Commission has an executive role, for example it executes the budget and manages research programmes.

The Court of Justice of the EU

The Court of Justice of the EU, which includes the Court of Justice, the General Court and specialized courts, ensures that the law is observed in the interpretation and application of the Treaties. The Court of Justice of the EU has competence:

- to rule on actions brought by an institution, a Member State or a natural or legal person;

- to give preliminary rulings, at the request of courts or tribunals of the Member States, on the interpretation of the Treaties or the validity of acts adopted by the European institutions; and

- to rule in other specific cases provided for in the Treaties (including the Euratom Treaty).

The Court of Auditors

The Court of Auditors is an independent body, which is composed of one national from each Member State and which carries out auditing functions by examining the accounts of the revenue and expenditure of Euratom and the EU.

Advisory bodies

In addition, several advisory bodies exist under the Euratom Treaty, some of which are unique to Euratom while others are common to Euratom and the EU. The purpose of these bodies is to assist the decision-making institutions of Euratom in the exercise of their functions. For example, the Economic and Social Committee is such an advisory body operating within both Euratom and the EU, and is consulted by the Council, the European Parliament or by the Commission where it is so provided. In principle, the Economic and Social Committee has a consultative role in the legislative process. Other advisory bodies, which are attributed exclusively to Euratom, include the group of scientific and health experts provided for in Article 31 of the Euratom Treaty. This group gives its opinion to the Commission during the development of basic safety standards for the protection of the health of workers and the general public against ionising radiation. Further, Article 134 of the Euratom Treaty provides for the Scientific and Technical Committee, which is attached to the Commission and has an advisory status. Amongst other, this Committee advises the Commission in developing the list of fields of research concerning nuclear energy.

The Euratom Supply Agency[30]

The Euratom Supply Agency (ESA), set up by the Euratom Treaty itself[31], is in charge of implementing a common supply policy for nuclear materials, in particular nuclear fuels, with the aim of ensuring a regular and equitable supply for all European users of such materials. The policy is based on a reasonable diversification of supply sources, intended to prevent excessive dependence on any single external source of supply, likely to jeopardise security of supply in the medium and long term.

To perform its mission, ESA is endowed with the exclusive right to conclude contracts for the supply of nuclear materials from inside or outside the Community.

In practice, in normal circumstances of supply, the "simplified procedure" is used, by which commercial partners –inside or outside the EU– may negotiate their transactions between themselves with the obligation to subsequently submit their draft contracts to ESA for consideration and conclusion. In any case, even within the framework of the simplified procedure, the Agency maintains the right to object to (and refuse to sign) any contract likely to put at risk the achievement of the objectives of the Treaty. For that reason, all supply contracts, submitted to ESA for conclusion, undergo thorough analysis.

The External Action Service

The Lisbon Treaty led to the creation of the post of High Representative of the EU for Foreign Affairs and Security Policy, and the establishment of the EU's diplomatic arm, the European External Action Service (EEAS). EEAS assists the High Representative in ensuring the consistency and coordination of the Union's external action, as well as by preparing policy proposals and implementing them after their approval by the Council. It also assists the President of the European Council and the President and Members of the Commission in their respective functions in the area of external relations and ensures close cooperation with the Member States. The network of EU delegations around the world is part of EEAS's structure.

[30] See, also, at: http://ec.europa.eu/EURATOM/index.html

[31] Articles 53 et seq. of the Euratom Treaty.

A.2.3 Member States of Euratom

The following twenty eight (28) States are presently members of Euratom: the Kingdom of Belgium, the Republic of Croatia, the Czech Republic, the Kingdom of Denmark, the Federal Republic of Germany, the Republic of Estonia, the Hellenic Republic, the Kingdom of Spain, the French Republic, Ireland, the Italian Republic, Republic of Bulgaria, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Grand Duchy of Luxembourg, the Republic of Hungary, the Republic of Malta, the Kingdom of the Netherlands, the Republic of Austria, the Republic of Poland, the Portuguese Republic, the Republic of Romania, the Republic of Slovenia, the Slovak Republic, the Republic of Finland, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland.

A.2.4 Euratom competences in the framework of the Joint Convention

A.2.4.1 *Accession of Euratom to the Joint Convention*

With regard to Euratom's aspirations in the international scene, the signatory States stated in the preamble to the Euratom Treaty that they were, inter alia:

> *"Desiring to associate other countries with their work and to cooperate with international organisations concerned with the peaceful development of atomic energy"*.

Hence, the Treaty stipulates that Euratom may, within the limits of its powers and jurisdiction, enter into obligations by concluding agreements or contracts with international organisations or third States[32]. In fact, Euratom is Contracting Party to several bilateral and multilateral international agreements as well as important Conventions in the area of nuclear energy, which, apart from the Joint Convention, include the Convention on Nuclear Safety[33], the Convention on Early Notification of a Nuclear Accident[34] and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency[35].

Euratom acceded to the Joint Convention by a Commission Decision of 14 June 2005[36], following a Council Decision of 24 January 2005[37]. The instruments of accession were deposited with the Director General of IAEA on 4 October 2005. Euratom's accession came into effect on 2 January 2006, in accordance with Article 40(2) of the Joint Convention.

The instruments of accession included the declaration required by Article 39(4)(iii) of the Joint Convention. In particular, Article 39(4)(iii) of the Joint Convention stipulates that: *"When becoming party to this Convention, such an organization shall communicate to the Depositary referred to in Article 43, a declaration indicating which States are members thereof, which Articles of this Convention apply to it, and the extent of its competence in the field covered by those articles"*.

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32 Article 101.
33 INFCIRC/449, 5 July 1994.
34 INFCIRC/335, 18 November 1986.
35 INFCIRC/336, 18 November 1986.
36 C (2005) 1729.
37 2005/84/Euratom, OJ L 30, 03.02.2005, p. 10.

A.2.4.2 *The declaration by Euratom according to the provisions of Article 39(4)(iii) of the Joint Convention regarding Community competences in the framework of the Joint Convention*

In December 2002, the Court of Justice ruled on the competences of Euratom with regard to the Convention on Nuclear Safety[38]. In its judgment[39], the Court found that Euratom possesses competences relating not only to radiation protection, but also to nuclear safety[40]. Based on this landmark ruling, the existing basic safety standards, aiming at the protection of the health of workers and of the general public against the dangers arising from ionising radiations, can be "supplemented" with safety requirements governing the safe management of radioactive waste and spent fuel. Moreover, the Court had already adjudicated in 1988 that the provisions of Title II, Chapter 3, of the Treaty, on health and safety, form a coherent whole conferring powers of a considerable scope, in order to protect the population and the environment against risks of nuclear contamination[41].

The declaration of competences of Euratom, under Article 39(4)(iii) of the Joint Convention, was consistent with the above principles established by the Court. It stated:

> *"The Community declares that Articles 1 to 16, 18, 19, 21 and 24 to 44 of the Joint Convention apply to it.*
>
> *The Community possesses competences, shared with its Member States, in the fields covered by Articles 4, 6 to 11, 13 to 16, 19 and 24 to 28 of the Joint Convention as provided by the Treaty establishing the European Atomic Energy Community in Article 2(b) and the relevant Articles of Title II, Chapter 3, entitled 'Health and Safety'."*

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38 The Convention on Nuclear Safety was adopted on 17 June 1994. Euratom acceded to this Convention by a Commission Decision of 16 November 1999 (Commission Decision 1999/819/Euratom concerning the accession to the 1994 Convention on Nuclear Safety by the European Atomic Energy Community, OJ L 318, 11.12.1999, p. 2), following a Council Decision of 7 December 1998. The instruments of accession were deposited with the Director General of IAEA on 31 January 2000. Thus, for Euratom the Convention on Nuclear Safety entered into force on 30 April 2000, in accordance with Article 31(2) of the Convention.

39 Case C-29/99 *Commission v. Council* ECR 2002, p. I-11221; judgment of the Court of 10 December 2002.

40 In paragraphs 82 and 83 of the Court's reasoning, it is stated that: "*it is not appropriate, in order to define the Community's competences, to draw an artificial distinction between the protection of the health of the general public and the safety of sources of ionising radiation. Those considerations should inform the determination as to whether the Community possesses competences in the fields covered by articles of the Convention…*".

41 Case C-187/87, ECR 1988, p. 5013.

Section B

POLICIES AND PRACTICES

(Article 32(1) of the Joint Convention)

ARTICLE 32. REPORTING
1. In accordance with the provisions of Article 30, each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party the report shall also address its:
(i) spent fuel management policy;
(ii) spent fuel management practices;
(iii) radioactive waste management policy;
(iv) radioactive waste management practices;
(v) criteria used to define and categorize radioactive waste...

B.1 GENERAL EURATOM POLICIES AND PRACTICES

B.1.1 Foreword: relevant data

Through its Member States, Euratom is a significant producer of radioactive waste. As a result, management of radioactive waste and spent fuel is one of the key issues in Europe's nuclear energy policies. This is also reflected in the number of legal instruments the Community has produced, upon the basis of the Euratom Treaty, regulating amongst other radioactive waste management and decommissioning. An overview of the relevant Euratom legislation can be found in Section E.1 of this Report.

Fourteen (14) of the twenty eight (28) Euratom Member States have nuclear power plants in operation[42]; two (2) other Member States have nuclear power plants only under decommissioning[43]. Each Member State may define its fuel cycle policy, considering spent fuel as a valuable resource that may be reprocessed or as waste for direct disposal. General data about the spent fuel quantities are presented below.

As regards radioactive waste, according to the draft Eighth Situation Report on the Management of Radioactive Waste[44] and based on the information provided by Member States as for the end of year 2010, the annual generation reported in the EU is about 122 500 m³, mainly low and intermediate level waste (reported 42 800 m³ short-lived and 34 800 m³ long-lived), as well as very low level waste (reported 44 700 m³). About 200 m³ are high level waste (i.e. vitrified residues from the reprocessing of spent fuel).

As regards spent fuel, the amount of annual production in the EU is approximately 3 200 tonnes (Heavy Metal), about one third of which can currently be considered as being

42 The Member States having nuclear power plants in operation are:
Belgium, Bulgaria, the Czech Republic, Finland, France, Germany, Hungary, the Netherlands, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

43 Italy and Lithuania.

44 At the time of writing, the Eight Situation Report on the Management of Radioactive Waste is under preparation. Euratom will report in more detail on this situation report at the next Review Meeting of Contracting Parties.

placed in storage for possible direct disposal as waste. Some Member States[45] have only very small quantities of spent fuel originating from research reactors.

Most of the short-lived, low and intermediate level waste is routinely disposed of. By 2020 it is likely that many Member States having nuclear power will have operational repositories for this type of waste. By contrast, all accumulations of the more hazardous high-level and long-lived wastes (including spent fuel for direct disposal) are currently being stored in surface or near-surface facilities pending the availability of more permanent solutions.

B.1.2 General Euratom policies

Radioactive waste and spent fuel management policy remains largely a national competence and varies between Member States. Some Member States are reassessing their waste management options, as well as the associated decision-making processes. Some regard spent fuel as waste, others as a resource from which valuable quantities of fissile and fertile material can be extracted, while others have not yet defined their policy. However, Member States are obliged to define their spent fuel policy as part of their implementation of Council Directive 2011/70/Euratom.

A few countries have established precise programmes for the development of geological disposal with fixed milestones and deadlines: Finland, France and Sweden expect to have operational disposal facilities for high level waste by 2025-2030; Germany and Belgium will possibly follow by 2050. The remaining Member States have set target dates, but are less advanced in the implementation of repository development or the determination of specific spent fuel management plans.

The management of spent fuel and radioactive waste is an integral part of the safe and sustainable use of nuclear energy for nuclear power production and of ionising radiation in medicine, industry, agriculture, research and education.

This entails, in particular, establishing a common framework aiming at achieving and maintaining a high uniform level of safe management of radioactive waste and spent fuel throughout the Community by recalling internationally accepted safety principles (such as those laid down in the IAEA Safety Fundamentals and the Joint Convention) and providing requirements for the establishment of national programmes for the management of radioactive waste and spent fuel, including development of repositories.

The specific objectives, linked with the achievement of the above general policies, are:

> ***– to achieve a sustained political commitment for the long-term management of spent fuel and radioactive waste;***
>
> ***– to ensure that workers and the general public are protected against dangers arising from ionising radiation now, in the future and beyond national borders, without imposing undue burdens on future generations or compromising the ability of future generations to meet their own needs;***
>
> ***– to ensure a transposition of the political decisions into clear provisions for implementation of all steps on radioactive waste and spent fuel management from generation to disposal;***

[45] Austria, Denmark, Greece, Poland and Portugal.

– to achieve and maintain continuing improvement of the management system, based on stepwise decision-taking and social acceptance;

– to ensure adequate, available when needed and transparently managed financial resources in accordance with the polluter-pays principle.

In fact, safe management of radioactive waste has been one of the major objectives of Euratom since its inception. Over the last thirty years Euratom has developed activities and policies related to radioactive waste and spent fuel management, first through research and development (R&D) Framework Programmes[46] and Community plans of action, a Green Paper on security of energy supply[47] and finally by the development of a common legislative framework in the field of radioactive waste and spent fuel management.

The action plans recognised that radioactive waste raises a combination of issues, some involving the development of existing technologies via R&D, whilst others being of a legal, administrative, financial and social nature. They also assumed that collaboration with third countries and organisations on management and storage of radioactive waste could benefit from any expansion of Community activities.

The development of a common legislative framework in the field of radioactive waste and spent fuel management was a lengthy process. The original Commission proposals[48] were not readily acceptable. It was only after a wide-ranging consultation process with stakeholders before another proposal could be finally endorsed by the Council, namely Council Directive 2011/70/Euratom, which came into force on 22 August 2011.

B.1.3 European Nuclear Safety Regulators Group

In this process, the European Nuclear Safety Regulators Group (ENSREG), initially called "High Level Group on Nuclear Safety and Waste Management"[49] (established on 17 July 2007[50]), played a central role in assisting Euratom in the development of policies and legislative proposals in the area of nuclear safety as well as spent fuel and radioactive waste management. Beyond clear advice on European rulemaking, they also suggested a better use of the Joint Convention process within Euratom, the identification and enhanced use of best practices in the context of continuous improvement and a better exchange of information on waste safety experience[51]. ***Following the adoption of Council Directive 2011/70/Euratom, ENSREG produced guidelines regarding Member States' reporting, as required under Article 14(1) of the directive***.

B.1.4 European Nuclear Energy Forum

The European Nuclear Energy Forum (ENEF)[52] is another European initiative, endorsed by the Member States heads of State and government in March 2007. It is a platform for a broad discussion on the opportunities and risks of nuclear energy, including spent fuel and radioactive waste management, as well as on transparency issues. ENEF gathers all relevant stakeholders in the nuclear field, such as the governments of all Member States of Euratom,

46 On Euratom Research Framework Programmes, see Section K.2 and Appendix I, below.
47 Towards a European strategy for the security of energy supply, COM (2000) 769 final.
48 COM (2004) 526 final.
49 See also at: http://ec.europa.eu/energy/nuclear/ensreg/ensreg_en.htm
50 By Commission Decision 2007/530/Euratom, OJ L 195/44 of 27.07.2007.
51 See also at: http://ec.europa.eu/energy/nuclear/ensreg/doc/2009_ensreg_report.pdf
52 See also at: http://ec.europa.eu/energy/nuclear/forum/forum_en.htm

European institutions (including the European Parliament and the European Economic and Social Committee), nuclear industry, electricity consumers and the civil society.

Several plenary meetings and dedicated working groups supported and assisted Euratom in the development of a legally binding instrument in this area. ***Following the adoption of Council Directive 2011/70/Euratom, ENEF created guidance[53] for the successful development and implementation of national plans for spent fuel and radioactive waste management, covering all steps from production up to disposal***.

B.1.5 The Sustainable Nuclear Energy Technology Platform

The Sustainable Nuclear Energy Technology Platform (SNE–TP) was launched in September 2007. It aims at promoting the research, development and demonstration of European nuclear fission technologies and gathers about eighty (80) organisations (research organisations, utilities, vendors, technology providers, technical safety organisations, universities, consultancy companies and non-governmental organisations).

Within the framework of the Strategic Energy Technology Plan (SET-Plan), stakeholders have formulated a collective vision of the contribution which fission could make towards Europe's transition to a low-carbon energy mix by 2050, with the aim of integrating and expanding R&D capabilities in order to reach this objective.

A new version of a Strategic Research Agenda, issued in February 2013, is electronically available[54]. It is the result of the contribution of nearly 100 scientists and engineers from the member organisations of SNE–TP. In the area of radioactive waste management, it concentrates on waste minimisation.

B.1.6 The Implementing Geological Disposal Technology Platform

The Implementing Geological Disposal Technology Platform (IGD–TP[55]) was launched in November 2009, as a tool to support the confidence-building in the safety and implementation of deep geological disposal solutions[56]. It will facilitate access to expertise and technology, interact with the stakeholders and communicate the results to the benefit of all of Europe. ***The vision of the platform members (waste management organisations) is that by 2025 the first geological disposal facilities for spent fuel, high level waste and other long-lived radioactive waste will be operating safely in Europe***.

B.1.7 Complementary solutions to disposal

Complementary solutions to disposal are also under investigation in some countries, in particular partitioning and transmutation (P&T). In the case of P&T, research is still on-going. While having the potential to reduce significantly the quantities of long-lived and/or radiotoxic radionuclides (in particular minor actinides) in the most hazardous waste forms, P&T would not completely eliminate all such waste constituents and therefore is not a replacement for geological disposal. Nonetheless, it could be a valuable complement,

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53 Guidelines under Council Directive 2011/70/Euratom for the establishment and notification of National Programmes: http://ec.europa.eu/energy/nuclear/forum/meetings/doc/2013_05_30/related_docs/napro_guidelines.pdf

54 See also at: http://www.snetp.eu

55 See at : http://www.igdtp.eu/

56 IGD-TP, Vision document of October 2009. See also at: www.igdtp.eu

enabling optimum use to be made of the space in geological repositories, in particular by reducing the heat generation of the waste.

Surface and sub-surface storage could also be considered as a temporary option, provided a permanent solution is defined with associated milestones and deadlines. While envisaged by most experts in the short to medium-term, especially to allow time for implementing geological disposal and also to allow for the temperature decrease of heat emitting wastes, storage is not considered sustainable in the longer term.

B.1.8 Public opinion

European citizens are concerned about the management of spent fuel and radioactive waste in Europe. The Eurobarometers published in July 2008[57] and April 2010[58] show that European citizens think that Member States should take up their responsibilities and implement now demonstrated solutions for high-level radioactive waste, instead of leaving it for the future, and that nuclear waste management should be regulated at European level. An open consultation carried out in the website of the Commission during the months of March to May 2010 showed similar conclusions, where an overwhelming majority of the respondents declared their support for the development of binding Community legislation in this area[59].

B.1.9 Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste

Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste was adopted on 19 July 2011[60].

The general objective of the directive is the establishment of a Euratom framework for the responsible and safe management of spent fuel and radioactive waste to avoid imposing undue burdens on future generations, ensuring that Member States provide for appropriate national arrangements for a high level of safety, as well as for necessary public information and participation.

References to specific aspects of this directive are made in subsequent parts of this Report.

B.2. EURATOM POLICIES IN THE FRAMEWORK OF THE JOINT RESEARCH CENTRE (JRC)

B.2.1 General introduction to the JRC and the Decommissioning and Waste Management Programme

The JRC was set up at the beginning of the 1960s, under Article 8 of the Euratom Treaty, with sites in Ispra (Italy), Geel (Belgium), Karlsruhe (Germany), Petten (Netherlands), Brussels (Belgium) and, later, Seville (Spain). Article 8(1) of the Treaty provides in particular: "*After consulting the Scientific and Technical Committee, the Commission shall establish a Joint*

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57 Special Eurobarometer survey 297 – Attitude towards radioactive waste, Commission, 2008: http://ec.europa.eu/public_opinion/index_en.htm

58 Special Eurobarometer survey 324 – Europeans and nuclear safety, Commission, 2010: http://ec.europa.eu/energy/nuclear/safety/safety_en.htm

59 Public Consultation, 31 March 2010 to 31 May 2010 – Approaches for a possible EU legislative proposal on the management of spent fuel and radioactive waste: http://ec.europa.eu/energy/nuclear/consultations/2010_05_31_fuel_waste-en.htm

60 OJ L 199, 02.08.2011, p.48.

Nuclear Research Centre. The Centre shall ensure that the research programmes and other tasks assigned to it by the Commission are carried out…".

Originally, the JRC was dedicated entirely to nuclear research, but since then it has diversified its activities. The mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the Commission, the JRC functions as a reference centre of science and technology for the EU. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

In 1999 the Commission decided to launch the Decommissioning and Waste Management Programme ("D&WM Programme"), for decommissioning the obsolete nuclear installations on the JRC sites. In this, the Commission followed the new approach adopted by most EU Member States, preferring to start decommissioning immediately rather than implement a "deferred" decommissioning which would take advantage of the diminishing radioactivity of the installations.

The latest communication on the progress on the D&WM Programme was presented to the Council and the European Parliament in 2013[61]. This document includes the realisations of the programme and the budgetary forecast. Based on the update of the programme prepared in view of the communication, the consolidated estimate for the whole JRC D&WM Programme after 2013 amounts to 989,2 million euro.

The decommissioning and related waste management costs are paid through a dedicated budget line, which is fixed on a seven-annual basis. Costs associated with the running operational waste production of research activities are covered by the research budget or by third parties if the research is performed on their account.

B.2.2 Brief overview of JRC nuclear installations and liabilities

On the largest JRC site in Ispra, Italy, most of the nuclear installations are either obsolete or no longer required and have been shut down definitively, and therefore require decommissioning. For this reason, the decommissioning programme at JRC-Ispra is the most advanced.

Currently, there is no centralised national repository or national long term storage facility in Italy. In addition, transfer of radioactive waste among different regions is regulated by directives issued by regional and local authorities. The JRC-Ispra D&WM programme has five main objectives:

– keeping obsolete installations safe in accordance with the safety standards in force (operations which are known as "safe conservation");

– constructing or improving of waste characterisation, treatment, conditioning and interim storage installations;

– recovering, treating and reconditioning existing waste;

[61] Communication from the Commission to the Council and the European Parliament - Decommissioning of Nuclear Installations and Management of Radioactive Waste: Management of Nuclear Liabilities arising out of the Activities of the Joint Research Centre (JRC) carried out under the Euratom Treaty (COM (2013) 734).

– conditioning nuclear materials with a view to their storage on-site or their transfer to third parties;

– decommissioning of obsolete installations and managing the resulting waste.

JRC-Ispra has focussed on designing and building its own pre-decommissioning waste characterisation, treatment, conditioning and temporary storage installations at its site. The total waste volumes at JRC-Ispra after decommissioning will, once conditioned, have to be stored on-site until national long term storage or waste disposal facilities will be available in Italy.

The overall approach is based on the concept of the JRC as awarding authority, managing and maintaining control of the decommissioning and waste management activities and maximising the use of experienced contractors, when feasible from a technical, managerial and legal viewpoint. A staffing policy has been drawn up, indicating the evolution of profiles and competences as the programme develops. Moreover, major long-term contracts for assistance in managing the various projects have been placed for.

Following previous expert recommendations, the JRC-Ispra Programme management structure has been significantly re-organised. The main changes were the appointment of a Decommissioning Technical Programme Manager for the overall coordination of the site programme, the creation of a specific sector to support the financial files of the decommissioning projects and the re-organisation of the radiation protection support. In order to smoothen the procurement of outsourced support by external companies, a more systematic approach was pursued by establishing framework contracts in six lots: programme implementation assistance, engineering, waste management works, dismantling works, radiological laboratory assistance and external radiological measurements.

In order to reduce the risks on the Italian liabilities linked to previous common nuclear research activities at the Ispra site, the risks on the long term waste storage capacities on the site and on the waste acceptance criteria, Euratom has signed on 27 November 2009 an Agreement with the Italian Government in order to:

- regularise the historical liabilities on the site by transferring the responsibility for the Ispra-1 reactor decommissioning to the Italian Government;

- formalise the transfer of all waste on the JRC-Ispra site to the future Italian national repository by the end of the D&WM programme;

- limit the risk of later waste reconditioning which could be the result of changes in Italian waste acceptance criteria.

The Agreement has not yet been formally executed by the Italian Government. As a consequence of this, the transfer of the licence of the Ispra-1 reactor to an Italian operator has not yet been completed.

The other JRC nuclear installations, located in Petten, Geel and Karlsruhe, are still in operation. Decommissioning of the related operating facilities will not start before their shutdown, which is not planned yet. Nevertheless, in accordance with IAEA's recommendations, the Commission has drawn up decommissioning plans including budgetary estimations. In addition, pre-decommissioning activities are carried out for the dismantling of out-of-use equipment from past research work and for the removal off-site

(including transfer of ownership) of obsolete nuclear spent fuel and non-irradiated nuclear materials for possible re-use of recycling.

An overview matrix providing the types of liabilities and the general policies and practices for the JRC sites is given hereunder.

Type of Liability	**Long-Term Management Policy**	**Funding of Liabilities**	**Current Practice/ Facilities**	**Planned Facilities**
Spent Fuel	Reprocessing or long-term storage in national repository	Funds provided from the EU budget	- Interim storage	- Interim storage
Nuclear Fuel Cycle Waste	N.A.	N.A.	N.A.	N.A.
Application Wastes (i.e. research wastes)	National repositories	Funds provided from the EU budget or third parties	- On-site temporary storage - Characterisation and free release - Waste minimization	- Waste conditioning and immobilisation - Interim storage of conditioned waste
Decommissioning Liabilities	Decommissioning	Funds provided from the EU budget or third parties	- Clean-up and pre-decommissioning - Elaboration decommissioning plans - Decommissioning	
Disused Sealed Sources	Sources collection, ownership transfer and storage at third parties facilities	Funds provided from the EU budget	- On-site temporary storage - Ownership transfer and shipment to third party facilities	

B.2.3 Policies and practices at JRC nuclear sites

B.2.3.1 *Spent fuel management policy*

The spent fuel has to be considered for the two JRC sites with research reactors, i.e. JRC-Petten (HFR in operation) and JRC-Ispra (Ispra-1 and Essor reactors, both shut down).

The spent fuel management policy followed by the Commission on each site is dictated by:

– safety, ensuring interim storage conditions in compliance with the existing regulations in the host country;

– efficiency, producing ultimate waste forms/packages that are compatible with the national disposal requirements;

– economics or the ultimate cost to the EU taxpayer, i.e. making use of existing routes (reprocessing or return to third party) whenever feasible (rather than waiting for theoretical national solutions for which the actual cost is uncertain), hence considering the interests of the EU and especially the retention of valuable materials within the Union.

B.2.3.2 *Spent fuel management practices*

At JRC-Petten spent fuel from the HFR is managed by the NRG, the Dutch operator and licence holder of the HFR and is either shipped to an intermediate storage facility managed by COVRA (the central organisation for nuclear waste management), or back to the USA in the case of fuel originating from that country, under the take-back programme.

At JRC-Ispra most of the spent fuel has been returned to the USA and the residual spent fuel, mainly in the pool of the Essor reactor, will be transferred to dry storage in dual-purpose casks, pending shipment to the national long term storage facility when available. About 90% of the non-irradiated nuclear materials has been removed from the site, their title of ownership transferred, and shipped to the USA and France for recycling. Recently, a centralised dry store has been installed in one of the former hot cells of the Essor reactor complex for the temporary storage of the irradiated nuclear materials before their repackaging in dual purpose dry casks.

B.2.3.3 *Radioactive waste management policy*

The policy of the JRC sites is to reduce the amount of radioactive waste to the lowest level as reasonably achievable and to transfer the resulting waste packages to the national waste management organisation in the host country.

On the JRC sites which have still nuclear facilities in operation, the efforts to reduce waste originating from the research activities are focussed mainly on waste segregation and, when possible, decontamination and release of the waste from regulatory control. Concerning future waste from the decommissioning of the JRC facilities, studies are on-going on technological solutions of waste conditioning which could reduce the volumes of waste anticipated in the decommissioning plans.

B.2.3.4 *Radioactive waste management practices*

At JRC-Petten, radioactive waste generated at the HFR is, like for the spent fuel, managed under the responsibility of NRG, the operator and licence holder of the HFR, and transferred to COVRA.

At JRC-Geel, waste is transferred to ONDRAF/NIRAS and shipped to the Belgoprocess facilities.

JRC-Karlsruhe is located adjacent to the Central Decontamination Operations Department (HDB), located on the site of the Karlsruhe Institute for Technology (KIT). The HDB manages radioactive wastes originating from the Karlsruhe site, including JRC, and various other sites in Germany. It should be noted that irradiated material no longer used for research activities is subject to intermediate storage as waste.

At JRC-Ispra the waste is stored in facilities on site, waiting for the availability of a national repository. In the meantime, JRC-Ispra is constructing and refurbishing several waste management facilities in order to treat, characterise, condition and package properly the existing (historical) waste and the (future) waste arising from dismantling operations. The conditioned waste will be temporarily stored on-site in a dedicated interim storage facility, pending shipment to the national long term storage facility when available.

On the JRC-Ispra site, where the main waste management activities are on-going, during the last three years:

– the storage facility for liquid waste started operation;

– the installations for the radiological characterisation of waste started operation;

– the facility for the immobilisation of waste with concrete has been ordered and should be ready to operate in 2016;

- in parallel an appropriate IP-2 5 m^3 "final waste package" for the conditioned waste is in the process of qualification;

– the "interim storage facility" for conditioned waste has been realised and commissioned;

– all the out-of-use alkali metals (15 tons) have been evacuated from the site;

– about 1700 obsolete radiological sources have been evacuated from the site;

– historical technological waste present in various buildings has been sorted (on-going activity, approximately 40% progress achieved), characterised, properly repacked and stored per category in a dedicated "transit area", awaiting its conditioning..

B.2.3.5 *Waste categorisation criteria*

At each site JRC follows the relevant national waste categorisation criteria, defined by law or by national standards. Reference is made to the national reports from Belgium, Germany, Italy and the Netherlands, for the corresponding legislation and criteria.

Section C

SCOPE OF APPLICATION

(Article 3 of the Joint Convention)

ARTICLE 3. SCOPE OF APPLICATION
1. This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.
2. This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.
3. This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed within exclusively civilian programmes.
4. This Convention shall also apply to discharges as provided for in Articles 4, 7, 11, 14, 24 and 26.

The scope of application of various requirements under the Joint Convention is defined in the aforementioned declaration submitted by Euratom at the time of its accession[62].

In addition, the following observations are made:

- To date, Euratom has not made a declaration under Article 3(1) of the Joint Convention[63].

- Euratom has not made a declaration under Article 3(2) of the Joint Convention.

- Euratom has not made a declaration under Article 3(3) of the Joint Convention[64].

62 See Section A.2.4.2 above.

63 Reprocessing is not covered further by this Report. In accordance with Euratom law (Council Directive 2011/70/Euratom), each Member State remains free to define its fuel cycle policy: whether to regard spent fuel as a valuable resource that may be reprocessed or as radioactive waste that is destined for direct disposal. Euratom does not possess any reprocessing facility.

64 The Court of Justice has ruled that activities falling within the military sphere are outside the scope of all the provisions of the Euratom Treaty, as well as of Euratom secondary legislation {Case C-61/03 *Commission v. UK* [2005] ECR I-2477 and Case 65/04 *Commission v. UK* [2006] ECR I-2239}.

Section D

INVENTORIES AND LISTS

(Article 32(2) of the Joint Convention)

ARTICLE 32. REPORTING
(...)
2. This report shall also include:
(i) a list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;
(ii) an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;
(iii) a list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;
(iv) an inventory of radioactive waste that is subject to this Convention that:
(a) is being held in storage at radioactive waste management and nuclear fuel cycle facilities;
(b) has been disposed of; or
(c) has resulted from past practices.
This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity and specific radionuclides;
(v) a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.

D.1 JRC GEEL (BELGIUM)

The current nuclear installations of the Institute for Reference Materials and Measurements (IRMM) at the JRC-Geel site consist of two major accelerator buildings (GELINA and Van de Graaff) and a series of research laboratories located in two separate buildings.

In 2002, JRC-Geel completed a first stage of its programme for the removal of obsolete facilities: a radiochemical laboratory building was decommissioned and is now being used for non-nuclear activities; one obsolete old Van de Graaff accelerator was dismantled. Since then, JRC-Geel has established specific contracts for the gradual removal of its obsolete non-irradiated nuclear materials.

Spent fuel inventory

There is no spent fuel present at the JRC-Geel site.

Radioactive waste inventory and practices

The radioactive waste produced on the JRC-Geel site is transferred to Belgoprocess in Dessel, where it is conditioned and stored, pending its disposal.

The present amount of radioactive waste stored on the site is limited to the quantities pending the shipment to the Belgoprocess facilities, i.e. about 2m^3 (non-conditioned). It concerns waste generated by operational research activities and periodic clean-up activities, such as the removal of obsolete equipment from the GELINA accelerator area and the reduction of the number of glove boxes in the laboratory buildings.

A detailed radiological investigation was conducted of all still active nuclear installations, with a view to establishing an accurate forecast of future waste volumes and decommissioning costs. This was undertaken under the supervision of ONDRAF/NIRAS, the body designated by the Belgian Government to monitor the decommissioning and waste management activities. This evaluation of future liabilities also includes the provisional decommissioning plan. It was formally approved by ONDRAF/NIRAS in 2001 and updated every five years.

The expected waste volumes that will be produced as a result of the decommissioning of all installations amount to 900 m^3 (non-conditioned waste).

About 80% of this amount is related to the evacuation of the activated concrete shielding of the GELINA facility. Investigations are on-going with NIRAS/ONDRAF for an adapted package (5m^3 final waste package) that could significantly reduce the total volume.

Sealed source inventory and practices

In 2002-2003, a campaign was organised to evacuate through NIRAS/ONDRAF the obsolete sealed sources present on the site. About 120 sources were evacuated.

Currently, 85 sealed sources are still in use for research purposes and related activities.

D.2 JRC KARLSRUHE (GERMANY)

The nuclear installations of the Institute of Transuranium Elements (ITU) at JRC-Karlsruhe are located within the site of KIT and comprise a series of annexed buildings ("wings") for basic actinide research, which is mainly performed in glove boxes and hot cells. An extension (new wing) has been licenced and is currently in the design phase.

The continuously evolving scientific and technological activities have led to a variety of nuclear equipment. Equipment which is no longer required by current activities is progressively removed to allow optimum utilisation of the nuclear infrastructure. Consequently, the current focus of the JRC-Karlsruhe decommissioning and waste management programme is on management of historical waste and the dismantling of obsolete nuclear equipment, such as glove boxes.

Spent fuel inventory

The quantity of irradiated fuel arising from research activities is limited to approximately 30 kg.

Specific installations are under development for the treatment of the obsolete irradiated material for which no further use is foreseen, to allow its storage and later deep geological disposal.

Radioactive waste inventory and practices

The radioactive waste produced at JRC-Karlsruhe is transferred to the conditioning and interim storage facilities of HDB, located on the same site.

Currently, about 80 m^3 (non-conditioned) waste is stored at JRC-Karlsruhe in view of its radiological characterisation before transfer to HDB. This waste is originating from past

research activities as well as from dismantling works. At HDB, the waste is conditioned and stored temporarily pending its disposal.

An additional characterisation and re-conditioning campaign for waste drums transferred to HDB before 1995 is on-going. This extra effort is needed to meet the waste acceptance requirements for disposal established in 1995 for the Konrad mine which has been licenced as the German repository for the radioactive waste with negligible heat generation**.**

The total waste volumes that will be produced after the decommissioning of all installations have been estimated at 4500 m^3 (conditioned waste).

Sealed source inventory and practices

All sources present on the site are inventoried according to the terms of the German legislation.

Currently, a campaign has been initiated to transfer disused neutron sources to the USA for recycling.

D.3 JRC PETTEN (NETHERLANDS)

Since 2005 the operating licence of the HFR at the Petten site has been transferred from JRC to the Dutch company NRG, which previously operated the reactor under a JRC licence. This has clarified the responsibilities towards the national safety authorities as the operator and the licence holder became a single body. Nevertheless, the Community will continue to own the HFR (under a long term lease contract with the Dutch Government) and has the liability for its later decommissioning.

Spent fuel inventory and practices

For about ten years, the obsolete spent nuclear fuel which was a historical property of the JRC has been regularly shipped away from the site, partially to the USA and partially to COVRA. The last shipment was undertaken in March 2011. All spent fuel from the HFR is currently managed under NRG responsibility.

Radioactive waste inventory and practices

As mentioned above, the operational radioactive waste generated at the HFR is managed under the responsibility of NRG. In 2007, a contract was also signed with NRG concerning the removal and disposal of historic high active waste originated from experiments and from the HEU fuel cycle. This waste has been moved to COVRA.

In 2005 and 2011, JRC-Petten has conducted detailed assessments of these future decommissioning liabilities, including the amount of waste that will be generated. ***The total waste volumes that will be produced after the decommissioning of all installations have been estimated at 1300 m^3 (non-conditioned waste).***

Sealed source inventory

There are no sealed sources of significant activity present at JRC-Petten.

D.4 JRC ISPRA (ITALY)

Safety and radiation protection of the Ispra JRC facilities, including the safe management of spent fuel and radioactive waste, are regulated by the Italian legislation according to agreement between the Commission and the Government of the Republic of Italy, dated July 22, 1959, transposed into the Italian legislation with Law No. 906 of August 1, 1960.

Currently, almost all the nuclear research installations of the JRC-Ispra site have been definitively shut down. It concerns two former research reactors (Ispra-1 and Essor), three major buildings for past experiments (a radiochemical laboratory, which has been decommissioned and released from regulatory control in 2010, a hot cell fuel handling laboratory and a fuel melting oven) and the older installations for the processing of the solid and liquid waste having reached the end of their technical lifetime, as well as areas where historical raw research waste was stored in temporary facilities and conditioned waste, according to applicable Italian norms and prescriptions issued in the 60's/70's, was either temporarily stored in dedicated facilities or buried.

Italy has currently no central site able to store the JRC-Ispra waste and for this reason JRC has built its own interim storage facility for conditioned waste and has also focussed on the construction or refurbishment of waste characterisation and treatment installations on its site.

Spent fuel inventory and practices

About 700 kg of spent fuel is still present on the JRC-Ispra site, essentially residual fuel assemblies, bundles and pins from past experiments. Most of this fuel is currently stored in the pool of the Essor reactor and in dry pits and vaults.

The strategy is to dismantle and repack part of the experimental fuel in dry storage structure inside a hot cell. In a second stage all the fuel will be transferred in one or two dry storage dual-purpose casks and temporarily stored in a dedicated building, pending the shipment to the national storage or repository.

Additionally, there are about 900 kg of flashed bars made of U-Pu metallic alloy stored in a protected location inside the Essor reactor. The same strategy applied to the spent fuel is currently envisaged, unless transfer will be possible to a third party for recycling.

Radioactive waste inventory and practices

The total radioactive waste inventory for the JRC-Ispra site can be summarised as follows:

– 2000 m^3 of unconditioned historical waste from previous operational and dismantling activities;

– 1200 m^3 of conditioned bituminised historical waste;

– 700 m^3 of historical waste conditioned in concrete pits and concrete blocks;

– 5000 m^3 of unconditioned waste expected to be produced in future decommissioning activities. This figure does not include the facilities still in operation like the Cyclotron, whose definitive shut-down is planned at the end of 2014 and the new or refurbished facilities realised to manage -until the intermediate storage- on site the historical and the decommissioning waste, whose definitive

shutdown and related decommissioning is planned close to the end of the whole JRC Ispra D&WM Programme (2030).

General criteria for waste management strategy

The general waste management strategy is based on the criteria listed in the national guide for the waste management, called "Guida Tecnica 26". These criteria are:

1) Radiological and environmental protection guided by the ALARA principle;

2) Waste volume reduction;

3) Classification of waste based on the radioisotope qualities and quantities into three different categories which necessitate different confinement times, conditioning and management strategies.

In order to implement the strategy, the infrastructures created during the 60's to supply routine services, including storage of all radioactive waste coming from research and development activities carried out in the JRC, underwent significant modifications and improvements.

Waste pre-treatment, characterisation and conditioning

Pre-treating operations are carried out on the site. The following installations have been installed over the last 10 years:

- waste drum measurement systems (in operation);
- facilities for waste sorting, cutting and decontamination (in operation);
- an abrasive blasting unit (in commissioning phase);
- a waste release facility (in operation);
- a renewed radiochemical laboratory (in design phase);
- a new treatment station for liquid waste (in operation).

Concerning waste conditioning (volume optimisation and reduction), the choice has been made to use external service providers, mainly off site. This includes the following contracts:

- super-compaction services (contract concluded);
- metal melting services (contract under elaboration);
- incineration (planned – contracts in tendering phase);
- conditioning of sludges (planned).

Final Waste Package and Waste Immobilisation

A standardisation of waste containers is pursued. JRC-Ispra will generally employ for its low level waste 5.2 m^3 prismatic containers (IP-2 containers). ***A dedicated design (in conformity with the Italian UNI standards) is currently under qualification (planned to be available for 2015).***

Where necessary, alternative qualified 440 L drums will also be used, e.g. for the conditioned sludges (not planned yet).

Additionally, an installation is under design on the JRC-Ispra site for the immobilisation of the solid waste by grouting (grouting facility, planned to be in operation in 2016).

For the packing of the intermediate level waste ("category 3" waste according to Guida Tecnica 26), suitable existing qualified containers are under investigation.

Interim Storage Facilities

For the temporary storage of the conditioned and immobilised low level waste, JRC-Ispra has opted for a lightweight interim storage facility (ISF) realized in the vicinity of other waste management facilities (commissioned in 2013). The building has been designed to store 10.500 m^3 of waste (conditioned mainly in 5,2 m^3 containers, but partially also in 440L drums) for a period of 50 years.

A small complementary facility for the storage of intermediate level waste and the irradiated material packaged in dual-purpose dry casks is currently in the planning phase.

Management of historical waste on the site

Since 1999 actions have been undertaken to sort and if necessary treat the historical non-conditioned waste stored on the site (planned to be terminated in 2014 for the low level waste). This waste is standard (re-)packed in 200 L drums. In follow-up, all the waste drums are characterised and will be shipped for conditioning (first shipment for super-compaction planned in 2014).

In addition, some of the waste from previous research activities, which has been conditioned in the past according to existing applicable Italian norms and prescriptions, are temporarily stored in a dedicated facility or buried inside the site waste management area. The conditioning and packing doesn't comply with the current applicable international standards as well as the storage underground practices. For this reason this waste will have to be retrieved, re-conditioned and packed according to the current applicable standards and norms. It concerns:

- about 1200 m3 of low level waste (about 6000 drums) conditioned in bitumen and disposed in three underground trenches covered with earth, which will be retrieved, characterised and incinerated in an offsite facility (contracts in tendering phase). This activity is planned to be completed by 2024;

- about 700 m3 of low/intermediate level waste conditioned in concrete; part is stored underground in 15 concrete pits, which will be retrieved, characterised and dismantled to segregate waste from the inert matrix. This activity is planned to be completed by 2023; part is conditioned in about 230 concrete blocks which are stored in a dedicated facility and the blocks must undergo characterisation, segregation and/or repacking. This activity is planned to be completed by 2025.

It should be noted that no reportable events have been recorded during the period of storage of the above mentioned conditioned waste.

Decommissioning activities

In parallel, the decommissioning of the shutdown installations has been initiated on the JRC-Ispra site. During the period between the shutdown and decommissioning of a nuclear installation, a programme of routine activities is undertaken to keep the installation in a safe state, in compliance with regulatory and site requirements. These activities also include keeping operating and maintenance knowledge and records of shutdown nuclear installations and existing radioactive wastes for radiological characterisation of the installations, with a view to decommissioning. In this respect all installations and equipment have been submitted to a global physical and radiological characterisation.

Clean-up and preliminary dismantling works are undertaken and in parallel decommissioning plans are elaborated. Where applicable, decommissioning licence requests are prepared.

Sealed source inventory and practices

From 2007 to 2010, three campaigns were organised to collect and evacuate obsolete sealed sources present on the site. More than 1700 sources were evacuated as such for recycling and/or future disposal.

Currently about 300 sealed sources are still in use for research purposes, instruments calibration and training activities (the large majority of which in the Safeguards Performance Laboratory (PERLA). Like in the past, it is envisaged to transfer disused sources to a third party, either for recycling or for future disposal.

D.5 COMMISSION PREMISES IN LUXEMBOURG

Under a licence issued by the Health Ministry of Luxembourg, the Commission's Directorate-General for Energy (DG ENER) holds a total number of 78 low-radioactivity sealed sources. 37 of these radioactive sources are stored in specific locations inside the Commission's DG ENER premises in Luxembourg[65]. These 27 gamma sources and 10 neutron sources are used for calibrating and testing safeguards non-destructive measurement equipment and for testing radioactivity detection instruments.

Moreover, DG ENER holds 43 fissile materials calibration standards containing in total about 1430 grams of uranium of different enrichment. These calibration standards are stored in two different locations inside the EUFO building in Luxemburg.

The radioactive sources measurements results are reported annually to the Luxembourg radiation protection competent authority and the fissile materials are under Euratom safeguards.

[65] EUROFORUM building.

Section E

LEGISLATIVE AND REGULATORY SYSTEM

(Articles 18 and 19 of the Joint Convention)

E.1 LEGISLATIVE AND REGULATORY FRAMEWORK (ARTICLE 19 OF THE JOINT CONVENTION)

ARTICLE 19. LEGISLATIVE AND REGULATORY FRAMEWORK
1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.
2. This legislative and regulatory framework shall provide for:
(i) the establishment of applicable national safety requirements and regulations for radiation safety;
(ii) a system of licencing of spent fuel and radioactive waste management activities;
(iii) a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a licence;
(iv) a system of appropriate institutional control, regulatory inspection and documentation and reporting;
(v) the enforcement of applicable regulations and of the terms of the licences;
(vi) a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management.
3. When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall take due account of the objectives of this Convention.

The sources of Euratom and EU law are the respective Treaties, which are regarded as "primary" sources of law, and secondary legislation that can be enacted by the institutions participating in the legislative process by virtue of the powers bestowed to them under the Treaties. Additional sources of law in both Euratom and EU legal order are: the case-law of the Court of Justice of the EU, general principles of law, fundamental rights and agreements or contracts with third countries or nationals of third countries or other international organisations.

E.1.1 Primary law

According to the above, the Euratom Treaty constitutes Euratom's "primary law", in other words the original supreme source of law on the strength of which the Community is established and secondary legislation can be adopted. It is the legal basis for the competences and activities of Euratom.

This Treaty was signed in Rome on 25 March 1957, for an indefinite duration[66]. On the basis of the Treaty, the Community coordinates research programmes in the area of nuclear energy. Further, it seeks international cooperation and it prevents nuclear materials from being diverted from their intended uses as declared by the users[67].

[66] Article 208 of the Euratom Treaty provides: *"This Treaty is concluded for an unlimited period"*.
[67] It is recalled that Euratom activities are limited to peaceful civil uses of nuclear energy.

The Treaty also foresees the adoption of appropriate basic safety standards. Article 2(b) of Title I of the Euratom Treaty states that in order to perform its task, Euratom shall "*establish uniform safety standards to protect the health of workers and of the general public and ensure that they are applied*". In turn, Title II, Chapter 3, of the Treaty ("Health and Safety" – Articles 30 to 39) sets out a number of detailed provisions intended to establish and apply basic safety standards, so as to materialise the proviso of Article 2(b). Thus, Article 30 of the Treaty stipulates: "*Basic standards shall be laid down within the Community for the protection of the health of workers and the general public against the dangers arising from ionising radiations...*". In addition, Articles 31 and 32 provide for the details regarding the adoption and the revision of such Community standards, while Article 33 ensures that Member States' implementing legislation complies with them. Articles 34 et seq. ensure, in various ways, the monitoring by the Commission of national health and safety measures, including any plans for the disposal of radioactive waste[68].

In the context of the Lisbon Treaty, which entered into force on 1 December 2009, European leaders agreed on a very limited number of amendments to the Euratom Treaty, while explicitly recalling the necessity that the provisions of this Treaty should continue to have full legal effect[69]. These considerations are indicators of the overall positive results of Euratom since its inception. As noted by the Commission, already in 2007: "*In its 50 years of existence, the Euratom Treaty has enabled the EU, through the Community it established, to carry out important activities in a strategic sector, in particular in terms of energy supply, research, the protection of health, safeguards for the peaceful use of nuclear materials and international relations. During this half-century of the history of the Euratom Treaty, its text has demonstrated its flexibility, adapting to a changing political, economic and technological context*"[70].

E.1.2 Secondary legislation

It has been explained that "secondary law" means measures that are adopted by the institutions under the express empowerment of a Treaty provision, as opposed to "primary law" which signifies the law laid down by the Treaty provisions themselves.

Under the combined provisions of Article 106a(1),(2) of the Euratom Treaty and Article 288 TFEU, the secondary legislative and other relevant instruments adopted by Euratom, as well as their impact on the national regulatory systems of the Member States, are as follows:

> "*…the institutions shall adopt regulations, directives, decisions, recommendations and opinions.*
>
> *A regulation shall have general application. It shall be binding in its entirety and directly applicable in all Member States.*
>
> *A directive shall be binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods.*
>
> *A decision shall be binding in its entirety. A decision which specifies those to whom it is addressed, shall be binding only on them.*
>
> *Recommendations and opinions shall have no binding force*".

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68 For more details on these Treaty provisions, see Section E.2 below.

69 See above, Section A.2.1.

70 European Communities (2007), "EURATOM – 50 years of nuclear energy serving Europe", pp. 60-61.

Therefore, with the exception of recommendations and opinions, the other three types of Community instruments mentioned in Article 288 TFEU, namely regulations, directives and decisions, are legally binding (either on all Member States[71] or on those to whom are specifically addressed[72]).

In fact, a substantial corpus of Euratom binding secondary legislation has been adopted and updated over the years. ***With regard to spent fuel and radioactive waste management, the central legislative act is Council Directive 2011/70/Euratom establishing a Community framework for such responsible and safe management[73]. The directive applies to all stages of management of spent fuel and radioactive waste from civilian activities. It supplements the basic standards referred to in Article 30 of the Euratom Treaty, as regards the safety of spent fuel and radioactive waste, and is without prejudice to the basic safety standards directive (Council Directive 2013/59/Euratom of 5 December 2013, referred to below).***

Council Directive 2011/70/Euratom

Council Directive 2011/70/Euratom reflects the main principles and requirements of the IAEA Safety Standards and of the Joint Convention. The directive imposes obligations on the Member States to establish and maintain a national policy, as well as a national legislative, regulatory and organisational framework for the management of spent fuel and radioactive waste that allocates responsibilities and provides for coordination between relevant competent bodies. The national framework shall provide for the following:

- a national programme for the implementation of spent fuel and radioactive waste management policy;
- national arrangements for the safety of spent fuel and radioactive waste management;
- a system of licencing of spent fuel and radioactive waste management activities, facilities or both, including the prohibition of spent fuel or radioactive waste management activities, of the operation of a spent fuel or radioactive waste management facility without a licence, or both and, if appropriate, prescribing conditions for further management of the activity, facility or both;
- a system of appropriate control, a management system, regulatory inspections, documentation and reporting obligations for radioactive waste and spent fuel management activities, facilities or both, including appropriate measures for the post-closure periods of disposal facilities;
- enforcement actions, including the suspension of activities and the modification, expiration or revocation of a licence together with requirements, if appropriate, for alternative solutions that lead to improved safety;
- the allocation of responsibility to the bodies involved in the different steps of spent fuel and radioactive waste management;
- national requirements for public information and participation;
- the financing scheme(s) for spent fuel and radioactive waste management.

[71] This is the case of regulations.
[72] This is the case of directives and decisions.
[73] OJ L 199, 02.08.2011, p.48.

The effective independence of national regulatory bodies in the field of safety of spent fuel and radioactive waste management is re-assured by the directive. Article 6, entitled "competent regulatory authority", provides:

> ***" (...) 1. Each Member State shall establish and maintain a competent regulatory authority in the field of safety of spent fuel and radioactive waste management.***
>
> ***2. 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.***
>
> ***3. Member States shall ensure that the competent regulatory authority is given the legal powers and human and financial resources necessary to fulfil its obligations in connection with the national framework (...)"***

With reference to transparency issues, Article 10 requires Member States to ensure that necessary information on the management of spent fuel and radioactive waste is 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.

Moreover, Member States shall ensure that the national framework is improved where appropriate, taking into account operating experience, insights gained from the decision-making process and the development of relevant technology and research.

Finally, Member States must submit a report to the Commission on the implementation of the above 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. According to Articles 11 and 15 paragraph 4 of the directive, Member States shall notify to the Commission by the same date the content of their national programme, setting out how they intend to implement their national policies for the responsible and safe management of spent fuel and radioactive waste, to secure the aims of this directive.

Following the adoption of Council Directive 2011/70/Euratom, the Commission has actively assisted Member States in transposing the directive into their national legislation. A dedicated Transposition Seminar was organized in June 2012, followed by a seminar under ENEF on the relevant National Programs in September 2012 and a joint ERDO (European Repository Development Organisation) - ENEF - Commission workshop in December 2013 aimed at supporting small European Member States in responding to and reporting under this directive. Furthermore, the Commission contributed to the preparation of guidelines regarding Member States Reports by ENSREG and of guidance for the successful development and implementation of National Plans for spent fuel and radioactive waste management by ENEF.

Other Euratom secondary legislation

Other Euratom legislative instruments include the following:

- Council Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel (repealing previous Council Directive

92/3/Euratom)[74] lays down a Community system of supervision and control of transboundary shipments of radioactive waste and spent fuel. In particular, it provides for a compulsory and common scheme of notification and a standard control document, for shipments of radioactive waste or spent fuel which have a point of departure, transit or destination in an EU Member State, provided that the quantities in question exceed certain limits;

- Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations (known as the "Nuclear Safety Directive")[75], imposes obligations on the Member States to establish and maintain a national legislative, regulatory and organisational framework for nuclear safety. Like Council Directive 2011/70/Euratom, Directive 2009/71/Euratom supplements the basic standards referred to in Article 30 of the Treaty, as regards the safety of nuclear installations, and is without prejudice to the basic safety standards directive ***(Council Directive 2013/59/Euratom of 5 December 2013, referred to below)***. Its goal is to promote the continuous improvement of nuclear safety and to ensure that at all times a high level of nuclear safety is provided by the Member States to protect workers and the general public against dangers arising from nuclear installations. Towards this end, it reflects the fundamental safety principles and requirements of the Convention on Nuclear Safety[76] and is builds upon the Fundamental Safety Principles[77] established by the IAEA[78].

The Nuclear Safety Directive also covers spent fuel storage facilities, as well as storage facilities for radioactive waste that are on the same site and are directly related to a nuclear power plant, an enrichment plant, a nuclear fuel fabrication plant, a reprocessing plant or a research reactor facility. This fact is taken into account by Council Directive 2011/70/Euratom, which states in its Preamble: "Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations imposes obligations on the Member States to establish and maintain a national framework for nuclear safety. While that Directive concerns principally the nuclear safety of nuclear installations, it states that it is also important to ensure the safe management of spent fuel and radioactive waste, including at storage and disposal facilities. Therefore, those facilities, addressed both in Directive 2009/71/Euratom and in this Directive, should not be subject to disproportionate or unnecessary obligations, especially as regards reporting".

By June 2014, the Council and the Commission reached agreement on the amendment of the Nuclear Safety Directive. The European Parliament voted a favourable opinion on the Commission's proposal in April 2014[79]. The amendment builds on the lessons learned from Fukushima and the EU stress tests[80] and is based on various sources of

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74 OJ L 337, 05.12.2006, p. 21.

75 OJ L 172, 02.07.2009, p. 18.

76 See Section A.2.4.2, footnote 38 above.

77 IAEA Safety Standard Series No. SF-1 (2006).

78 Detailed reference to Council Directive 2009/71/Euratom has been made in the Euratom report on the implementation of the obligations under the Convention on Nuclear Safety which was submitted to the Secretariat of the IAEA in 2010, in view of the Fifth Review Meeting of Contracting Parties (Vienna, April 2011).

79 At the time of drafting of the present Report, the amendment was not yet formally adopted by the Council.

80 See Section K.6 below.

technical expertise, such as the Western European Nuclear Regulators Association[81] or the IAEA. It has been drawn up in close cooperation with national regulators.

The amended directive sets out EU-wide safety objectives to further reduce nuclear safety risks. It establishes European peer reviews to monitor the achievement of these objectives and to exchange experiences. It also increases transparency in nuclear safety and strengthens the independence and the powers of national regulators[82].

– ***Following the entry into force of the Euratom Treaty, a comprehensive set of legislation establishing basic safety standards has been enacted on the basis of Article 31 of the Treaty. The main pillar of that legislation has been the basic safety standards directive (BSS Directive), which was first established in 1959 and subsequently updated in 1962, 1966, 1976, 1980, 1984, 1996 and 2013, taking account of advances in scientific knowledge of the effects of ionising radiation in line with the recommendations of the International Commission on Radiological Protection (ICRP), as well as of operational experience.***

The latest BSS Directive is Council Directive 2013/59/Euratom laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation[83]. The new BSS consolidates the existing set of Euratom radiation protection legislation into one single piece of legislation, repealing five Directives – the Medical Exposure Directive[84], the High Activity Sealed Sources Directive[85], the Outside Workers Directive[86], the Public Information Directive[87] and the previous BSS Directive (96/29)[88].

Euratom adopted the new BSS Directive (Council Directive 2013/59/Euratom), in order to: (i) take account of the scientific and technological progress since 1996, in particular the new recommendations in Publication 103(2007) of the ICRP but also of the operational experience with the current requirements, and (ii) to consolidate the existing set of Euratom radiation protection legislation into one single piece of legislation. These recent basic safety standards offer the highest protection of workers, patients and members of the public based on latest scientific knowledge. The new BSS Directive establishes uniform standards for the protection of the health of individuals subject to occupational, medical and public exposures against the dangers arising from ionising radiation. The directive applies to any planned, existing or emergency exposure situation which involves a risk from exposure to ionising radiation which cannot be disregarded from a radiation protection point of view or with regard to the environment in view of long term human health protection. The directive applies in particular to the

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81 See at: http://www.wenra.org

82 For further information, also Section K.7 below.

83 OJ L 13, 17.1.2014, p. 1.

84 Council Directive 97/43/Euratom of 30 June 1997 on health protection of individuals against the dangers of ionising radiation in relation to medical exposure.

85 Council Directive 2003/122/Euratom of 22 December 2003 on the control of high-activity sealed radioactive sources and orphan sources.

86 Council Directive 90/641/Euratom of 4 December 1990 on the operational protection of outside workers exposed to the risk of ionising radiation during their activities in controlled areas.

87 Council Directive 89/618/Euratom of 27 November 1989 on informing the general public about health protection measures to be applied and steps to be taken in the event of a radiological emergency.

88 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.

manufacture, production, processing, handling, disposal, use, storage, holding, transport, import to, and export from the Community of radioactive material.

The directive introduces a graded approach to regulatory control of practices by way of notification, authorisation and appropriate inspections commensurate with the magnitude and likelihood of exposures resulting from the practice, and commensurate with the impact that regulatory control may have in reducing such exposures or improving radiological safety. Authorisation can take the form of a registration or a licence. Justified practices, such as the disposal or storage of radioactive waste, need to be notified prior to the practice commencement. Article 28 stipulates that Member States shall require licencing, inter alia, for the operation, decommissioning and closure of any facility for the long term storage or disposal of radioactive waste, including facilities managing radioactive waste for this purpose. Article 30 defines the requirements for release of regulatory control and defines general clearance criteria.

The directive clearly defines the responsibilities of an undertaking or an employer for the radiation protection of their workers, including emergency workers, and provides for detailed requirements on the radiation protection programme for workers. The operational protection of exposed workers[89] is based on:

- ***prior evaluation to identify the nature and magnitude of the radiological risk to exposed workers;***
- ***optimisation of radiation protection in all working conditions;***
- ***classification of exposed workers into different categories;***
- ***control measures and monitoring relating to the different areas and working conditions, including individual monitoring;***
- ***medical surveillance of workers;***
- ***education and training of workers.***

It provides also for the protection of members of the public in normal circumstances, as well as in emergency exposure situations. The operational protection of members of the public[90] from practices subject to licencing, in normal circumstances, shall include:

- ***examination and approval of the proposed siting of the facility from a radiation protection point of view;***
- ***acceptance into service of the facility subject to adequate protection being provided against any exposure or radioactive contamination liable to extend beyond the perimeter of the facility or radioactive contamination liable to extend to the ground beneath the facility;***
- ***examination and approval of plans for the discharge of radioactive effluents;***
- ***measures to control the access of members of the public to the facility.***

89 Article 32.

90 Article 65.

For practices where a discharge authorisation is granted, the radioactive discharges into the environment need to be monitored and reported. Further to this, the BSS Directive requires the estimation of doses to members of the public from authorised practices, and the set-up of an environmental monitoring programme.

The directive requires that Member States shall establish an adequate legislative and administrative framework ensuring the provision of appropriate radiation protection education, training and information to all individuals whose tasks require specific competences in radiation protection. In addition, it contains detailed requirements for radiation protection education, training and information of workers, including emergency workers, and members of the public.

Member States shall transpose the new BSS Directive[91] in their national legal order by 6 February 2018.

– ***With regard to radioactive substances in drinking water, the new Council Directive 2013/51/Euratom lays down requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption, by setting out parametric values, frequencies and methods for monitoring radioactive substances (radon, tritium and other radioactive substances). It reformulates the "drinking water directive" (Directive 98/83/EC) and incorporates the requirements for monitoring levels of radioactivity in specific Euratom legislation, in order to maintain the uniformity, coherence and completeness of radiation protection legislation at Community level.***

In addition, there are EU Directives dealing with:

– environmental assessment at EU level:

  - Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment[92], as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC, and codified by Directive 2011/92/EU (amended in turn by Directive 2014/52/EU);

  - Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programs on the environment[93].

– implementing the Aarhus Convention on access to information, public participation in decision-making and access to justice in environmental matters:

  - 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[94];

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91 The text of the directive is available at: http://ec.europa.eu/energy/nuclear/radiation_protection/radiation_protection_en.htm

92 OJ L 175, 05.07.1985, p. 40.

93 OJ L 197, 21.07.2001, p. 30.

94 OJ L 41, 14.02.2003, p. 26.

- 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[95].

– the management of waste from extracting industries:

- Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC provides for measures, procedures and guidance on the management of waste from extractive industries[96]. While this directive covers the management of waste from extractive industries which may be radioactive, it does not cover such aspects as are specific to radioactivity, which are a matter dealt with under the Euratom Treaty.

E.1.3 Soft law[97]

Also, the following (non-binding) Recommendations relate with the management of spent fuel and radioactive waste:

- Commission Recommendation of 24 October 2006 on the management of the financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste[98]. The focus lies on the adequacy of funding, its financial security and the transparency in its use, ensuring that the funds are only used for the intended purposes;

- Commission Recommendation 2008/956/Euratom of 4 December 2008 on the criteria for the export of radioactive waste and spent fuel to third countries[99]. The Recommendation clarifies the main requirements relating to the export of radioactive waste or spent fuel to third countries, referred to in Article 16(1)(c) of Directive 2006/117, as well as the criteria which Member States should take into consideration in order to evaluate whether the above requirements are met;

- The revised Commission Recommendation (2010/635/Euratom) on the application of Article 37 of the Treaty[100]. Article 37 requires Member States to provide the Commission with general data relating to any plan for the disposal of radioactive waste; thereupon, the Commission delivers an opinion with regard to the plan concerned[101]. The revised Recommendation improves relevant terminology to ensure consistency and clarity, and simplifies the general data to be provided by Member States. It strengthens the assessment of accidental situations by introducing a new

95 OJ L 156, 25.06.2003, p. 17.
96 OJ L 102, 11.04.2006, p. 15.
97 Euratom and EU non-binding acts are often called "soft law". Such acts include recommendations, as well as opinions, which, as it is expressly provided in Article 288 TFEU, "have no binding force". However, while this precludes soft law measures from having legally binding effect on the national legal order, it does not immunize them from the judicial process. It is, for example, open to a national court to make a reference to the Court of Justice of the EU concerning the interpretation or validity of a measure of that kind. Moreover, soft law instruments are useful for developing Community policy.
98 OJ L 330, 28.11.2006, p.31.
99 OJ L 338, 17.12.2008, p. 69.
100 OJ L 279, 23.10.2010, pp. 36-67.
101 See also Sections E.2, F.1, F.4.1 and G-H.2, below.

requirement for safety-related information on unplanned releases from nuclear reactors and reprocessing plants. Concerning dismantling operations, in addition to nuclear reactors and reprocessing plants, a submission of general data for the dismantling of mixed-oxide fuel fabrication plants is required.

E.2 IMPLEMENTING MEASURES (ARTICLE 18 OF THE JOINT CONVENTION)

ARTICLE 18. IMPLEMENTING MEASURES
Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under this Convention.

The obligations under the Joint Convention are reflected in the requirement under the Euratom Treaty to implement the basic safety standards provided for in its Articles 30 et seq. (Title II, Chapter 3, of the Euratom Treaty) and related secondary legislation. More specifically:

- Elaboration of basic safety standards relevant to radiation protection is a task conferred to Euratom by the aforementioned Articles 2(b), 30 and 31 of the Treaty. It is restated that Article 2(b) empowers the Community to establish uniform safety standards for the protection of the health of workers and the general public and to ensure that they are applied, while Article 30 elucidates this general empowerment by stipulating: "*Basic standards shall be laid down within the Community for the protection of the health of workers and the general public against the dangers arising from ionising radiations. The expression 'basic standards' means: (a) maximum permissible doses compatible with adequate safety; (b) maximum permissible levels of exposure and contamination; (c) the fundamental principles governing the health surveillance of workers*".

- Article 31 is specifically concerned with the procedure which is required for the adoption of such uniform basic standards. It provides: "*The basic standards shall be worked out by the Commission after it has obtained the opinion of a group of persons appointed by the Scientific and Technical Committee from among scientific experts, and in particular public health experts, in the Member States. The Commission shall obtain the opinion of the Economic and Social Committee on these basic standards. After consulting the European Parliament the Council shall, on a proposal from the Commission, which shall forward to it the opinions obtained from these Committees, establish the basic standards; the Council shall act by a qualified majority*".

- Article 32 makes express provision for the possibility to revise or supplement the basic standards which have already been adopted, specifying that "*At the request of the Commission or of a Member State, the basic standards may be revised or supplemented, in accordance with the procedure laid down in Article 31*".

To ensure that the basic safety standards are properly incorporated into the legal systems of the Member States, Article 33 of the Treaty provides: "*Each Member State shall lay down the appropriate provisions, whether by legislation, regulation or administrative action, to ensure compliance with the basic standards which have been established and shall take the necessary measures with regard to teaching, education and vocational training. The Commission shall make appropriate recommendations for harmonising the provisions applicable in this field in*

the Member States. To this end, the Member States shall communicate to the Commission the provisions applicable at the date of entry into force of this Treaty and any subsequent draft provisions of the same kind. Any recommendations the Commission may wish to issue with regard to such draft provisions shall be made within three months of the date on which such draft provisions are communicated". Thus, Member States are under an obligation to lay down the appropriate provisions to ensure compliance with the basic standards adopted by the Community and to communicate those provisions to the Commission.

Moreover, with regard to Euratom health and safety measures, there are additional provisions in Title II, Chapter 3, of the Euratom Treaty ensuring monitoring by the Commission. Reference is made here below to the following provisions of the Treaty:

- "*Any Member State in whose territories particularly dangerous experiments are to take place shall take additional health and safety measures, on which it shall first obtain the opinion of the Commission. The assent of the Commission shall be required where the effects of such experiments are liable to affect the territories of other Member States*" (Article 34).

- "*Each Member State shall establish the facilities necessary to carry out continuous monitoring of the level of radioactivity in the air, water and soil and to ensure compliance with the basic standards. The Commission shall have the right of access to such facilities; it may verify their operation and efficiency*" (Article 35).

- "*The appropriate authorities shall periodically communicate information on the checks referred to in Article 35 to the Commission so that it is kept informed of the level of radioactivity to which the public is exposed*" (Article 36).

- With regard to plans for the disposal of radioactive waste, in particular, the Treaty requires Member States to provide the Commission with general data and empowers the latter to deliver its opinion thereupon. It states: "*Each Member State shall provide the Commission with such general data relating to any plan for the disposal of radioactive waste in whatever forms will make it possible to determine whether the implementation of such plan is liable to result in the radioactive contamination of the water, soil or airspace of another Member State. The Commission shall deliver its opinion within six months, after consulting the group of experts referred to in Article 31*" (Article 37)[102].

- "*The Commission shall make recommendations to the Member States with regard to the level of radioactivity in the air, water and soil. In cases of urgency, the Commission shall issue a directive requiring the Member State concerned to take, within a period laid down by the Commission, all necessary measures to prevent infringement of the basic standards and to ensure compliance with regulations. Should the State in question fail to comply with the Commission directive within the period laid down, the Commission or any Member State concerned may forthwith, by way of derogation from Articles 258 and 259 of the Treaty on the Functioning of the European Union, bring the matter before the Court of Justice*" (Article 38).

[102] More information on the application of this provision is given under Sections F.1, F.4.1 and G-H.2, below.

Furthermore, the Treaties guarantee that Euratom possesses the necessary enforcement mechanisms to ensure that Community binding legislation is complied with by the Member States. To this end, the Court of Justice of the EU is entrusted with an important role[103]: this Court, which includes the Court of Justice, the General Court and specialised courts[104], ensures that the law is observed in the interpretation and application of the TEU, the TFEU and the Euratom Treaty, as well as of secondary legislation adopted by the institutions. The Court of Justice has competence, inter alia, over actions brought against Member States for failure to fulfil their obligations, references for a preliminary ruling and appeals against decisions of the General Court. It most commonly adjudicates on matters of interpretation of the Treaties or of secondary law, raised by:

- claims by the Commission that a Member State has not implemented a Euratom or EU directive or other binding legal requirement, in the framework of an infringement procedure[105].

- references from national courts of the Member States, asking the Court of Justice questions about the meaning or validity of a particular piece of Euratom or EU law[106]. The Court gives its ruling on the interpretation of the law, which is binding on the national court.

Council Directive 2011/70/Euratom, which establishes a Community framework for the responsible and safe management of spent fuel and radioactive waste, also comes within the ambit of the above legal mechanisms which ensure compliance of national laws with binding Community rules.

103 Article 19 TEU and Articles 251 to 281 TFEU.

104 According to Article 19(1) TEU: "*The Court of Justice of the European Union shall include the Court of Justice, the General Court and specialised courts…*".

105 Articles 19 TEU and 258 TFEU, in conjunction with Article 106a of the Euratom Treaty.

106 Articles 19 TEU and 267 TFEU, in conjunction with Article 106a of the Euratom Treaty.

Section F

OTHER GENERAL SAFETY PROVISIONS

(Articles 21, 24, 25 and 26 of the Joint Convention)

F.1 RESPONSIBILITY OF THE LICENCE HOLDER (ARTICLE 18 OF THE JOINT CONVENTION)

ARTICLE 21. RESPONSIBILITY OF THE LICENCE HOLDER
1. Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.
2. If there is no such licence holder or other responsible party, the responsibility rests with the Contracting Party which has jurisdiction over the spent fuel or over the radioactive waste.

The Commission is involved in the licencing process for radioactive waste management under Article 37 of the Treaty, which states: "*Each Member State shall provide the Commission with such general data relating to any plan for the disposal of radioactive waste in whatever form as will make it possible to determine whether the implementation of such plan is liable to result in the radioactive contamination of the water, soil or airspace of another Member State. The Commission shall deliver its opinion within six months…*". The licence cannot be granted at national level, before the Commission's opinion is delivered.

As stated above, a revised Commission Recommendation on the application of Article 37 of the Treaty was adopted on October 2010[107], aiming at clarifying, simplifying and improving the relevant aspects of the procedure under Article 37, on the basis of the experience gained, and replacing previous Commission Recommendation 99/829/Euratom[108].

The principle of responsibility of the licence holder, incorporated in the IAEA Fundamental Safety Principle 1, is fully endorsed by Council Directive 2011/70/Euratom (Article 7)[109]. The directive requires Member States to ensure that the prime responsibility for the safety of spent fuel and radioactive waste management facilities and/or activities rests with the licence holder and cannot be delegated.

Council Directive 2011/70/Euratom provides further that each Member State has ultimate responsibility for the management of spent fuel and radioactive waste generated in it, in accordance with the IAEA Fundamental Safety Principle 2. Where radioactive waste or spent fuel is shipped for processing or reprocessing to a Member State or a third country, the ultimate responsibility for the safe and responsible disposal of those materials, including any waste as a by-product, remains with the Member State or third country from which the radioactive material was shipped.

107 2010/635/Euratom, OJ L 279, 23.10.2010, pp. 36-67.
108 OJ L 324, 16.12.1999, p. 23.
109 As well as by the new BSS Directive (Article 29).

F.2 OPERATIONAL RADIATION PROTECTION (ARTICLE 24 OF THE JOINT CONVENTION)

ARTICLE 24. OPERATIONAL RADIATION PROTECTION
1. Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:
(i) the radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, economic and social factors being taken into account;
(ii) no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and
(iii) measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.
2. Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:
(i) to keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and
(ii) so that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.
3. Each Contracting Party shall take appropriate steps to ensure that during the operating lifetime of a regulated nuclear facility, in the event that an unplanned or uncontrolled release of radioactive materials into the environment occurs, appropriate corrective measures are implemented to control the release and mitigate its effects.

As already noted, Title I, Article 2(b), of the Treaty requires Euratom to establish uniform safety standards to protect the health of workers and of the general public and ensure that they are applied. Hence, Title II, Chapter 3, of the Treaty, empowers the Community to lay down basic standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation.

The current safety standards with regard to radiation protection are set out in the new BSS Directive 2013/59/Euratom. The general principles for radiation protection under the BSS Directive remain *dose limitation*, *optimisation* and *justification*. The system of *dose limitation* is laid down in the directive (20 mSv or, in special circumstances, 50 mSv in a year for exposed workers and 1 mSv in a year for members of the public). The key principle in terms of operational protection is *optimisation*: all exposures must be kept as low as reasonably achievable, taking economic and social factors into account. Dose limits are established for occupational exposure and for public exposure. Dose constraints should be used, where appropriate, in the context of optimisation. According to the principle of *justification*, decisions introducing a practice shall be justified in the sense that such decisions shall be taken with the intent to ensure that the individual or societal benefit resulting from the practice outweighs the health detriment that it may cause. Decisions introducing or altering an exposure pathway for existing and emergency exposure situations shall be justified in the sense that they should do more good than harm. Justification, nevertheless, is a matter of judgment by the Member States and the directive does not prescribe how to make this judgment in more detail.

F.3 EMERGENCY PREPAREDNESS (ARTICLE 25 OF THE JOINT CONVENTION)

ARTICLE 25. EMERGENCY PREPAREDNESS
1. Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on-site and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.
2. Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.

General remarks

The primary responsibility of protecting the general public in the event of a nuclear or radiological emergency lies with the Member States' authorities. However, Euratom has competences to establish legislation regarding emergency preparedness and emergency response. Articles 30 to 32 of the Treaty confer on Euratom the competence to lay down basic standards for emergency measures, which includes the power to require Member States to draw up plans laying down measures for emergency preparedness in respect of nuclear installations. At the international level, this competence of Euratom in the area of emergency preparedness is reflected in the accession of Euratom to the Convention on Early Notification of a Nuclear Accident[110] and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency[111]. The Commission contributes to these actions by initiating and participating in international systems for radiological emergency preparedness.

In light of the above, Article 97 of the new BSS Directive stipulates that Member States shall ensure that account is taken of the fact that emergencies may occur on their territory and that they may be affected by emergencies occurring outside their territory. Member States shall establish an emergency management system and adequate administrative provisions to maintain such a system. Article 98 requires that emergency response plans are established in advance for the various types of emergencies identified by an assessment of potential emergency exposure situations and that these emergency response plans are tested, reviewed and, as appropriate, revised at regular intervals, taking into account lessons learned from past emergency exposure situations and the results of the participation in emergency exercises at national and international level. Undertakings are requested to notify the competent authority immediately of any emergency in relation to the practices for which it is responsible and to take all appropriate action to mitigate the consequences. Further requirements concern the protective measures to be taken. Finally, the directive defines prior information to the members of the public likely to be affected by an emergency and information to be provided to the affected members of the public in the event of an emergency.

The European Community Urgent Radiological Information Exchange

Council Decision 87/600/Euratom[112] makes arrangements for the early exchange of information in the event of a radiological emergency (ECURIE[113]). These arrangements cover

110 OJ L 314, 30.11.2005, p. 22.
111 OJ L 314, 30.11.2005, p. 28.
112 Decision 87/600/Euratom of 14 December 1987 on Community arrangements for the early exchange of information in the event of a radiological emergency, OJ L 371, 30.12.1987, p. 76.

Euratom Member States, Switzerland and the Former Yugoslav Republic of Macedonia, and "*apply to the notification and provision of information whenever a Member State decides to take measures of a wide-spread nature in order to protect the general public in case of a radiological emergency*" (Article 1). A radiological emergency may be declared either due to an accident at a facility where a significant release of radioactive material occurs or is likely to occur, or due to detection of abnormal levels of radioactivity which are likely to be detrimental to public health. Article 2(i) of the decision sets out the actions to be taken by the Member State that initially decides to take measures, as follows: (a) forthwith notify the Commission and those Member States which are -or are likely to be- affected of such measures and the reasons for taking them; (b) promptly provide the Commission and those Member States which are -or are likely to be- affected with available information relevant to minimising the foreseen radiological consequences, if any, in those States. The decision also specifies the nature of the information which shall be provided and requires that the initial information is supplemented at appropriate intervals. The Commission forwards the information it receives from a Member State to all Member States.

ECURIE is a 24h emergency notification and information exchange system. The system notifies the competent authorities of the participating states and the Commission in case of a major nuclear accident or radiological emergency. During an emergency, the system provides an information exchange platform for the participating States, in order to inform about the current and foreseeable status of the accident, meteorological conditions, national countermeasures taken, etc. The legal basis for the participation of Euratom Member States in ECURIE is the aforementioned Council Decision 87/600/Euratom and the Agreement between Euratom and non-Member States on the participation of the latter in the Community arrangements for the early exchange of information in the event of a radiological emergency[114]. The Commission is responsible for ECURIE management and development[115].

Also, a set of Euratom regulations[116] lay down maximum permitted levels of radioactive contamination of foodstuffs and feeding stuffs following a nuclear accident or any other case of radiological emergency. These pre-established maximum permitted levels can be made immediately applicable through the adoption of a regulation by the Commission, if the latter receives official information about an accident through the ECURIE system, indicating that these levels are likely to be reached or have been reached.

On 10 January 2014, the Commission adopted a proposal for a Council Regulation[117] amending the above set of Euratom regulations. This proposal provides more flexible procedures allowing specific reactions to any nuclear accident or radiological emergency (in the EU, in the vicinity of the EU or in a remote country). It should be noted that the pre-established maximum permitted levels remain unchanged in this proposal.

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113 European Community Urgent Radiological Information Exchange.

114 OJ C 102 of 29.04.2003, p. 2.

115 For more details on the ECURIE system, see at: http://rem.jrc.ec.europa.eu/40.html

116 Council Regulation No 3954/87 of 22 December 1987, OJ L 371 of 30.12.1987, p. 11, as amended by Council Regulation No 2218/89 of 18 July 1989, OJ L 211 of 27.07.1989, p. 1; Commission Regulation No 770/90 of 29 March 1990, OJ L 83 of 29.03.1990, p. 78; Commission Regulation No 944/89 of 12 April 1989, OJ L 101 of 13.04.1989, p. 17; Council Regulation No 2219/89 of 18 July 1989, OJ L 211 of 22.07.1989, p. 4.

117 Proposal for a Council Regulation laying down maximum permitted levels of radioactive contamination of food and feed following a nuclear accident or any other case of radiological emergency.

The European Radiological Data Exchange Platform

Other forms of international cooperation in this area include EURDEP[118]. This is both a standard data format and a network for the exchange of environmental radiation monitoring data between European countries in real-time. Participation of the Euratom Member States is based on Commission Recommendation 2000/473/Euratom[119]. Participation of the various non-Euratom countries is on a voluntary basis. Those countries that send their national radiological monitoring data have access to the data of all the other participating countries. The system is continuously operating with a daily data exchange routine and there is a general consensus that participating in the system automatically means that the data transmissions will continue during an emergency in an elevated frequency[120]. In 2010, the Commission concluded a Memorandum of Understanding with the IAEA concerning the EURDEP-system. This Memorandum makes EURDEP technology available for the IAEA, for creating a global on-line environmental radiation data exchange application.

IACRNE

Further, the Commission participates in IACRNE[121] and has concluded bilateral agreements with international organisations on arrangements in the area of radiological emergency preparedness. Other radiological emergency preparedness activities of the Commission include training of national authorities, assistance to research activity coordination and regular preparedness exercises.

F.4 DECOMMISSIONING (ARTICLE 26 OF THE JOINT CONVENTION)

ARTICLE 26. DECOMMISSIONING
Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that:
(i) qualified staff and adequate financial resources are available;
(ii) the provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;
(iii) the provisions of Article 25 with respect to emergency preparedness are applied; and
(iv) records of information important to decommissioning are kept.

F.4.1 Implementing legislation

Under the new BSS Directive decommissioning of nuclear installations is still subject to prior authorisation[122]. This authorisation relates specifically not only to the disposal of radioactive waste for decommissioning, but also to conventional disposal of residues from dismantling with very low levels of contamination, or recycling or reuse thereof (e.g. in steel smelters). However, according to Article 30 of this directive, such materials may be released from the requirements of the BSS Directive provided they comply with the clearance levels established either by Table A of Annex VII or by national legislation or the national competent authority following exemption and the criteria set out in Annex VII and taking into account technical guidance provided by the Community. Such guidance has been provided by the Group of

118 European Radiological Data Exchange Platform.
119 OJ L 191 of 27.07.2000, p. 37.
120 For more details on the EURDEP system, see at: http://rem.jrc.ec.europa.eu/175.html
121 Inter-Agency Committee on Response to Nuclear Emergencies.
122 See Article 28 b),

Experts established under Article 31 of the Euratom Treaty. Until now, specific clearance levels for the recycling of metals, buildings and building rubble, as well as default values (general clearance levels) for any other type of material, were made available to Member States as guidance. Some Member States have incorporated these values into their legislation; others apply them on an ad hoc basis or apply values calculated specifically for the disposal or recycling pathways relevant to national practice. With the new BSS directive, generic clearance levels are prescribed although specific levels and associated requirements for specific materials or for materials originating from specific types of activities can still be established.

Further to the BSS Directive, decommissioning also falls within the scope of Council Directive 2011/70/Euratom. The General Principles defined under Article 4 of the directive require amongst others the *"generation of waste to be kept to a minimum … by means of appropriate design measures and of operating and decommissioning practices, including the recycling and reuse of material"*. According to Article 7, the safety demonstration as part of the licencing of a facility shall cover inter alia the decommissioning of the facility. The national programmes to be prepared by the Member States shall cover all types of spent fuel and radioactive waste under its jurisdiction and all stages of spent fuel and radioactive waste management from generation to disposal (Article 11).

General data on the dismantling of nuclear installations have to be notified by the Member States to the Commission under Article 37 of the Treaty, which has the objective to forestall any possibility of radioactive contamination of other Member State(s). Following this notification to the Commission, the latter delivers its opinion, thereupon, within six months, after consulting the Group of Experts referred to in Article 31 of the Treaty. Certain details concerning this procedure are now dealt with by the abovementioned Commission Recommendation 2010/635/Euratom[123].

Over the past three years (since 20/12/2011), the Commission has given opinions on the disposal of radioactive waste from the dismantling/decommissioning of the following nuclear installations: the Chinon A-3 GCR and the Bugey-1 GCR (France), the Caorso BWR and the Latina Magnox reactor (Italy), the Lingen BWR (Germany), the Kozloduy 1 & 2 VVER (Bulgaria) and the Studsvik R0 & R02 research reactors (Sweden).

F.4.2 Qualified staff and adequate financial resources

Article 26 of the Joint Convention requires that "*Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that: (i) qualified staff and adequate financial resources are available*".

Education and training

With respect to qualified staff, Council Directive 2011/70/Euratom provides that the national framework in place requires all parties to make arrangements for education and training for their staff, in order to further develop necessary expertise and skills, in accordance with the IAEA Fundamental Safety Principles 1, 2 and 3.

It is a key-concern, not only for decommissioning and waste management but of policy makers, regulators and industry in general, that human resources could be at risk,

[123] OJ L 279, 23.10.2010, p. 36.

especially because of high retirement expectations in countries with nuclear installations, and a lack of nuclear experience in "newcomer" countries. Highly qualified people are needed over a long time period to safely operate installations, build new facilities, decommission facilities as well as manage radioactive waste and deal with radiation protection issues. For that reason, broad and deeply rooted research and training programmes, at both national and international level, are essential for the proper mastering of the many disciplines used in the nuclear domain and for the strengthening of the nuclear safety culture.

On 16 September 2011, the Commission adopted the 1st Situation Report on Education and Training in the Nuclear Energy Field in the EU[124]. The report provided a comprehensive picture of the situation of human resources in the nuclear energy sector in the EU, identified the challenges and presented initiatives in this field, both ongoing and planned ones - mainly at global EU and international levels. The 2nd Situation Report[125] presents existing and planned national initiatives and activities in this area, but provides also an update of the EU and international situation. To be mentioned in this context is the JRC's EN3S activity: in 2011, JRC embedded its on-going and future training and education activities into one global concept under the "European Nuclear Safety and Security School" (EN3S). In collaboration with relevant European and international partners, EN3S is based on educational and training tracks in the fields of nuclear security and safety, nuclear safeguards, nuclear materials and fuel cycle, nuclear decommissioning and waste management, nuclear data and actinide science. The school contains four main components: Higher Academic Education through grants for PhD students; Vocational Training through specific JRC courses; User Facility (access to infrastructure); and Information Centre.

Aspects relating to financial resources

Nuclear decommissioning is the final step in the lifecycle of a nuclear installation which requires a long term financial planning. The number of nuclear power plants in the EU (as well as research reactors and other nuclear fuel cycle installations) that are definitively closed and undergoing decommissioning is steadily increasing. It is a fair assumption that more than one quarter of the reactors currently operating in the enlarged EU-28 will need to be shut down by 2025, which underlines the increasing importance of decommissioning in the years ahead.

To assure safe decommissioning of nuclear installations and the related management of waste it is vital to have adequate financial resources available in time for its intended use.

According to Council Directive 2011/70/Euratom, the costs for the management of spent fuel and radioactive waste shall be borne by those who generated those materials (in accordance with the IAEA Fundamental Safety Principle 1). Member States shall ensure that the national framework require that adequate financial resources be available when needed for implementation of their national programmes for the management of spent fuel and radioactive waste, taking due account of the responsibility of spent fuel and radioactive waste generators. The financing scheme(s) for spent fuel and radioactive waste management are mandatory elements of the national frameworks and programmes.

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124 Communication from the Commission to the European Parliament and the Council, 1st Situation Report on Education and Training in the Nuclear Energy Field in the European Union; COM(2011) 563 final.

125 At the time of writing, the procedure for the adoption of the Second Situation Report is being finalised.

While the decommissioning of nuclear installations is an exclusively national competence, the national decommissioning funding schemes were discussed in the context of the directive on the common rules for the internal market in electricity[126]. The European Parliament expressed its concern at the possible adverse effects of the misuse of financial resources earmarked for the decommissioning of nuclear plants and the management of waste. As a result, an inter-institutional statement made in July 2003[127] set the ground for Community action, highlighting the need for adequate financial resources for decommissioning and waste management activities to be available for the purpose for which they have been established and to be managed with full transparency. At the same time, the Commission stated its intention to publish an annual report on the use of decommissioning and waste management funds.

The first report[128] on the use of financial resources earmarked for the decommissioning of nuclear power plants, published in 2004 and covering the EU Member States possessing nuclear power plants (both operational and shut-down), noted the diverse national approaches to financing decommissioning. The creation of the European internal market has brought an increased need for transparency and harmonisation in the management of these financial resources.

Pending adoption of legally binding instruments, the Commission has adopted in 2006 Recommendation 2006/851/Euratom[129] on the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste.

Then, in 2007, the second report[130] was adopted comparing EU nuclear operators and Member States funding practice with that detailed in the Commission's Recommendation (of 2006). Whereas the first report of 2004 was limited to power reactors, the second report covers all nuclear installations with an emphasis being placed on those which are at greatest risk, should decommissioning funding be inadequately addressed. The report highlights examples of good practice in countries where the polluter-pays-principle is enshrined in national legislation and where funds show a demonstrable performance from the viewpoint of providing adequate resources when needed. Nevertheless, despite specific national legislation, there are grounds for progress in several aspects of fund adequacy, management and use, in particular through detailed monitoring and reporting at both national and EU level.

The Commission expressed its intention to focus on the adequacy of funding, its financial security and the ring fencing that is required in order to ensure that the funds are only used for the purposes intended.

For future nuclear constructions a common approach to methodology should be progressed, but for currently operating systems the Commission's activities need to be based upon independent evaluation and reporting.

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126 Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC; OJ L 176, 15.06.2003.

127 OJ L 176, 15. 07.2003.

128 Communication from the Commission to the European Parliament and the Council, "Report on the use of financial resources earmarked for the decommissioning of nuclear power plants"; COM (2004) 719 final, Brussels, 26 October 2004.

129 OJ L 330, 28.11.2006, p.31.

130 COM (2007) 794 final and SEC (2007) 1654.

Following the adoption of the Commissions' second report in 2007, the third report on the use of financial resources earmarked for the decommissioning of nuclear installations, spent fuel and radioactive waste was adopted in 2013. This report is based on Member States' responses to a dedicated survey. The survey was aided by specific guidance, elaborated by a dedicated working group, as to the interpretation and implementation of the 2006 Recommendation.

Regarding financial resources for decommissioning, there is a particular case in which the Community has taken part in the raising of financial resources and provides financial support under the specific terms of accession of Lithuania, Slovakia and Bulgaria to the EU, where certain nuclear power plants were subject to early shutdown. This support is subject to certain conditions to various decommissioning projects, including management of radioactive waste and spent fuel. Funding support has been extended for the years 2014 to 2020, based on Council Regulations (Euratom) No 1368/2013 and No 1369/2013, adopted in December 2013[131].

[131] OJ L 346, of 20.12.2013, p. 1 and p.7.

Sections G and H

SAFETY OF RADIOACTIVE WASTE MANAGEMENT AND SAFETY OF SPENT FUEL MANAGEMENT

(Articles 4, 6 to 11 and 13 to 16 of the Joint Convention)

G-H.1 GENERAL SAFETY REQUIREMENTS (ARTICLES 4 AND 11 OF THE JOINT CONVENTION)

ARTICLE 4. GENERAL SAFETY REQUIREMENTS
Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management, individuals, society and the environment are adequately protected against radiological hazards. In so doing, each Contracting Party shall take the appropriate steps to:
(i) ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;
(ii) ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;
(iii) take into account interdependencies among the different steps in spent fuel management;
(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;
(v) take into account the biological, chemical and other hazards that may be associated with spent fuel management;
(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;
(vii) aim to avoid imposing undue burdens on future generations.

ARTICLE 11. GENERAL SAFETY REQUIREMENTS
Each Contracting Party shall take the appropriate steps to ensure that at all stages of radioactive waste management individuals, society and the environment are adequately protected against radiological and other hazards.
In so doing, each Contracting Party shall take the appropriate steps to:
(i) ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;
(ii) ensure that the generation of radioactive waste is kept to the minimum practicable;
(iii) take into account interdependencies among the different steps in radioactive waste management;
(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;
(v) take into account the biological, chemical and other hazards that may be associated with radioactive waste management;
(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;
(vii) aim to avoid imposing undue burdens on future generations.

General safety requirements and the regulatory framework set up by the new BSS Directive have already been reported in Section E.1.2 above.

Avoiding undue burdens on future generations is an objective of Council Directive 2011/70/Euratom, in accordance with the IAEA Fundamental Safety Principle 7. Through the implementation of this directive Member States will have demonstrated that they have

taken reasonable steps to ensure that that objective is met. The directive requires that the national policies on spent fuel and radioactive waste management are based on the following principles, taking also into account the IAEA Fundamental Safety Principles 3 and 7:

- 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;

- the interdependencies between all steps in spent fuel and radioactive waste generation and management shall be taken into account;

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

- implementation of measures shall follow a graded approach;

- the costs for the management of spent fuel and radioactive waste shall be borne by those who generated those materials;

- 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.

The directive specifies requirements for demonstration of the safety of any activity or facility for spent fuel and radioactive waste management, related in particular to the IAEA Fundamental Safety Principles 1 and 3.

The directive also imposes obligations associated with the application of the abovementioned principles with respect to:

- 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;

- transparency in decision-making on spent fuel and radioactive waste management;

- education and training to obtain the expertise and the skills required;

- licence holders;

- national programmes.

Member States must report to the Commission on the implementation of the directive, for the first time by 23 August 2015 and every three years thereafter, taking advantage of the review and reporting under the Joint Convention. On the basis of the Member States′ reports, the Commission will submit to the Council and the European Parliament a report on progress made with the implementation of the directive and on the inventory of spent fuel and radioactive waste. They will notify their national programmes to the Commission.

Member States must, at least every ten years, invite international peer review of their national frameworks, competent regulatory authority and/or national programmes with the aim of ensuring that high standards are achieved in the safe management of spent fuel and

radioactive waste. The outcome of any peer review will be reported to the Member States and the Commission.

As regards the nuclear installations at JRC sites, it is recalled that they are located in the territories of Member States, therefore all safety requirements of the specific Member States have to be met.

G-H.2 SITING OF PROPOSED FACILITIES (ARTICLES 6 AND 13 OF THE JOINT CONVENTION)

ARTICLE 6. SITING OF PROPOSED FACILITIES
1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed spent fuel management facility:
(i) to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime;
(ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment;
(iii) to make information on the safety of such a facility available to members of the public;
(iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.
2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.

ARTICLE 13. SITING OF PROPOSED FACILITIES
1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility:
(i) to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;
(ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;
(iii) to make information on the safety of such a facility available to members of the public;
(iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.
2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.

As required by Council Directive 2011/70/Euratom, siting of radioactive waste and spent fuel management facilities is subject to national licencing processes. The directive requires for a "safety demonstration" as a part of the licencing a facility or activity in accordance with the IAEA Fundamental Safety Principles 1 and 3[132].

Similarly, Article 65 of the BSS Directive requires licensing of the proposed siting of installations by the national competent authorities. In terms of emergency preparedness (Article 99 of the BSS Directive), Member States must seek to cooperate with other Member States, or non-Member States, in relation to possible radiological emergencies that might affect other Member States. The assessment of such consequences is an important feature of the procedure under Article 37 of the Euratom Treaty. The general data on the proposed site, features of the surroundings, planned discharges and envisaged magnitude of design basis

[132] See more detailed information given in Section G-H.4 below.

accidents, which could lead to unplanned discharges, enable the Commission to give an opinion on the impact on other Member States, both during normal operation and in the event of an accident. While the site location and distance to borders are important in this judgment, the Commission does not give an opinion on the proposed siting as such.

Over the past three years (since 20/01/2012), the Commission has given opinions pursuant to Article 37 of the Treaty on:

- ***modifications of existing installations on which an opinion had already been given: units 3 & 4 of the Blayais NPS and units 2-5 of the Bugey NPS (France), the decommissioning of the Bradwell NPS (United Kingdom);***

- ***new projects: the Penly-3 EPR, the Spiral-2 LINAC and two waste handling facilities at the existing Cires (France), the Dounreay low-level waste facilities, the two EPR and the interim storage facilities for spent fuel and intermediate-level waste at Hinkley Point C (United Kingdom), the interim dry storage facility for spent fuel and the solid waste management and storage facility at Ignalina (Lithuania), the VVER units 3&4 at Mochovce (Slovakia), the Talvivaara uranium extraction facility (Finland) and the ITER experimental fusion reactor at Cadarache (France).***

Also, according to Articles 41, 42 and 43 of the Treaty,

- "*Persons and undertakings engaged in the industrial activities listed in Annex II to this Treaty shall communicate to the Commission investment projects relating to new installations and also to replacements or conversions which fulfil the criteria as to type and size laid down by the Council on a proposal from the Commission…*",

- "*The projects referred to in Article 41 shall be communicated to the Commission and, for information purposes, to the Member State concerned not later than three months before the first contracts are concluded with the suppliers or, if the work is to be carried out by the undertaking with its own resources, three months before the work begins…*" and

- "*The Commission shall discuss with the persons or undertakings all aspects of investment projects which relate to the objectives of this Treaty. It shall communicate its views to the Member State concerned*", respectively.

Other legal instruments regulate in more detail the obligation established by Article 41 of the Treaty: Regulation No 2587/1999[133] specifies what types of investment projects should be communicated to the Commission on the basis of that article; Regulation No 1209/2000[134] determines procedures for effecting such communications.

Considering the fact that for any new investment projects within Euratom nuclear safety and waste management should be addressed, the present Report mentions the following installations associated with relevant investment projects with respect to which the Commission has expressed its views under Articles 41-43 of the Treaty (since the last

[133] Council Regulation (Euratom) No 2587/1999 of 2 December 1999 defining the investment projects to be communicated to the Commission in accordance with Article 41 of the Treaty establishing the European Atomic Energy Community; OJ L 315, 09.12.1999, pp. 1-3.

[134] Commission Regulation (EC) No 1209/2000 of 8 June 2000 determining procedures for effecting the communications prescribed under Article 41 of the Treaty establishing the European Atomic Energy Community - OJ L 138, 09.06.2000, pp. 12-14.

reporting by Euratom under the Joint Convention): the New Low Level Waste Disposal Facilities at Dounreay (United Kingdom), the 1st stage of decommissioning of V1 Nuclear Power Plant Bohunice and the completion of disposal structures at the national radioactive waste repository at the Mochovce site (Slovakia), the Visaginas Nuclear Power Plant Project (Lithuania) and the CEMEX plant at the Saluggia site (Italy).

G-H.3 DESIGN AND CONSTRUCTION OF FACILITIES (ARTICLES 7 AND 14 OF THE JOINT CONVENTION)

ARTICLE 7. DESIGN AND CONSTRUCTION OF FACILITIES
Each Contracting Party shall take the appropriate steps to ensure that:
(i) the design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;
(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;
(iii) the technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing or analysis.

ARTICLE 14. DESIGN AND CONSTRUCTION OF FACILITIES
Each Contracting Party shall take the appropriate steps to ensure that:
(i) the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;
(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;
(iii) at the design stage, technical provisions for the closure of a disposal facility are prepared;
(iv) the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.

The measures required by the Joint Convention concerning design, construction and operation of nuclear installations can come under the provisions which the Member States lay down to ensure compliance with the basic safety standards, adopted in accordance with the first paragraph of Article 33 of the Euratom Treaty. The Commission has powers to make recommendations for harmonising those provisions, as is clear from the second paragraph of Article 33.

With reference to the opinions delivered by the Commission under Articles 41-43 of the Euratom Treaty[135], these also take into account aspects relating to design and construction.

Pursuant to Council Directive 2011/70/Euratom, design of radioactive waste and spent fuel management facilities is included in national licencing processes. The Directive requires for a "safety demonstration" as a part of the licencing of a facility or activity in accordance with the IAEA Fundamental Safety Principles 1 and 3[136].

[135] See Section G-H.2 above.
[136] See more detailed information given in Section G-H.4, below.

G-H.4 ASSESSMENT OF SAFETY OF FACILITIES (ARTICLES 8 AND 15 OF THE JOINT CONVENTION)

ARTICLE 8. ASSESSMENT OF SAFETY OF FACILITIES
Each Contracting Party shall take the appropriate steps to ensure that:
(i) before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;
(ii) before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

ARTICLE 15. ASSESSMENT OF SAFETY OF FACILITIES
Each Contracting Party shall take the appropriate steps to ensure that:
(i) before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;
(ii) in addition, before construction of a disposal facility, a systematic safety assessment and an environmental assessment for the period following closure shall be carried out and the results evaluated against the criteria established by the regulatory body;
(iii) before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

In accordance with Article 33 of the Treaty, the Commission makes appropriate recommendations for harmonising the provisions applicable in this field in the Member States, and therefore requires Member States to communicate those provisions to the Commission.

As stipulated in Article 65 of the new BSS Directive (Council Directive 2013/59/Euratom), all Member States shall ensure the operational protection of the population through a set of measures including for example the examination and approval of the proposed siting of the facility from a radiation protection point of view, taking into account relevant demographic, meteorological, geological, hydrological and ecological conditions.

Council Directive 2011/70/Euratom introduces the concept of "safety demonstration" (or "safety case" according to the IAEA Safety Standards). Member States shall ensure that the national framework in place requires licence holders, under the regulatory control of the competent regulatory authority, to regularly assess, verify and continuously improve, as far as is reasonably achievable, the safety of the radioactive waste and spent fuel management facility or activity in a systematic and verifiable manner. This shall be achieved through an appropriate safety assessment, other arguments and evidence.

As part of the licencing of a facility or activity, the safety demonstration shall cover the development and operation of an activity and the development (i.e. siting, design, construction and commissioning), operation and decommissioning of a facility or closure of a disposal facility as well as the post- closure phase of a disposal facility. The extent of the safety demonstration shall be commensurate with the complexity of the operation and the magnitude of the hazards associated with the radioactive waste and spent fuel, and the facility or activity. The licencing process shall contribute to safety in the facility or activity during normal operating conditions, anticipated operational occurrences and design basis accidents.

It shall provide the required assurance of safety in the facility or activity. Measures shall be in place to prevent accidents and mitigate the consequences of accidents, including verification of physical barriers and the licence holder's administrative protection procedures that would have to fail before workers and the general public would be significantly affected by ionising radiation. That approach shall identify and reduce uncertainties.

Member States shall further ensure that the national framework requires licence holders to establish and implement integrated management systems, including quality assurance, which give due priority for overall management of spent fuel and radioactive waste to safety and are regularly verified by the competent regulatory authority (cf. IAEA Fundamental Safety Principles 1 and 2).

In addition, Member States shall ensure that the national framework requires 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 (cf. IAEA Fundamental Safety Principle 1).

G-H.5 OPERATION OF FACILITIES (ARTICLES 9 AND 16 OF THE JOINT CONVENTION)

ARTICLE 9. OPERATION OF FACILITIES

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the licence to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;

(iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;

(v) incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;

(vi) programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;

(vii) decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.

ARTICLE 16. OPERATION OF FACILITIES

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the licence to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;

(iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;

(v) procedures for characterization and segregation of radioactive waste are applied;

(vi) incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;

(vii) programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;

(viii) decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body;

(ix) plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.

Article 35 of the Treaty requires Member States to establish the "*facilities necessary to carry out continuous monitoring of the level of radioactivity in the air, water and soil and to ensure compliance with the basic standards*" and gives the Commission the right of access to such facilities for verification purposes. Article 36 of the Treaty requires periodic communication to the Commission of the monitoring data referred to in Article 35.

The new BSS Directive (Council Directive 2013/59/Euratom) states in Article 28: "Member States shall require licencing for the (...) operation and decommissioning of any nuclear facility".

Equally, according to Council Directive 2011/70/Euratom, operation of facilities is subject to national licencing processes. As already noted, the directive requires for a "safety demonstration" as a part of the licencing of a facility or activity[137]. Concepts or plans for the post-closure period of a disposal facility's lifetime, including the period during which appropriate controls are retained and the means to be employed to preserve knowledge of that facility in the longer term are mandatory elements of the national programmes.

G-H.6 DISPOSAL OF SPENT FUEL (ARTICLE 10 OF THE JOINT CONVENTION)

ARTICLE 10. DISPOSAL OF SPENT FUEL
If, pursuant to its own legislative and regulatory framework, a Contracting Party has designated spent fuel for disposal, the disposal of such spent fuel shall be in accordance with the obligations of Chapter 3 relating to the disposal of radioactive waste.

Council Directive 2011/70/Euratom provides for the same requirements in respect to disposal of radioactive waste and spent fuel destined for disposal if regarded as radioactive waste. It is clearly stated in the Preamble to this directive that storage of radioactive waste (including storage of spent fuel considered as radioactive waste, as well as long-term storage), is an interim solution, but not an alternative to disposal.

[137] See Section G-H.4 above.

Section I

TRANSBOUNDARY MOVEMENT

(Article 27 of the Joint Convention)

ARTICLE 27. TRANSBOUNDARY MOVEMENT

1. Each Contracting Party involved in transboundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant binding international instruments. In so doing:

(i) a Contracting Party which is a State of origin shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;

(ii) transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;

(iii) a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;

(iv) a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to transboundary movement;

(v) a Contracting Party which is a State of origin shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.

2. A Contracting Party shall not licence the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.

3. Nothing in this Convention prejudices or affects:

(i) the exercise, by ships and aircraft of all States, of maritime, river and air navigation rights and freedoms, as provided for in international law;

(ii) rights of a Contracting Party to which radioactive waste is exported for processing to return, or provide for the return of, the radioactive waste and other products after treatment to the State of origin;

(iii) the right of a Contracting Party to export its spent fuel for reprocessing;

(iv) rights of a Contracting Party to which spent fuel is exported for reprocessing to return, or provide for the return of, radioactive waste and other products resulting from reprocessing operations to the State of origin.

I.1 COUNCIL DIRECTIVE 2006/117/EURATOM ON THE SUPERVISION AND CONTROL OF SHIPMENTS OF RADIOACTIVE WASTE BETWEEN MEMBER STATES AND INTO AND OUT OF THE COMMUNITY

Council Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and nuclear spent fuel[138] replaced previous legislation[139] containing the rules applicable for authorising the movement of radioactive waste from one country to another and extended these rules to spent nuclear fuel, whether it is intended for disposal or for reprocessing, while making the rules easier to apply and more consistent with other EU and international provisions.

[138] OJ L 337, 05.12.2006, p. 21.

[139] In particular, Council Directive 92/3/Euratom of 3 February 1992, OJ L 35, 12.02.1992, p. 24.

It lays down a standardised system of controls and authorisations for the transboundary shipments of radioactive waste and spent fuel, from the point of origin to the destination, and prevents illegal trafficking in them.

It applies both to shipments between Member States and to imports into and exports out of the Community. It ensures that the Member States of destination and of transit are informed about movements of radioactive waste or spent fuel to or through their country and that they have an opportunity to object to, or impose conditions, in relation to a shipment of radioactive waste or spent fuel which requires their consent.

As well, the mandatory acknowledgement of receipt of the application by the authorities of the countries of destination and transit, together with the extension of the period for granting consent, allow tacit approval to be assumed with a high degree of certainty.

As regards exports, the authorities of the third country of destination should not only be informed of the shipment, but should also give their consent to it. Export of radioactive waste to certain places is totally forbidden, e.g. to the Antarctic, to the parties to the Cotonou ACP-EC Agreement or to States which do not have the administrative and technical capacity and regulatory structure to manage the radioactive waste or spent fuel safely.

Directive 2006/117 is fully consistent with the existing legislation for the health protection of workers and the population against the dangers arising from ionising radiation. It also ensures consistency with international Conventions, in particular with the Joint Convention.

Commission Decision 2008/312/Euratom of 5 March 2008[140] established the standard document for the supervision and control of shipments of radioactive waste and spent fuel, referred to in Article 17 of Directive 2006/117. This standard document is made available in electronic form and is used for any shipments of radioactive waste or spent fuel between Member States, or into, out of and through the Community, which come within the ambit of Directive 2006/117.

Moreover, on 4 December 2008, the Commission issued Recommendation 2008/956/Euratom on the criteria for the export of radioactive waste and spent fuel to third countries[141]. The Recommendation clarifies the main requirements relating to the export of radioactive waste or spent fuel to third countries, referred to in Article 16(1)(c) of Directive 2006/117, as well as the criteria which Member States should take into consideration in order to evaluate whether the above requirements are met. In doing so, the Recommendation draws a distinction between "leading" criteria and "additional" criteria. The former include amongst others *"IAEA membership and resultant adherence to the relevant safety standards of the International Atomic Energy Agency"* and the *"signature and ratification of, and compliance with the Joint Convention on the Safety of Radioactive Waste Management and the Safety of Spent Fuel Management, the Convention on Nuclear Safety, the Vienna Convention on Civil Liability for Nuclear Damage, the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, the Convention for Supplementary Compensation for Nuclear Damage or the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982"*. The latter encompass the *"signature and ratification of, and compliance with the Convention on Assistance in the Case of a Nuclear Accident and Radiological Emergency and the Convention on Early Notification in a Nuclear Accident, to demonstrate that appropriate information will be given to the affected population in the event of a radiological emergency and that adequate protective and corrective measures, including the preparation and testing*

[140] OJ L 107, 17.4.2008, p. 32.
[141] OJ L 338, 17.12.2008, p. 69.

of emergency plans, will apply in the event of a radiological emergency in order to control the release and mitigate its effects". Finally, the Recommendation invites the competent authorities of the Member States to cooperate, with a view to exchanging information on its application.

Under Council Directive 2006/117/Euratom, the Commission is obliged to report on the implementation of this directive to the Council, the European Parliament and the European Economic and Social Committee, based on the Member States' reports to the Commission.

The first such report from the Commission was published on 25 April 2013. In this report, the Commission notes that the directive is now being fully implemented so as to guarantee an adequate protection of the population. The implementation of the directive has not given rise to any major problems. The report provides a first summary overview of authorisations given in the Community. The number of authorisations of shipments is relatively small and there is a clear picture on exports outside Euratom.

In addition, Commission Recommendation 2009/527[142] has been developed for the improvement of the system of transmission of documents and information under directive 2006/117. This Recommendation prompts the competent authorities of the Member States: to cooperate in order to ensure the smooth operation of the automatic consent procedure laid down in Article 9(2) of directive 2006/117; to take the necessary measures in order to ensure that all information regarding shipments covered by that directive is handled with due care and is protected against any misuse; and to apply general security measures to all information which is processed by them, when applying directive 2006/117.

I.2 COUNCIL DIRECTIVE 2011/70/EURATOM ESTABLISHING A COMMUNITY FRAMEWORK FOR THE RESPONSIBLE AND SAFE MANAGEMENT OF SPENT FUEL AND RADIOACTIVE WASTE

Council Directive 2011/70/Euratom requires that radioactive waste shall be disposed of in the Member State in which it was generated, unless at the time of shipment an agreement, taking into account the criteria established by the Commission in accordance with Article 16(2) of Council Directive 2006/117/Euratom, has entered into force between the Member State concerned and another Member State or a third country to use a disposal facility in one of them. Prior to a shipment to a third country, the exporting Member State shall inform the Commission of the content of any such agreement and take reasonable measures to be assured that:

- the country of destination has concluded an agreement with the Community covering spent fuel and radioactive waste management or is a party to the Joint Convention;

- the country of destination has radioactive waste management and disposal programmes with objectives representing a high level of safety equivalent to those established by this directive;

- the disposal facility in the country of destination is authorised for the radioactive waste to be shipped, is operating prior to the shipment, and is managed in accordance with the

[142] Commission Recommendation of 7 July 2009 for a secure and effective system of transmission of documents and information relating to the provisions of Council Directive 2006/117/Euratom, OJ L 177, 08.07.2009.

requirements set down in the radioactive waste management and disposal programme of that country of destination.

The above provisions do not apply to shipment of spent fuel of research reactors to a country where research reactor fuels are supplied or manufactured, taking into account applicable international agreements.

The directive does not affect the right of a Member State or an undertaking in that Member State to return radioactive waste after processing to its country of origin where:

- the radioactive waste is to be shipped to that Member State or undertaking for processing; or

- other material is to be shipped to that Member State or undertaking with the purpose of recovering the radioactive waste.

Finally, the directive does not affect the right of a Member State or an undertaking in that Member State to which spent fuel is to be shipped for treatment or reprocessing to return to its country of origin radioactive waste recovered from the treatment or reprocessing operation, or an agreed equivalent.

I.3 EURATOM REGULATION (EURATOM) NO 1493/93 ON SHIPMENTS OF RADIOACTIVE SUBSTANCES BETWEEN MEMBER STATES

Regulation (Euratom) No 1493/93 on shipments of radioactive substances between Member States[143] ensures that as from 1 January 1993 competent authorities in Member States receive the same level of information on shipments of radioactive substances as they did prior to the removal of intra-Community frontier controls (which was completed by 31 December 1992). It provides for a double declaration system (by the holder and the consignee) for intra-Community shipments.

The aim of the Regulation is to establish a system for controlling shipments of radioactive substances within Euratom. Specified procedures must be followed whenever radioactive substances, exceeding certain quantities, are shipped between Euratom Member States. These procedures include prior notification and the provision of specific information.

Before proceeding with shipment, the holder must obtain a written declaration by the consignee of the radioactive substances confirming compliance with the relevant provisions. This declaration must be stamped by the authorities of the Member State of destination.

Commission Communication 2009/C41/02[144] indicates the competent authorities of the Member States, as defined in Article 2 of the Regulation[145], as well as all necessary information for communicating with them rapidly.

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143 Council Regulation (Euratom) No 1493/93, OJ L 148, 19.06.1993, p. 1.

144 OJ C 41, 19.02.2009, p. 2, replacing previous Commission Communication 2002/C40/04 (OJ C 40, 14.02.2002, p. 4).

145 The definition given for '*competent authorities*' is: "*any authority responsible in the Member State for the application or administration of this Regulation or of any other authority designated by the Member State*".

Section J

DISUSED SEALED SOURCES

(Article 28 of the Joint Convention)

ARTICLE 28. DISUSED SEALED SOURCES
1. Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner.
2. A Contracting Party shall allow for re-entry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.

The new BSS Directive sets up a system of notification or authorisation of practices with radioactive sources. As a matter of principle, the production, processing, handling, use, holding, storage, transport, import to and export from the Community and disposal of radioactive substances is subject to notification.

As regards high-activity sealed sources (HASS), Council Directive 2003/122/Euratom on the control of high-activity sealed radioactive sources and orphan sources[146], has been repealed and replaced by corresponding provisions in the new BSS Directive. The new BSS Directive introduces new activity limits for HASS definition, which correspond to the lower limits of the IAEA Category 3 sources. This way the definition of HASS in the EU is harmonised with the IAEA regulations.

In order to facilitate the return of disused sealed sources to suppliers, manufacturers or recognised installations based in another country, Council Directive 2006/117/Euratom[147] expressly excludes such shipments from the administrative authorisation system.

Council Directive 2011/70/Euratom does not prevent repatriation of disused sources to a supplier or manufacturer. Once the disused sources are considered as radioactive waste according to the directive, they fall within its scope and should be managed according to its provisions.

Council Regulation No 1493/93/Euratom establishes a mechanism for controlling shipments of radioactive substances, in particular radioactive sources, between Member States.

146 OJ L 346, 31.12.2003, p. 57.
147 Council Directive 2006/117/Euratom of 12 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel; OJ L 337, 05.12.2006, p. 21.

Section K

GENERAL EFFORTS TO IMPROVE SAFETY

This Section mentions a number of safety issues and initiatives, concentrating amongst other on the international dimension. Therefore, it includes information on the European comprehensive risk and safety assessment of nuclear power plants, which covered spent fuel pools and which were carried out and peer reviewed in the course of 2011-2012, and the Memorandum of Understanding which was signed by the Commission and the IAEA in 2013 (covering cooperation in the area of safety of spent fuel and radioactive waste management). This Section further reports on the contribution of Euratom Research Framework Programmes. The recent revision of the Nuclear Safety Directive is also reported. Moreover, based on the information given in other parts of the Report, the present Section recalls certain ways in which Euratom legislation and/or practice has promoted international peer reviews and transparency. It closes with a summary of the measures taken to address the challenges identified in the previous (Fourth) Review Meeting of Contracting Parties, certain strong features in current Euratom practices and the prospects of future progress[148].

K.1 SITUATION REPORTS

One aspect of the former Community Plans of Action was the requirement for continuous analysis by the Commission of the situation regarding radioactive waste management in the EU. The results of this analysis had to be presented periodically to the Council.

There have now been seven so-called "situation reports", describing the status of radioactive waste management in the EU. The first four reported on actions carried out under Community Plans of Action. Although the Plans of Action expired in 2000, it was felt necessary to continue with the concept of a situation report, since it provided the only EU-wide analysis of radioactive waste management activities. The fifth[149] and sixth[150] reports concentrated on the aspect of waste inventories and disposal sites, together with waste management policies and practices. In these last two reports waste quantities were included from Member States which acceded during the enlargements in 2004 and 2007, giving in total twenty seven (27) Member States, of which sixteen (16) have operated nuclear power plants. In addition, the seventh report[151] includes the likely evolution of waste quantities over the coming years (to 2040), as well as the disposal capacities up to 2070.

The reports have shown the continual increase in inventories of high-level waste and spent fuel in line with nuclear power generation. For high level waste/spent fuel it is likely that by 2025-2030 only Finland, France and Sweden will have operational disposal facilities. Germany and Belgium will possibly follow by 2050. The remaining Member States have set target dates which must in some cases be seen as speculative, in view of the low level of

148 In accordance with the revised Guidelines.

149 Fifth Situation Report - Radioactive Waste Management in the Enlarged EU, EUR20653EN, 2003.

150 COM (2008) 542 final, available at: http://ec.europa.eu/energy/nuclear/waste_management/waste_management_en.htm.

151 Report from the Commission - Seventh Situation Report on Radioactive Waste and Spent Fuel Management in the EU, SEC (2011) 1007 final.

activity concerning repository development activities, combined with the fact that a number of states have yet to define specific spent fuel management plans.

There are also significant stocks of long-lived low and intermediate level wastes, which in most circumstances also require deep disposal.

Finally, in the case of the least hazardous waste categories, short-lived low- and intermediate-level waste and very low-level waste, in general terms the estimated disposal capacities will be sufficient to cover the disposal needs. By 2020, if current plans are followed up, all these States having nuclear power plants, with the exception of the Netherlands, could have operational disposal facilities for short-lived low and intermediate level waste.

At the time of drafting of the present Report, the Eighth Situation Report on the Management of Radioactive Waste is under preparation. This will most probably be the last report in this format. Future reporting on the status of radioactive waste management in the EU/Euratom and future waste risings will be combined with the reporting provided for under Council Directive 2011/70/Euratom.

K.2 EURATOM RESEARCH PROGRAMMES[152]

Euratom makes a major contribution to the safety of radioactive waste management through its research activities under the Treaty. The legal basis for research activities in the field of nuclear science and technology is to be found in Title I, Article 2(a), which provides that "*In order to perform its task, the Community shall, as provided in this Treaty: (a) promote research and ensure the dissemination of technical information*", as well as in the provisions of Title II, Chapter 1, entitled "*Promotion of research*" and especially Article 7 which foresees the adoption of Community research and training programmes. ***As laid down in the Treaty, Euratom research and training programmes are established by the Council, on a proposal from the Commission, and following consultation of the Euratom Scientific and Technical Committee (STC)***. The Commission is responsible for the implementation of these programmes.

A distinction is made between "direct actions" and "indirect actions". Direct actions are research activities pursued in the research establishments of JRC and paid for entirely from the EU budget. Indirect actions are conducted in research centres, universities or undertakings, with financial assistance from the EU and on conditions laid down by the rules governing participation in the various programmes.

K.2.1 Euratom research in 2011-2013

In line with the Treaty, Euratom programmes can be drawn up for a period of maximum of five (5) years. Starting in 2011, EU research programmes were established over a 7-year timeframe, and therefore the synchronicity between EU and Euratom research was ensured by adopting a complementary 2-year Euratom programme. As a result, the last Euratom programme was an extension of the seventh Euratom Framework Programme (FP7, 2007–2011)[153] covering the years 2012-2013 and referred to as "FP7+2"[154].

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152 For additional information on Euratom Research and Training Programmes, see Appendix I.

153 Council Decision 2006/970/Euratom of 18 December 2006 (Framework Programme), Council Decision 2006/976/Euratom of 19 December 2006 (Specific Programme), Council Decision 2006/977/Euratom

Under Euratom FP7 and FP7+2, indirect actions in research activities have been implemented on the basis of annual work programmes drawn up by the Commission and submitted to the opinion of two consultative committees composed of Member States representatives[155].

Under Euratom FP7, the budget for indirect actions related to fission and radiation protection research amounted to €287 million over the period 2007–2011. Five (5) main areas of activities were identified: management of radioactive waste (geological disposal, partitioning and transmutation), reactor systems (including installation safety and innovative concepts), radiation protection, research infrastructures, human resources and training.

The Commission proposal for the Euratom FP7+2 programme was presented in June 2011, in the wake of the Fukushima accidents. During the negotiations in the Council, Member States reached a compromise according to which the general objective of the programme should be focused on nuclear safety and security aspects, the latter being the remit of JRC. The budget for indirect actions related to fission and radiation protection under this programme amounted to €118 million.

An overview of activities in the field of radioactive waste management under the Euratom FP7 and FP7+2 is provided in Appendix I[156].

K.2.2 Euratom research under Horizon 2020 (the Euratom Programme 2014-2018)

The Commission proposal for the Euratom Programme 2014-2018 was published in November 2011 as an integral part of the Horizon 2020 FP for Research and Innovation[157]. It was negotiated by the Council during 2012-2013 and it was adopted on 17 December 2013.

The programme directly complements Horizon 2020 and supports its key objectives of "excellent science, industrial leadership and societal challenges". An important aspect is that the Euratom Programme will be for the first time implemented through a single regulation and on the basis of the same rules for participation as Horizon 2020, leading to significant simplification for participants.

For fission research, the programme is fully in line with the post-Fukushima reorientation towards safety aspects agreed in 2011. The budget for indirect actions in fission research and radiation protection amounts to €315 million.

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of 19 December 2006 (Specific Programme direct actions) and Council Regulation No 1908/2006 of 19 December 2006 (Rules for participation).

154 Council Decision 2012/93/Euratom of 19 December 2011 (Framework Programme), Council Decision 2012/94/Euratom of 19 December 2011 (Specific Programme), Council Decision 2012/95/Euratom of 19 December 2011 (Specific Programme direct actions) and Regulation No 139/2012 of 19 December 2011 (Rules for participation).

155 The Euratom Consultative Committee on Fusion (CCE-FU) established by Council Decision of 8 January 1981 and the Euratom Consultative Committee on Fission (CCE-FI) established by Council Decision 84/338 of 29 June 1984.

156 Details of projects carried out under FP7 and FP7+2 can be found on the Cordis website: //cordis.europa.eu/fp7/dc/index.cfm?fuseaction=UserSite.FP7CallsPage

157 COM(2011) 812 final, 30.11.2011.

Indirect actions (Euratom research) under Horizon 2020 will make use of the possibility to have multi-annual work programmes, as provided for by the new Financial Regulation[158]. The first Euratom work-programme will therefore cover the years 2014-2015.

As in the past, implementation of the indirect actions will be ensured via calls for proposals announced in the Official Journal of the EU. Publication will be ensured on the Participant Portal website[159]. The submitted proposals will be evaluated by independent experts from the various fields covered by the call. Successful proposals will be funded mainly by a shared-cost mechanism, whereby an EU grant is awarded covering part of the overall project budget, with the project consortium partners contributing the balance of the funding.

The nuclear activities of JRC (direct actions) will aim at supporting the implementation of Council Directives 2009/71/Euratom and 2011/70/Euratom, as well as Council Conclusions giving priority to the highest standards for nuclear safety and security in the Union and internationally. JRC shall notably contribute to assess and improve the safety of nuclear installations and the peaceful use of nuclear energy and other non-fission applications, to provide a scientific basis to relevant Community legislation and, where necessary, to react within the limits of its mission and competence to nuclear incidents and accidents. To that effect, JRC will continue to carry out research and assessments in the field of fuel cycle safety and radioactive waste management. The main areas covered are related to:

- ***the development of innovative techniques for spent fuel and nuclear waste characterisation;***
- ***the scientific research on the properties of spent fuel, the reduction of the radiological toxicity of wastes, the assessment of closing the fuel cycle strategies and recycling technologies;***
- ***the improved understanding of the long-term behaviour of spent fuel and vitrified high level waste during long term storage and in disposal scenarios;***
- ***the technical assistance to the implementation of Council Directive 2011/70/Euratom for the responsible and safe management of spent nuclear fuel and radioactive waste.***

More recently, the European Parliament, during its debates on the future Euratom research programme, requested that JRC builds upon its experience with the decommissioning of JRC nuclear facilities and further reinforces its research to support safe decommissioning in Europe. As a result, areas of competence have been identified in which the JRC will enhance its support to nuclear decommissioning in the EU:

- ***the development of the measurement techniques in use for decommissioning;***
- ***the standardisation of measurements and calculations for decommissioning;***
- ***support to education and training and knowledge management.***

158 Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012.

159 http://ec.europa.eu/research/participants/portal4/desktop/en/home.html

K.3 EURATOM LOANS

Financial support in the form of loans is available for all Member States[160] and certain non-Member States[161]. All projects must have obtained approval from the competent national authorities, in particular the safety authorities.

Member States are granted loans to finance investment projects relating to the industrial production of electricity in nuclear power stations and to industrial fuel cycle installations. Although most are related to electricity production, many have included direct or indirect references to the safety of spent fuel and radioactive waste management.

Projects supported in non-Member States in Europe must give priority to improving the level of safety and efficiency of nuclear power stations and fuel cycle installations which are in service or under construction. Support is also given to projects that relate to the decommissioning of installations where upgrading of safety levels is not technically or economically justified and which would pose a hazard if abandoned. Such measures are eligible for financial support only where no provision was made during the operational life of the installation.

With regard to upgrading the safety of nuclear installations, Euratom loans have in the last few years been granted to projects such as the safety upgrade of the Kozloduy Power Plant Units 5 and 6 in Bulgaria, the safety upgrade of Khmelnitsky Power Plant Unit 2 and Rovno Power Plant Unit 4 in Ukraine, ***and the Complex (consolidated) Safety Upgrade Program of Power Units of Nuclear Power Plants also in Ukraine***.

K.4 INSTRUMENT FOR NUCLEAR SAFETY COOPERATION

The EU contributes significantly to the promotion of nuclear safety, including radioactive waste management, also through actions undertaken under the Instrument for Nuclear Safety Cooperation, established by Council Regulation No 237/2014 of 13 December 2013[162]. Within the framework provided by this Instrument, the Union engages in cooperation with non-EU countries, amongst others in the field of the promotion of nuclear safety culture, safe management of radioactive waste and safeguarding of nuclear materials. Concrete actions are aimed to address problems related to the safe management of radioactive waste of all types and of nuclear material, including environmental remediation of former uranium mines.

The Commission is responsible for the implementation of these actions with the non-EU countries concerned. The Annual Action Programmes, also containing projects in the field of radioactive waste management, are elaborated by the Commission, based on the Strategy and Multi-annual Indicative Programme established by the European External Action Services, taking into account the opinion of a committee of appointed representatives from the Member States.

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160 Council Decision 77/270/Euratom empowering the Commission to issue Euratom loans for the purpose of contributing to the financing of nuclear power stations, OJ L 88, 06.04.1977, p. 11, as amended and supplemented (the "Establishing Decision").

161 Council Decision 94/179/Euratom to authorise the Commission to contract Euratom borrowings in order to contribute to the financing required for improving the degree of safety and efficiency of nuclear power stations in certain non-Member countries, OJ L 84, 29.03.1994, pp. 41-43, as amended and supplemented (the "Scope Extension Decision").

162 OJ L L77, 15.03.2014, p. 109. This Euratom Regulation will be applied from 2014 to 2020.

K.5 INSTRUMENT FOR PRE-ACCESSION ASSISTANCE

The EU contributes to the safety of radioactive waste management and spent fuel management also through actions undertaken under the Instrument for Pre-Accession Assistance (IPA), established by Council Regulation (EC) No 1085/2006 of 17 July 2006.

Within this Instrument, the EU cooperates with candidate and potential candidate countries in the Western Balkan in the field of safe management of radioactive waste and material, decommissioning of nuclear facilities and safe management of spent fuel[163]. The most significant action in the field of radioactive waste management is currently being implemented in Vinča, Serbia. The objective of the Vinča Nuclear Institute Decommissioning (VIND) programme, which is coordinated and partly financially supported by the IAEA, is to condition and store approximately 4000 sealed radioactive sources and safely dismantle the old storage facilities. The cost of the repatriation and waste management actions in Vinča financed by IPA amounts to EUR 18,4 million.

The elaboration and implementation of these projects are similar to the projects implemented under the Instrument for Nuclear Safety Cooperation[164].

K.6 EU STRESS TESTS (POST-FUKUSHIMA)

Europe's response to the events at Fukushima (Daiichi) I Nuclear Power Plant, initiated by the Tōhoku earthquake and tsunami on 11 March 2011, was immediate. The European Council of 24/25 March, 2011, requested that the safety of all EU nuclear plants should be reviewed on the basis of a comprehensive and transparent risk and safety assessment ("stress tests"). These stress tests were defined as targeted reassessments of the safety margins of nuclear power plants, developed by ENSREG, with the participation of the Commission.

Specifications on the stress tests[165] defined three main areas to be assessed: extreme natural events, response of the plants to prolonged loss of electric power and/or loss of the ultimate heat sink and severe accident management[166]. As such, the main aim of stress tests was to assess the safety and robustness of nuclear power plants with regard to the preliminary lessons learned from Fukushima. For this purpose, they went beyond the safety evaluations made during the licencing process and periodic safety reviews.

All EU Member States that operated nuclear power plants at the time[167], plus Lithuania[168], participated in the nuclear stress test exercise[169]. Several countries[170] decided –in addition

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163 Such as repatriation of spent fuel elements from the Vinča research centre, in Serbia, to Russia.

164 See Section K.4 above.

165 Annex I of the ENSREG declaration of 12-13 May 2011.

166 The methods of investigation were defined nationally and were under the responsibility of the national regulators.

167 Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, the Netherlands, Romania, Slovak Republic, Slovenia, Spain, Sweden and United Kingdom. Croatia also participated.

168 Despite closure of the last unit in the Ignalina nuclear power plant in 2009 (in fulfillment of the EU accession obligations), there were still site-specific operating licenses in place, as well as amounts of spent fuel stored on-site, hence the participation of this country in the EU stress tests.

169 Given the potential cross-border implications of nuclear accidents, the European Council asked the Commission to invite EU neighbouring countries to take part in the stress test process. Thus, together with the participating EU Member States, Switzerland and Ukraine also participated in the EU stress

to the agreed requirements– to include not only operating nuclear power plants but also decommissioned plants or other nuclear facilities.

The stress test process was organised in three phases:

- ***Self assessments by nuclear operators;***
- ***Review of the self assessments by national regulators;***
- ***Peer reviews of the national reports, within 2012.***

This peer review was completed with a main report that includes final conclusions and recommendations at European level and 17 country reports that include country-specific conclusions and recommendations. The report was endorsed by ENSREG and the Commission on 26 April 2012. All these documents, including the main results and conclusions of the stress tests, can be accessed at the ENSREG web page:

http://www.ensreg.eu/EU-Stress-Tests

Likewise, a compilation of the detailed recommendations addressed to national regulators can be found at the following link:

http://www.ensreg.eu/sites/default/files/Compilation%20of%20Recommendationsl_0.pdf

ENSREG adopted an Action Plan, dated 25 July 2012, which was agreed on 1 August 2012[171]. The purpose of this ENSREG Action Plan has been to assist in assuring that the conclusions from the stress tests and their peer review result in improvements in safety across European nuclear power plants. The Action Plan would also assist, through further peer review, in ensuring that the recommendations and suggestions from the stress test peer review are addressed by national regulators and ENSREG in a consistent manner.

This ENSREG Action Plan requested that each national regulator develops and makes public its national action plan (NAcP), associated with post-Fukushima lessons and stress test peer review recommendations and suggestions, by the end of 2012.

All participating countries followed the ENSREG guidance for the content of the NAcP and issued their NAcPs, which are also available in English via the ENSREG homepage[172].

The details of the EU stress tests and their findings have been reported by Euratom in the 2nd Extraordinary Meeting of Contracting Parties under the Convention on Nuclear Safety. Indeed, the purpose of that Meeting, which took place in the Headquarters of the IAEA, in Vienna, from 27 to 31 August 2012, was specifically to review and discuss lessons learned from the accident at TEPCO's Fukushima Daiichi nuclear power plant and to review the effectiveness of the provisions of that Convention. Euratom's reporting has been made available at the public domain[173], therefore Contracting Parties to the Joint Convention are invited to find more information on the EU stress tests in that report.

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tests and the peer review process, while other neighbouring countries that agreed to be involved on the basis of the same methodology (e.g. Turkey) have been working within different timetables.

170 Belgium, Bulgaria, Finland, France, Germany, Lithuania, Slovakia, Spain, Ukraine, United Kingdom.

171 See at: http://www.ensreg.eu/sites/default/files/ENSREG%20Action%20plan_0.pdf

172 See at: http://www.ensreg.eu/EU-Stress-Tests/Country-Specific-Reports/EU-Member-States

173 http://ec.europa.eu/energy/nuclear/safety/doc/20121114_euratom_report_cns_2thrm.pdf

K.7 REVISION OF COUNCIL DIRECTIVE 2009/71/EURATOM

The European Council of 24/25 March 2011 also mandated the Commission "to review the existing legal and regulatory framework for the safety of nuclear installations" and propose any improvements that may be necessary.

Thus, in October 2013, the Commission proposed to amend the 2009 Nuclear Safety Directive[174]. By June 2014, the Council and the Commission reached an agreement on the text of the amendment. Member States will have 36 months from the adoption of the amendment to introduce implementing legislation, in order to comply with its requirements.

The amendment, amongst other:

- ***introduces new EU-wide safety objectives;***
- ***sets up a system of European topical peer reviews;***
- ***strengthens the role and independence of national regulators;***
- ***increases transparency on nuclear safety matters;***
- ***includes new provisions for on-site emergency preparedness and response.***

The definition of "nuclear installations", covered by the Nuclear Safety Directive, encompasses spent fuel storage facilities, as well as storage facilities for radioactive waste that are on the same site and are directly related to a nuclear power plant, an enrichment plant, a nuclear fuel fabrication plant, a reprocessing plant or a research reactor facility.

K.8 MEMORANDUM OF UNDERSTANDING BETWEEN EURATOM AND THE IAEA

A Memorandum of Understanding was signed by the Commission and the IAEA on 17 September 2013, for a partnership between them on nuclear safety cooperation[175]. The signatory parties envisage cooperating and consulting with each other, with regard to matters of common interest.

This partnership is based on respect and mutual understanding of the respective strengths, mandates, organisational structures and institutional capacities, as well as the governing rules and policies of the respective sides. The objectives of the partnership are:

a. to establish a framework for cooperation;

b. to facilitate the joint identification of programmes for potential cooperation;

c. to enhance knowledge sharing with a view to fostering co-ordination and synergies, and to support best practices in IAEA Member States, when requested; and

d. to build on each party's comparative advantage, with the objective to strengthen nuclear safety worldwide.

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174 I.e. Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, discussed at Section E.1.2 above.

175 The document is available at: http://ec.europa.eu/energy/nuclear/safety/doc/20130917_ec_iaea_mou_nuclear.pdf

It is anticipated that working towards these objectives will lead to greater harmonisation, coordination and complementarity of planning and identification of projects for cooperation. Likewise, it will result in a structured framework for cooperation, for shared analysis and exchange of information.

Subject to the availability of funds, the parties envisage cooperating in specific areas, which also include:

- *"Safe management of spent fuel and radioactive waste"; and*
- *"Provision of IAEA peer reviews of radioactive waste and spent fuel management of the IAEA Member States which are Member States of Euratom, that so request, in accordance with IAEA Safety Standards and in line with 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".*

K.9 PROMOTION OF INTERNATIONAL PEER REVIEWS

Council Directive 2011/70/Euratom has contributed towards the advancement of international peer reviews in the Community. Article 14 of the directive requires Member States to invite periodically (at least every 10 years) 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.

In 2011, the Commission concluded with the IAEA an Agreement to provide a contribution for the implementation of the action entitled "EC-IAEA Cooperation in the Field of Nuclear Safety – Integrated Regulatory Review Services in the EU". At the time of drafting of this Report, the Commission and the IAEA had agreed to an extension of existing contractual arrangements to cover IRRS missions until September 2014. At the same time, the Commission and the IAEA were jointly preparing for a new cooperation agreement with the aim to cover IRRS missions (already foreseen under Council Directive 2009/71/Euratom) and the new services IAEA is able to provide under Council Directive 2011/70/Euratom.

K.10 PROMOTION OF OPENNESS AND TRANSPARENCY

To ensure openness and transparency, the outcomes of any peer review[176] shall be reported to the Commission and the other Member States, and may be made available to the public where there is no conflict with security and proprietary information (Article 14 of Council Directive 2011/70/Euratom).

In another Article directly referring to transparency (Article 10), Council Directive 2011/70/Euratom requires Member States to ensure also 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. In addition, Member States must ensure that the public is given the necessary opportunities to participate effectively in the decision-

[176] See Section K.9 above.

making process regarding spent fuel and radioactive waste management, in accordance with national legislation and international obligations.

Moreover, openness and transparency are promoted through discussions at international fora (such as ENSREG, ENEF) and by way of asking the stakeholders' opinion, where appropriate.

Furthermore, since the 1st Communication to the European Parliament and the Council in 1999, the Commission updates every four years the status of the D&WM Programme for JRC nuclear installations. The last Communication on this subject was issued in October 2013. Additionally, the Programme is peer reviewed every year by a panel of 12 independent experts from the Member States having major competences in the nuclear field, in the so-called "Nuclear Decommissioning and Waste Management Expert Group". The Expert Group meets twice a year in the JRC nuclear sites and monitors the Programme's progress, giving advice on the strategy and future technical challenges.

JRC-Ispra, following the advice of the European Parliament, opened in 2006 a dedicated web site (in two languages: English and Italian) to inform the local community and the international research staff working at Ispra premises about the relevant progress of the D&WM Programme and other significant events organised in this framework.

Alternatively every two years, the JRC-Ispra site, including its nuclear facilities, is open to the general public (JRC Open Day) and to the scholars (JRC School Day) having applied to visit its laboratories. During these visits, conferences are held and information is given on subjects like radioactivity, nuclear waste and the decommissioning programme. Moreover, Communication channels with the mayors of the villages surrounding the site, the local and regional authorities and the local press have been established and are regularly implemented.

Outside the formal authorisation and licencing processes, an informal dialogue with the Italian national authorities and other relevant nuclear stakeholders has been established, in particular with the Italian nuclear inspectorate (I.S.P.R.A.) and the operator of the Italian nuclear facilities undergoing decommissioning (Sogin).

K.11 CONCLUSIONS OF THE PREVIOUS REVIEW MEETING ON THE LAST EURATOM REPORTING – HIGHLIGHTS AND STRONG FEATURES OF RECENT EURATOM ACTIONS – PAST AND FUTURE CHALLENGES AND PRIORITIES

The Fourth Review Meeting of Contracting Parties highlighted a number of Euratom policies and technical developments, including the following achievements[177]:

- ***the adoption of Council Directive 2011/70/Euratom, establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, which the Euratom Member States have to comply with. This directive has taken into account the IAEA Safety Standards, in particular the Fundamental Safety Principles (published in 2006)[178];***

[177] All of them mentioned in the Rapporteur's Report on Country Group 2.

[178] Explicit reference to the IAEA Fundamental Safety Principles is made in paragraph 16 of the preamble to the directive.

- *the pursuit of international technical cooperation, such as the launch of the Implementing Geologic Disposal Technology Platform (IGD–TP) in 2009, aimed at addressing outstanding research and development issues in geologic disposal and implementing the technology in Europe by 2025;*

- *the conduct of comprehensive and transparent risk and safety assessments (stress tests) of European nuclear power plants, viewed as an international benchmark at the post-Fukushima era.*

Good practices identified in the Fourth Review Meeting of Contracting Parties included the following:

- *the efforts of Euratom to provide a basic legislative structure for the responsible and safe radioactive waste and spent fuel management in its Member States;*

- *Euratom research in the nuclear energy sector, covering several aspects relating to radioactive waste and spent fuel management;*

- *the collaboration with the IAEA to strengthen safety culture and emergency preparedness.*

Moreover, it was acknowledged during the Fourth Review Meeting discussions that waste management plans for JRC facilities being decommissioned are well developed.

Regarding the challenges for Euratom, as indicated in the outcome of the Fourth Review Meeting, emphasis was laid on:

- *the continuity of relevant research;*

- *the need to continue the flow of information, with due transparency, and the cooperation in the nuclear field, e.g. through international synergies and fora such as the European Nuclear Energy Forum (ENEF);*

- *the finalisation of the revision of the Euratom basic safety standards framework;*

- *the revision and strengthening of the Euratom legislative framework for nuclear safety, considering the stress tests results;*

- *the support of Member States in duly implementing Council Directive 2011/70/Euratom in their national systems;*

- *the continuity of the safe operation and/or decommissioning at JRC sites.*

The present Report has demonstrated that Euratom has since the last (Fourth) Review Meeting taken actions both to successfully continue the aforementioned positive practices and to address the challenges. Efforts within the last three years led inter alia to the following advantageous results, which are described in more detail in earlier parts of the present Report:

- *facilitating progress in the work of ENSREG, ENEF and technical platforms, as well as achievements at international level, such as the conclusion of a*

Memorandum of Understanding between Euratom and the IAEA, in 2013, for a partnership on nuclear safety cooperation (covering the area of safety of radioactive waste and spent fuel management);

- *the 2007-2011 Euratom research programme, covering research in the area of management of radioactive waste (geological disposal, partitioning and transmutation), was extended and continued during the years 2012-2013;*

- *the revision of the Euratom directive on nuclear safety, which has taken into account the findings of the stress tests and which is expected to enhance the nuclear safety of nuclear installations in Europe;*

- *the adoption of a new basic safety standards directive, in December 2013, which establishes such uniform standards for the protection of the health of individuals subject to occupational, medical and public exposures against the dangers arising from ionising radiation and which applies also to the holding, handling, disposal and storage of radioactive material;*

- *the support provided in the implementation of Council Directive 2011/70/Euratom in the Member States.*

Furthermore, the efforts to ensure the safe decommissioning at JRC sites continued. Significant progress has been made with the implementation of the JRC D&WM Programme since the last reporting under the Joint Convention. The main attention was given to JRC-Ispra, with the finalisation of the decommissioning of a first large installation, the removal of waste and nuclear materials, the launch of several waste characterisation facilities and the realisation and commissioning of the interim storage facility. The risk mitigation strategy has provided several improvements related to the internal organisation, as well as the signature (on 27 November 2009) of a Settlement Agreement between Euratom and the Italian Government on the historical liabilities present on the Ispra site. JRC is undertaking actions to contain the remaining constraints, which are mainly linked to the schedule for the execution of the Settlement Agreement, the delays caused by the complex authorisation process at JRC-Ispra, the expected waste volumes that will be produced on the different sites and the costs for their disposal, and to the transfer conditions of the JRC-Petten high flux reactor (HFR) after its shutdown and at the end of the dismantling works. Based on the updated evaluation of the programme, the consolidated estimate for the whole JRC D&WM Programme after 2013 amounts to 989,2 million euro. The decommissioning strategies and the evolution of the expenditures are monitored on a continuous basis by the D&WM Programme Steering Committee and submitted to a periodic expert review.

Finally, with reference to other future priorities, Euratom will focus on taking further its international cooperation initiatives, continuing research in the nuclear field and supporting Member States to ensure the application of high standards of nuclear safety in Europe. To this effect, Euratom is prepared to support progress of work in ENSREG and ENEF, to follow up the status of implementation of the post-stress tests national action plans aimed at enhancing nuclear safety, to pursue synergies with the IAEA, to prompt Member States to transpose the relevant Euratom legislative framework in their national legal order and to evaluate the alternatives for research projects.

Appendix I

Research

Overall objectives

The aims of each Euratom Framework Programme (FP) have been different, though there has been a large degree of continuity in most fields (including in the area of radioactive waste management), because of the long-term nature of the required research effort. The management of spent fuel, high-level waste and other long-lived radioactive waste remains the only aspect of the fuel cycle that has yet to reach the level of industrial maturity. Safety considerations mean that radioactive waste management is a topic of concern for a number of Member States and an area where research efforts are being concentrated. Euratom Member States are conducting activities aiming at starting operation of three first of the kind geological repositories in three different Members States by 2025. Research and development in this field is supported by the Euratom FP to notably offer to other Member States the necessary technical knowledge to develop national programmes.

Solutions for ultimate radioactive waste disposal is also considered as an integral element of the overall safety of nuclear reactors by reducing the inventory of spent fuel in wet storage, as it was recalled on the occasion of the great earth quake and tsunami in Japan. The Euratom FP is taking this into consideration to emphasise the need of more research in this field.

Last but not least, it is clear that the objective of protection of man is at the core of any nuclear activity and it is the primary goal of designing safe solutions for radioactive waste management. A better knowledge of the risks arising from exposures to ionising radiation in the low dose and low dose rate ranges and protracted exposures is also sought by the Euratom FP. With this aim, support is provided to low dose research being organised by the Multidisciplinary European Low Dose Initiative (MELODI).

Euratom Framework Programme 2007-2011 (FP7) and 2012-2013 (FP7+2)

As in previous programmes, Euratom FP7 covers research in both fusion and fission (including radiation protection) and specific research actions carried out by the JRC. The total EC contribution in the field of fission and radiation protection indirect actions is €355M over the seven years 2007-2013.

There is a high degree of continuity with FP6 activities and radioactive waste management research therefore remains a key area for support. In the area of geological disposal, the clear emphasis in FP7 is on implementation-oriented research and technological development, such as investigation and demonstration of technologies and safety of disposal of spent fuel and long-lived radioactive wastes in geological formations. Other objectives are to underpin the development of a common European view on the main issues related to the management and disposal of waste. Investigation of ways to reduce the amount and/or hazard of the waste by partitioning and transmutation and/or other techniques, in particular as part of advanced nuclear fuel cycles and systems (Generation-IV) included in the radioactive waste management activity area in FP7, has been transferred under the activity area Reactor Systems in FP7+2.

Table 1, below, summarises the final status of FP7 & FP7+2 implementation, in the field of radioactive waste management in general and geological disposal in particular. Only the

major projects, involving collaborative research activities, are listed; several smaller coordination and support actions, including in the area of education and training, are not listed. Euratom FP7 is implemented via one call for research proposals per year. In total, seven (7) calls have been completed and all the selected projects launched.

Table 1: Euratom FP7 & FP7+2 – Summary of major RWM projects to date[1]

Project acronym and title[2]	**Coordinator**	**EU contribution / total cost**	**Start date & duration**
ACSEPT Actinide recycling by separation and transmutation	CEA (FR)	€6M / €23.8M	1/1/08 4 years
RECOSY Redox phenomena controlling systems	FZK-INE (DE)	€3.50M / €6.2M	1/4/08 4 years
CARBOWASTE Treatment and Disposal of Irradiated Graphite and other Carbonaceous Waste	FZJ (DE)	€6M / €12.3M	1/4/08 5 years
FORGE Fate of Repository Gases	BGS (UK)	€6M / €11.6M	1/2/09 4 years 8 months
MODERN Monitoring Developments for safe Repository operation and staged closure	Andra (FR)	€2.8M / €5.1M	1/5/09 4.5 years
CATCLAY Processes of Cation Migration in Clayrocks	CEA (FR)	€0.82M / €1.55M	1/6/10 4 years
PEBS Long-term performance of Engineered Barrier Systems (EBS)	BGR (DE)	€2.8M / €6.5M	1/3/10 4 years
CROCK Crystalline rock retention processes	KIT (DE)	€1.06M / €1.8M	1/1/11 2.5 years
SKIN Slow processes in close-to-equilibrium conditions for radionuclides in water/solid systems of relevance to nuclear waste management	ARMINES (FR)	€1.2M / €2M	1/1/11 3 years
REDUPP Reducing Uncertainty in Performance Prediction	SKB (SE)	€0.9M / €1.6M	1/4/11 3 years
LUCOEX Large Underground Concept Experiments	SKB (SE)	€4.4M / €9.35M	1/1/11 4 years
IPPA Implementing Public Participation Approaches in Radioactive Waste Disposal	Karita Konsult (SE)	€1.6M / €2.4M	1/1/11 3 years

Project acronym and title[2]	Coordinator	EU contribution / total cost	Start date & duration
INSOTEC International Socio-Technical Challenges for implementing geological disposal	Univ. of Antwerp (BE)	€2.0M / €3.25M	1/3/11 3 years
BELBAR Bentonite Erosion: effects on the Long term performance of the engineered Barrier and Radionuclide Transport	SKB (SE)	€2.6M / €5.0M	1/3/12 4 years
FIRST-NUCLIDES Fast / Instant Release of Safety Relevant Radionuclides from Spent Nuclear Fuel	FZK-INE (DE)	€2.5M / €4.74M	1/1/12 3 years
DOPAS Full Scale Demonstration of Plugs and Seals	POSIVA (FI)	€8.7M / €15.74M	1/9/12 4 years
CAST CArbon-14 Source Term	NDA (UK)	€4.5M / €14.73M	1/10/13 4.5 years

[1] All projects are shared-cost (Euratom contributing on average 50%) and involve large multi-partner consortia, with partners from several Member States. Projects are also open to organisations from third countries, though normally such partners do not receive funding from the Euratom programme.

[2] For further information on FP7 projects, refer to http://cordis.europa.eu/fp7/euratom-fission/home_en.html.

In continuity to the FP6, the JRC aligned its Euratom FP7's Multi-Annual Work Programme along three main agendas of which "Nuclear waste management and Environmental impact" is relevant to the present report. Under this thematic priority, the JRC activities cover waste management in geological disposal conditions, partitioning and transmutation, conditional and environmental issues. Scientific aspects related to the back-end of the fuel cycle, including nuclear reference materials, nuclear data, actinide science and non-nuclear applications (e.g. medical applications of radioisotopes), and knowledge management, training and education issues are addressed. Within its actions on Waste Management Disposal and Alternative Nuclear Fuel Cycle, the JRC provides repository relevant data relative to the behaviour of nuclear waste which can be used for long-term modelling and assessment of repositories in view of their implementation. Another important contribution is in safety concerns linked to the development of advanced Generation-IV type fuel cycles, where specially adapted partitioning schemes are being set-up to cope with the goal of the full recycling of all actinides in view of a minimisation of the waste radio-toxicity. Basic data are being measured and a special focus is given to the understanding of the mechanisms involved in the processes applied. Demonstration of a full recycling of all actinides is achieved using aqueous and so-called dry processes based on molten salt pyrometallurgical techniques. Special focus is paid to corrosion behaviour of high burn-up UO_2 fuels. The JRC is also a key partner in large Euratom projects mentioned in Table 1 and supports the implementation of the European Research Area in the nuclear field by participating to Networks of Excellence, user access and pooling facilities programmes.

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

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular Articles 31 and 32 thereof,

Having regard to the proposal from the European Commission, drawn up after obtaining the opinion of a group of persons appointed by the Scientific and Technical Committee from among scientific experts in the Member States,

Having regard to the opinion of the European Economic and Social Committee [1],

Having regard to the opinion of the European Parliament [2],

Whereas:

(1) Article 2(b) of the Treaty establishing the European Atomic Energy Community ('Euratom Treaty') provides for the establishment of uniform safety standards to protect the health of workers and of the general public.

(2) Article 30 of the Euratom Treaty provides for the establishment of basic standards for the protection of the health of workers and the general public against the dangers arising from ionising radiations.

(3) Article 37 of the Euratom Treaty requires Member States to provide the Commission with general data relating to any plan for the disposal of radioactive waste.

(4) Council Directive 96/29/Euratom [3] establishes basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation. That Directive has been supplemented by more specific legislation.

(5) As recognised by the Court of Justice of the European Union in its case-law, the provisions of Chapter 3 of the Euratom Treaty, on health and safety, form a coherent whole conferring upon the Commission powers of some considerable scope in order to protect the population and the environment against the risks of nuclear contamination [4].

(6) Council Decision 87/600/Euratom of 14 December 1987 on Community arrangements for the early exchange of information in the event of a radiological emergency [5] established a framework for notification and provision of information to be used by the Member States in order to protect the general public in case of a radiological emergency. Council Directive 89/618/Euratom of 27 November 1989 on informing the general public about health protection measures to be applied and steps to be taken in the event of a radiological emergency [6] imposed obligations on the Member States to inform the general public in the event of a radiological emergency.

(7)Council Directive 2003/122/Euratom [7] provides for the control of high-activity sealed radioactive sources and orphan sources, including disused sources. In accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management ('the Joint Convention') and the International Atomic Energy Agency (IAEA) Code of Conduct on the Safety and Security of Radioactive Sources, and current industrial practices, disused sealed sources can be reused, recycled or disposed of. In many cases, this needs a return of the source or return of the equipment, including the source, to a supplier or a manufacturer, for requalification or processing.

(8)Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries [8] covers the management of waste from extractive industries which may be radioactive, but excluding such aspects as are specific to radioactivity, which are matters dealt with under the Euratom Treaty.

(9)Council Directive 2006/117/Euratom [9] lays down a European Atomic Energy Community ('Community') system of supervision and control of transboundary shipments of radioactive waste and spent fuel. That Directive was supplemented by Commission Recommendation 2008/956/Euratom of 4 December 2008 on criteria for the export of radioactive waste and spent fuel to third countries [10].

(10)Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations [11] imposes obligations on the Member States to establish and maintain a national framework for nuclear safety. While that Directive concerns principally the nuclear safety of nuclear installations, it states that it is also important to ensure the safe management of spent fuel and radioactive waste, including at storage and disposal facilities. Therefore, those facilities, addressed both in Directive 2009/71/Euratom and in this Directive, should not be subject to disproportionate or unnecessary obligations, especially as regards reporting.

(11)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 [12] applies to certain plans and programmes within the scope of Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment [13].

(12)Commission Recommendation 2006/851/Euratom of 24 October 2006 on the management of the financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste [14] focuses on the adequacy of funding, its financial security and its transparency in order to ensure that the funds are only used for the intended purposes.

(13)Under the specific terms of accession of Lithuania, Slovakia and Bulgaria to the European Union, where certain nuclear power plants were subject to early shutdown, the Community has taken part in the raising of financial resources and provides financial support subject to certain conditions to various decommissioning projects, including management of radioactive waste and spent fuel.

(14)The Joint Convention, concluded under the auspices of the IAEA, represents an incentive instrument which aims at achieving and maintaining a high level of safety worldwide in spent fuel and radioactive waste management through the enhancement of national measures and international cooperation.

(15)Some Member States have already participated and intend to participate further in the US-

Russian driven programme, called the Global Threat Reduction Initiative, by shipping the spent fuel of research reactors to the United States of America and to the Russian Federation.

(16) In 2006, the IAEA updated the structure of standards and published the Fundamental Safety Principles, which were jointly sponsored by the Community, the Organisation for Economic Cooperation and Development/Nuclear Energy Agency and other international organisations. Applying the Fundamental Safety Principles will facilitate the application of international safety standards and will make for greater consistency between the arrangements of different states.

(17) Following the Council's invitation to set up a High Level Group at EU level, as recorded in its Conclusions of 8 May 2007 on Nuclear Safety and Safe Management of Spent Nuclear Fuel and Radioactive Waste, the European Nuclear Safety Regulators Group (ENSREG) was set up by Commission Decision 2007/530/Euratom of 17 July 2007 on establishing the European High Level Group on Nuclear Safety and Waste Management [15] to contribute to the achievement of the Community objectives in the field of spent fuel and radioactive waste management. The conclusions and recommendations of ENSREG were reflected in the Council Resolution of 16 December 2008 on Spent Fuel and Radioactive Waste Management and the Council Conclusions of 10 November 2009 on the report by the European Nuclear Safety Regulators Group.

(18) The European Parliament adopted on 10 May 2007 a Resolution 'Assessing Euratom – 50 Years of European nuclear energy policy' where it called for harmonised standards for radioactive waste management and invited the Commission to review the relevant drafts of its legislative proposal and submit a new proposal for a directive on radioactive waste management.

(19) While each Member State remains free to define its energy mix, all Member States generate radioactive waste from power generation or in the course of industrial, agricultural, medical and research activities, or through decommissioning of nuclear facilities or in situations of remediation and interventions.

(20) The operation of nuclear reactors generates spent fuel. Each Member State remains free to define its fuel cycle policy. The spent fuel can be regarded either as a valuable resource that may be reprocessed or as radioactive waste that is destined for direct disposal. Whatever option is chosen, the disposal of high-level waste, separated at reprocessing, or of spent fuel regarded as waste should be considered.

(21) Radioactive waste, including spent fuel considered as waste, requires containment and isolation from humans and the living environment over the long term. Its specific nature, namely that it contains radionuclides, requires arrangements to protect human health and the environment against dangers arising from ionising radiation, including disposal in appropriate facilities as the end location point. The storage of radioactive waste, including long-term storage, is an interim solution, but not an alternative to disposal.

(22) A national radioactive waste classification scheme should support those arrangements, taking fully into account the specific types and properties of radioactive waste.

(23) The typical disposal concept for low and intermediate-level waste is near-surface disposal. It is broadly accepted at the technical level that, at this time, deep geological disposal represents the safest and most sustainable option as the end point of the management of high-level waste and spent fuel considered as waste. Member States, while retaining responsibility for their respective policies in respect of the management of their spent fuel and low, intermediate or high-level radioactive waste, should include

planning and implementation of disposal options in their national policies. Since the implementation and development of a disposal facility will take place over many decades, many programmes recognise the necessity of remaining flexible and adaptable, e.g. in order to incorporate new knowledge about site conditions or the possible evolution of the disposal system. The activities conducted under the Implementing Geological Disposal of Radioactive Waste Technology Platform (IGD-TP) could facilitate access to expertise and technology in this respect. To that end, reversibility and retrievability as operating and design criteria may be used to guide the technical development of a disposal system. However, those criteria should not be a substitute for a well designed disposal facility that has a defensible basis for closure. A compromise is needed as the management of radioactive waste and spent fuel is based on state-of-the-art science and technology.

(24) It should be an ethical obligation of each Member State to avoid any undue burden on future generations in respect of spent fuel and radioactive waste including any radioactive waste expected from decommissioning of existing nuclear installations. Through the implementation of this Directive Member States will have demonstrated that they have taken reasonable steps to ensure that that objective is met.

(25) The ultimate responsibility of Member States for the safety of spent fuel and radioactive waste management is a fundamental principle reaffirmed by the Joint Convention. That principle of national responsibility, as well as the principle of prime responsibility of the licence holder for the safety of spent fuel and radioactive waste management under the supervision of its competent regulatory authority, should be enhanced and the role and independence of the competent regulatory authority should be reinforced by this Directive.

(26) It is understood that the utilisation of radioactive sources by a competent regulatory authority for the purpose of carrying out its regulatory tasks does not affect its independence.

(27) Member States should ensure that adequate funding is available for the management of spent fuel and radioactive waste.

(28) Member States should establish national programmes to ensure the transposition of political decisions into clear provisions for the timely implementation of all steps of spent fuel and radioactive waste management from generation to disposal. It should be possible for such national programmes to be in the form of a single reference document or a set of documents.

(29) It is understood that national arrangements for the safety of spent fuel and radioactive waste management will be applied through some form of legal, regulatory or organisational instrument, the choice of which rests within the competence of the Member States.

(30) The different steps in spent fuel and radioactive waste management are closely interrelated. Decisions taken in one individual step may affect a subsequent step. Therefore such interdependencies should be taken into account when developing national programmes.

(31) Transparency is important in the management of spent fuel and radioactive waste. Transparency should be provided by ensuring effective public information and opportunities for all stakeholders concerned, including local authorities and the public, to participate in the decision-making processes in accordance with national and international obligations.

(32)Cooperation between Member States and at an international level could facilitate and accelerate decision-making through access to expertise and technology.

(33)Some Member States consider that the sharing of facilities for spent fuel and radioactive waste management, including disposal facilities, is a potentially beneficial, safe and cost-effective option when based on an agreement between the Member States concerned.

(34)The documentation of the decision-making process as it relates to safety should be commensurate with the levels of risk (graded approach) and should provide a basis for decisions related to the management of spent fuel and radioactive waste. This should enable the identification of areas of uncertainty on which attention needs to be focused in an assessment of safety. Safety decisions should be based on the findings of an assessment of safety and information on the robustness and reliability of that assessment and the assumptions made therein. The decision-making process should therefore be based on a collection of arguments and evidence that seek to demonstrate that the required standard of safety is achieved for a facility or activity related to the management of spent fuel and radioactive waste. In the particular case of a disposal facility, the documentation should improve understanding of those aspects influencing the safety of the disposal system, including natural (geological) and engineered barriers, and the expected development of the disposal system over time.

(35)A Member State which has no spent fuel, no immediate prospect of having spent fuel and no present or planned activities related to spent fuel, would be under a disproportionate and unnecessary obligation if it had to transpose and implement the provisions of this Directive with regard to spent fuel. Therefore, such Member States should be exempted, for as long as they have not taken a decision to develop any activity related to nuclear fuel, from the obligation to transpose and implement the provisions related to spent fuel of this Directive.

(36)A Treaty between the government of the Republic of Slovenia and the government of the Republic of Croatia on the regulation of the status and other legal relations regarding investment, exploitation and decommissioning of the Krško nuclear power plant governs the co-ownership of a nuclear power plant. That Treaty provides for shared responsibility for the management and disposal of radioactive waste and spent fuel. Therefore an exemption to certain provisions of this Directive should be laid down in order not to hinder the full implementation of that bilateral Treaty.

(37)While recognising that radiological and non-radiological hazards associated with spent fuel and radioactive waste should be taken into account in the national framework, this Directive does not cover non-radiological hazards, which fall under the Treaty on the Functioning of the European Union.

(38)Maintenance and further development of competences and skills in the management of spent fuel and radioactive waste, as an essential element to ensure high levels of safety, should be based on learning through operational experience.

(39)Scientific research and technological development supported by technical cooperation between actors may open horizons to improve the safe management of spent fuel and radioactive waste, as well as contribute to reducing the risk of the radiotoxicity of high-level waste.

(40)Peer review could serve as an excellent means of building confidence and trust in the management of radioactive waste and spent fuel in the European Union, with the aim of developing and exchanging experience and ensuring high standards,

HAS ADOPTED THIS DIRECTIVE:

CHAPTER 1
SCOPE, DEFINITIONS AND GENERAL PRINCIPLES

Article 1

Subject-matter

1. This Directive establishes a Community framework for ensuring responsible and safe management of spent fuel and radioactive waste to avoid imposing undue burdens on future generations.

2. It ensures that Member States provide for appropriate 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 ionising radiation.

3. It ensures the provision of necessary public information and participation in relation to spent fuel and radioactive waste management while having due regard to security and proprietary information issues.

4. Without prejudice to Directive 96/29/Euratom, this Directive supplements the basic standards referred to in Article 30 of the Euratom Treaty as regards the safety of spent fuel and radioactive waste.

Article 2

Scope

1. This Directive shall apply to all stages of:

(a) spent fuel management when the spent fuel results from civilian activities;

(b)radioactive waste management, from generation to disposal, when the radioactive waste results from civilian activities.

2. This Directive shall not apply to:

(a)waste from extractive industries which may be radioactive and which falls within the scope of Directive 2006/21/EC;

(b) authorised releases.

3. Article 4(4) of this Directive shall not apply to:

(a) repatriation of disused sealed sources to a supplier or manufacturer;

(b)shipment of spent fuel of research reactors to a country where research reactor fuels are supplied or manufactured, taking into account applicable international agreements;

(c)the waste and spent fuel of the existing Krško nuclear power plant, when it concerns shipments between Slovenia and Croatia.

4. This Directive shall not affect the right of a Member State or an undertaking in that Member State to return radioactive waste after processing to its country of origin where:

(a)the radioactive waste is to be shipped to that Member State or undertaking for processing;

or

(b)other material is to be shipped to that Member State or undertaking with the purpose of recovering the radioactive waste.

This Directive shall not affect the right of a Member State or an undertaking in that Member State to which spent fuel is to be shipped for treatment or reprocessing to return to its country of origin radioactive waste recovered from the treatment or reprocessing operation, or an agreed equivalent.

Article 3

Definitions

For the purpose of this Directive the following definitions shall apply:

(1)‘closure’ means the completion of all operations at some time after the emplacement of spent fuel or radioactive waste in a disposal facility, including the final engineering or other work required to bring the facility to a condition that will be safe in the long term;

(2)‘competent regulatory authority’ means an authority or a system of authorities designated in a Member State in the field of regulation of the safety of spent fuel or radioactive waste management as referred to in Article 6;

(3)‘disposal’ means the emplacement of spent fuel or radioactive waste in a facility without the intention of retrieval;

(4)‘disposal facility’ means any facility or installation the primary purpose of which is radioactive waste disposal;

(5)‘licence’ means any legal document granted under the jurisdiction of a Member State to carry out any activity related to the management of spent fuel or radioactive waste, or to confer responsibility for siting, design, construction, commissioning, operation, decommissioning or closure of a spent fuel management facility or of a radioactive waste management facility;

(6)‘licence holder’ means a legal or natural person having overall responsibility for any activity or facility related to the management of spent fuel or radioactive waste as specified in a licence;

(7)‘radioactive waste’ means radioactive material in gaseous, liquid or solid form for which no further use is foreseen or considered by the Member State or by a legal or natural person whose decision is accepted by the Member State, and which is regulated as radioactive waste by a competent regulatory authority under the legislative and regulatory framework of the Member State;

(8)‘radioactive waste management’ means all activities that relate to handling, pretreatment, treatment, conditioning, storage, or disposal of radioactive waste, excluding off-site transportation;

(9)‘radioactive waste management facility’ means any facility or installation the primary purpose of which is radioactive waste management;

(10)‘reprocessing’ means a process or operation, the purpose of which is to extract fissile and fertile materials from spent fuel for further use;

(11)‘spent fuel’ means nuclear fuel that has been irradiated in and permanently removed from a reactor core; spent fuel may either be considered as a usable resource that can be

reprocessed or be destined for disposal if regarded as radioactive waste;

(12)‘spent fuel management’ means all activities that relate to the handling, storage, reprocessing, or disposal of spent fuel, excluding off-site transportation;

(13)‘spent fuel management facility’ means any facility or installation the primary purpose of which is spent fuel management;

(14)‘storage’ means the holding of spent fuel or of radioactive waste in a facility with the intention of retrieval.

Article 4

General principles

1. Member States shall establish and maintain national policies on spent fuel and radioactive waste management. Without prejudice to Article 2(3), each Member State shall have ultimate responsibility for management of the spent fuel and radioactive waste generated in it.

2. Where radioactive waste or spent fuel is shipped for processing or reprocessing to a Member State or a third country, the ultimate responsibility for the safe and responsible disposal of those materials, including any waste as a by-product, shall remain with the Member State or third country from which the radioactive material was shipped.

3. 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.

4. Radioactive waste shall be disposed of in the Member State in which it was generated, unless at the time of shipment an agreement, taking into account the criteria established by the Commission in accordance with Article 16(2) of Directive 2006/117/Euratom, has entered into force between the Member State concerned and another Member State or a third country to use a disposal facility in one of them.

Prior to a shipment to a third country, the exporting Member State shall inform the Commission of the content of any such agreement and take reasonable measures to be assured that:

(a)the country of destination has concluded an agreement with the Community covering spent fuel and radioactive waste management or is a party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (‘the

Joint Convention');

(b)the country of destination has radioactive waste management and disposal programmes with objectives representing a high level of safety equivalent to those established by this Directive; and

(c)the disposal facility in the country of destination is authorised for the radioactive waste to be shipped, is operating prior to the shipment, and is managed in accordance with the requirements set down in the radioactive waste management and disposal programme of that country of destination.

CHAPTER 2
OBLIGATIONS

Article 5

National framework

1. Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for spent fuel and radioactive waste management that allocates responsibility and provides for coordination between relevant competent bodies. The national framework shall provide for all of the following:

(a)a national programme for the implementation of spent fuel and radioactive waste management policy;

(b)national arrangements for the safety of spent fuel and radioactive waste management. The determination of how those arrangements are to be adopted and through which instrument they are to be applied rests within the competence of the Member States;

(c)a system of licensing of spent fuel and radioactive waste management activities, facilities or both, including the prohibition of spent fuel or radioactive waste management activities, of the operation of a spent fuel or radioactive waste management facility without a licence or both and, if appropriate, prescribing conditions for further management of the activity, facility or both;

(d)a system of appropriate control, a management system, regulatory inspections, documentation and reporting obligations for radioactive waste and spent fuel management activities, facilities or both, including appropriate measures for the post-closure periods of disposal facilities;

(e)enforcement actions, including the suspension of activities and the modification, expiration or revocation of a licence together with requirements, if appropriate, for alternative solutions that lead to improved safety;

(f)the allocation of responsibility to the bodies involved in the different steps of spent fuel and radioactive waste management; in particular, the national framework shall give primary responsibility for the spent fuel and radioactive waste to their generators or, under specific circumstances, to a licence holder to whom this responsibility has been entrusted by competent bodies;

(g) national requirements for public information and participation;

(h)the financing scheme(s) for spent fuel and radioactive waste management in accordance with Article 9.

2. Member States shall ensure that the national framework is improved where appropriate, taking into account operating experience, insights gained from the decision-making process referred to in Article 4(3)(f), and the development of relevant technology and research.

Article 6

Competent regulatory authority

1. Each Member State shall establish and maintain a competent regulatory authority in the field of safety of spent fuel and radioactive waste management.

2. 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.

3. Member States shall ensure that the competent regulatory authority is given the legal powers and human and financial resources necessary to fulfil its obligations in connection with the national framework as described in Article 5(1)(b), (c), (d) and (e).

Article 7

Licence holders

1. Member States shall ensure that the prime responsibility for the safety of spent fuel and radioactive waste management facilities and/or activities rest with the licence holder. That responsibility can not be delegated.

2. Member States shall ensure that the national framework in place require licence holders, under the regulatory control of the competent regulatory authority, to regularly assess, verify and continuously improve, as far as is reasonably achievable, the safety of the radioactive waste and spent fuel management facility or activity in a systematic and verifiable manner. This shall be achieved through an appropriate safety assessment, other arguments and evidence.

3. As part of the licensing of a facility or activity the safety demonstration shall cover the development and operation of an activity and the development, operation and decommissioning of a facility or closure of a disposal facility as well as the post-closure phase of a disposal facility. The extent of the safety demonstration shall be commensurate with the complexity of the operation and the magnitude of the hazards associated with the radioactive waste and spent fuel, and the facility or activity. The licensing process shall contribute to safety in the facility or activity during normal operating conditions, anticipated operational occurrences and design basis accidents. It shall provide the required assurance of safety in the facility or activity. Measures shall be in place to prevent accidents and mitigate the consequences of accidents, including verification of physical barriers and the licence holder's administrative protection procedures that would have to fail before workers and the general public would be significantly affected by ionising radiation. That approach shall identify and reduce uncertainties.

4. Member States shall ensure that the national framework require licence holders to establish and implement integrated management systems, including quality assurance, which give due

priority for overall management of spent fuel and radioactive waste to safety and are regularly verified by the competent regulatory authority.

5. 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 as laid down in paragraphs 1 to 4.

Article 8

Expertise and skills

Member States shall ensure that the national framework require all parties to make arrangements for education and training for their staff, as well as research and development activities to cover the needs of the national programme for spent fuel and radioactive waste management in order to obtain, maintain and to further develop necessary expertise and skills.

Article 9

Financial resources

Member States shall ensure that the national framework require that adequate financial resources be available when needed for the implementation of national programmes referred to in Article 11, especially for the management of spent fuel and radioactive waste, taking due account of the responsibility of spent fuel and radioactive waste generators.

Article 10

Transparency

1. 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 inform the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, provided that this does not jeopardise other interests such as, inter alia, security, recognised in national legislation or international obligations.

2. Member States shall ensure that the public be given the necessary opportunities to participate effectively in the decision-making process regarding spent fuel and radioactive waste management in accordance with national legislation and international obligations.

Article 11

National programmes

1. Each Member State shall ensure the implementation of its national programme for the management of spent fuel and radioactive waste (‘national programme’), covering all types of spent fuel and radioactive waste under its jurisdiction and all stages of spent fuel and radioactive waste management from generation to disposal.

2. Each Member State shall regularly review and update its national programme, taking into account technical and scientific progress as appropriate as well as recommendations, lessons learned and good practices from peer reviews.

Article 12

Contents of national programmes

1. The national programmes shall set out how the Member States intend to implement their national policies referred to in Article 4 for the responsible and safe management of spent fuel and radioactive waste to secure the aims of this Directive, and shall include all of the following:

(a) the overall objectives of the Member State's national policy in respect of spent fuel and radioactive waste management;

(b) the significant milestones and clear timeframes for the achievement of those milestones in light of the over-arching objectives of the national programme;

(c) an inventory of all spent fuel and radioactive waste and estimates for future quantities, including those from decommissioning, clearly indicating the location and amount of the radioactive waste and spent fuel in accordance with appropriate classification of the radioactive waste;

(d) the concepts or plans and technical solutions for spent fuel and radioactive waste management from generation to disposal;

(e) the concepts or plans for the post-closure period of a disposal facility's lifetime, including the period during which appropriate controls are retained and the means to be employed to preserve knowledge of that facility in the longer term;

(f) the research, development and demonstration activities that are needed in order to implement solutions for the management of spent fuel and radioactive waste;

(g) the responsibility for the implementation of the national programme and the key performance indicators to monitor progress towards implementation;

(h) an assessment of the national programme costs and the underlying basis and hypotheses for that assessment, which must include a profile over time;

(i) the financing scheme(s) in force;

(j) a transparency policy or process as referred to in Article 10;

(k) if any, the agreement(s) concluded with a Member State or a third country on management of spent fuel or radioactive waste, including on the use of disposal facilities.

2. The national programme together with the national policy may be contained in a single document or in a number of documents.

Article 13

Notification

1. Member States shall notify to the Commission their national programmes and any subsequent significant changes.

2. Within 6 months of the date of notification, the Commission may request clarification and/or express its opinion on whether the content of the national programme is in accordance with Article 12.

3. Within 6 months of receiving the Commission's reaction Member States shall provide the requested clarification and/or inform the Commission of any revision of the national programmes.

4. The Commission, when deciding on the provision of Community financial or technical assistance for spent fuel and radioactive waste management facilities or activities, shall take into account the Member States' clarifications and progress regarding the national programmes.

Article 14

Reporting

1. 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.

2. 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.

3. Member States shall periodically, and at least every 10 years, arrange for self-assessments of their national framework, competent regulatory authority, national programme and its implementation, and invite international peer review of their national framework, competent regulatory authority and/or national programme with the aim of ensuring that high safety standards are achieved in the safe management of spent fuel and radioactive waste. The outcomes of any peer review shall be reported to the Commission and the other Member States, and may be made available to the public where there is no conflict with security and proprietary information.

CHAPTER 3
FINAL PROVISIONS

Article 15

Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 23 August 2013. They shall forthwith inform the Commission thereof.

When Member States adopt these measures, they shall contain a reference to this Directive or shall be accompanied by such reference on the occasion of their official publication. The methods of making such reference shall be laid down by Member States.

2. The obligations for transposition and implementation of provisions related to spent fuel of this Directive shall not apply to Cyprus, Denmark, Estonia, Ireland, Latvia, Luxembourg and Malta for as long as they decide not to develop any activity related to nuclear fuel.

3. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive and of any subsequent amendments to those provisions.

4. Member States shall for the first time notify to the Commission the content of their national programme covering all the items provided for in Article 12 as soon as possible, but not later than 23 August 2015.

Article 16

Entry into force

This Directive shall enter into force on the 20th day following its publication in the *Official Journal of the European Union*.

Article 17

Addressees

This Directive is addressed to the Member States.
Done at Brussels, 19 July 2011.

For the Council

The President

M. SAWICKI

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(1) Opinion of 4 May 2011 (not yet published in the Official Journal).

(2) Opinion of 23 June 2011 (not yet published in the Official Journal).

(3) OJ L 159, 29.6.1996, p. 1.

(4) C-187/87 (1988 ECR p.5013) and C-29/99 (2002 ECR p. I-11221).

(5) OJ L 371, 30.12.1987, p. 76.

(6) OJ L 357, 7.12.1989, p. 31.

(7) OJ L 346, 31.12.2003, p. 57.

(8) OJ L 102, 11.4.2006, p. 15.

(9) OJ L 337, 5.12.2006, p. 21.

(10) OJ L 338, 17.12.2008, p. 69.

(11) OJ L 172, 2.7.2009, p. 18.

(12) OJ L 156, 25.6.2003, p. 17.

(13) OJ L 197, 21.7.2001, p. 30.

(14) OJ L 330, 28.11.2006, p. 31.

(15) OJ L 195, 17.7.2007, p. 44.