A Step Closer to EU Law on the Management of Radioactive Waste and Spent Fuel

By Ana Stanič

On 3 November 2010, the European Commission (the 'Commission') proposed a Directive on the Management of Spent Fuel and Radioactive Waste. The proposed Directive builds on the standards contained in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management and the International Atomic Energy Agency (IAEA) 1995 Principles of Radioactive Waste Management. The Commission hopes that the Directive will be adopted sometime in 2011.

Euratom and all European Union (EU) Member States (except Malta, Portugal and Cyprus) are parties to the Joint Convention. The Joint Convention is an 'incentive' instrument containing no mechanism for enforcement or sanction in case of a breach of its terms. Unlike the Joint Convention, the proposed Directive seeks to impose binding and enforceable obligations in EU law concerning the management of radioactive waste and spent fuel. With the aim of contributing to the ongoing discussion concerning the scope and the terms of the Directive, this article discusses its key provisions as well as those of the Commission's previous proposals and the proposal of the European Nuclear Safety Regulators Group from March 2010. By way of background, the article outlines the existing EU law concering radioactive waste and spent fuel as well as the international framework for the management thereof.

Introduction

Around 89,000 cubic metres (m^3) of radioactive waste is produced annually in the EU.[1] According to the Commission's Staff Working Document of July 2010, 7,000 m^3 of high-level radioactive waste[2] had been accumulated in the EU by 2004.[3] Since it is estimated that it can take up to one million years for full radioactive decay to occur, the safe management of radioactive waste is the subject of much debate. At present in the EU most of the high-level radioactive waste is stored in interim surface and near-surface storage facilities which have a lifespan of 50–100 years.[4] Currently, there are no final repositories in the EU, or for that matter anywhere in the world. Deep geological disposal is planned to be operational in Finland by 2020, Sweden by 2023 and France by 2025, with Germany, the UK and Belgium possibly following by 2040.

The management of radioactive waste and spent fuel[5] is crucial for the future use of nuclear energy. In its Second Strategic Review in 2008, the Commission identified nuclear energy as a potentially important element in ensuring the EU's security of supply, as well as one of the options for meeting the EU's target for reducing greenhouse gas emissions by 20 per cent by 2020.[6] The Commission has maintained that the adoption of a uniform framework of rules concerning the mangement of radioactive waste and spent fuel throughout the EU is key to improving public confidence in the nuclear sector.

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1 Commission Staff Working Document Accompanying the Report from the Commission to the European Parliament and the Council, Sixth Situation Report Radioactive Waste and Spent Fuel Management in the European Union, COM, (2008)542 Final, SEC, (2008) 2416 final/2, 16 July 2010, at 8 (the 'Commission Staff Working Document').

2 Radioactive waste is material in gaseous, liquid or solid form for which no further use is foreseen by the countries of origin or destination, and which is controlled as radioactive waste by a regulatory body in the countries of origin and destination.

3 High-level waste is particularly hazardous as direct exposure, even for a short period of time, can be fatal. Details of the radioactive waste produced and stored in the Member States as of 2004 can be found in the annexes to the Commission Staff Working Document. See note 1 above. *Ibid.*

4 An important distinction is drawn between disposal and storage of radioactive waste and spent fuel. Disposal means the emplacement of spent fuel or radioactive waste in an authorised facility with no intention of retrieval, whereas storage refers to the holding of spent fuel radioactive waste in an authorised facility with the intention of retrieval.

5 Spent fuel is nuclear fuel that has been irradiated and permanently removed from a reactor core. Spent fuel may either be considered as a usable resource that can be reprocessed, or as radioactive waste destined for final disposal with no further use foreseen.

6 European Commission, *Second Strategic Review*, November 2008. See: http://ec.europa.eu/energy/ strategies/2008/2008_11_ser2_en.htm.

Over the last decade, the Commission has called for the adoption of a Community-wide approach to radioactive waste management. Back in 2003, the Commission put forward a package of three directives for discussion regarding: the safety in nuclear installations; the management of spent nuclear fuel and radioactive waste; and the supervision and control of shipments of spent fuel and radioactive waste. However, its proposal met with strong resistance from EU Member States (the MS) as many feared it would reduce the powers of national regulators in this strategically important industry. Moreover, at the time, there was little agreement among MS on geological disposal, which formed a key part of the Commission's proposal, as the appropriate disposal option. There was also no appetite among them for the imposition of a binding timetable for the adoption of national long-term management programmes.

After the amended version of the directive was rejected in 2004, the European Council (the 'Council') called for an extensive consultation with stakeholders before any instrument in this field would be developed in the framework of the Treaty establishing the European Atomic Energy Community (the 'Euratom Treaty').[7] Thereafter, very little progress was made on the adoption of binding EU law concerning radioactive waste and spent fuel. The first breakthrough was achieved in 2006 when the Council adopted Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel (the 'Shipment Directive').[8] This Directive revoked and replaced European Directive 92/3/Euratom on the transfer of radioactive waste within and outside the Community area.[9] Then 2009 saw the adoption by the Council of Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations (the 'Safety Directive').[10] With two out of the three directives proposed as part of the package in 2003 now adopted, the Council called on the Commission in November 2009 to recommence its work on a Community approach on the management of radioactive waste and spent fuel.

The draft terms of the Directive on the Management of Spent Fuel and Radioactive Waste (the 'Proposed Directive') were put forward for discussion on 3 November 2010 by Commissioner Günther Oettinger. With the aim of

7 Council conclusions on Nuclear Safety and Safe Management of Spent Fuel and Radioactive Waste, 10823/04, June 2004.

8 OJ L 337, 5 December 2006, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:337:0021:0032:EN:PDF.

9 OJ L 35, 12 December 1992, available at: http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=92&nu_doc=3.

10 OJ L 172/18, 2 July 2009, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri =CELEX:32009L0071:EN:NOT.

contributing to the ongoing discussion concerning the scope and the terms of the Proposed Directive, this article examines: the international framework for the management of radioactive waste and spent fuel; the key provisions of the Commissions' 2003 and 2004 proposals; the steps taken in recent years regarding the adoption of EU law on management of radioactive waste; and finally the key provisions of the Proposed Directive. By way of background, the current EU law on radioactive waste and spent fuel is outlined in the next section.

Background

Euratom's competences regarding spent fuel and radioactive waste arising from civil nuclear activities are set out in the Euratom Treaty.[11] Although Articles 2(b) and 30 of the Euratom Treaty provide respectively for uniform safety standards to protect the health of workers and of the general public and the establishment of basic standards within the Community to protect workers and the general public against the dangers arising from ionising radiations, there is no EU legislation ensuring the safe and sustainable management of spent fuel and radioactive waste from generation to disposal – at least until the Proposed Directive is adopted. Set out below is an outline of the current EU legislation concerning, or relevant to, the management of radioactive waste and spent fuel.

Article 37 of the Euratom Treaty

The key obligation imposed on MS concerning radioactive waste is to provide data to the Commission on their disposal plans. Specifically, Article 37 of the Euratom Treaty obliges an MS to provide the Commission with 'general data relating to any plan for the disposal of radioactive waste in whatever form 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'. Upon receipt of such data, the Commission is to deliver an opinion (within six months) on whether or not the plan is liable to result in cross-border contamination. The Commission's opinion is not legally binding on the MS. In other words, an MS is free to go ahead with its plans if it disagrees with the Commission's conclusions. 'The requirement, however, does mean that an adequate amount of time must be built into the process for seeking an authorisation to obtain the Commission's opinion before granting the authorisation'.[12]

11 The text of the Euratom Treaty is available at: http://eur-lex.europa.eu/en/treaties/dat/12006A/12006A.htm.

12 S Tromans, *Nuclear Energy* (Hart Publishing, 2010) 409.

Council Directive 96/29/Euratom of 13 May 1996

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[13] requires MS to ensure that the disposal of radioactive substances is reported and that such activity is only carried out by licensed persons.[14] It applies to all practices which involve a risk from ionising radiation emanating from an artificial source or from a natural radiation source in cases where natural radionuclides are or have been processed in view of their radioactive, fissile or fertile properties. It includes all activities relating to spent fuel and radioactive waste management. It also covers the authorised releases of materials that originate from such practices.

Shipment Directive

Although strictly speaking the Shipment Directive[15] adopted in 2006 does not address the management of radioactive waste, it does set out a compulsory and common system for the notification and prior authorisation of shipments of radioactive waste and obliges states to adopt a standard control document.

Safety Directive

The Safety Directive[16] adopted in 2009 established a Community framework for nuclear safety of nuclear installations which covers spent fuel storage facilities and other storage facilities for radioactive waste which are located on the same site as, and which are directly related to, nuclear installations. As such, it does not cover all types of facilities or aspects of the management of radioactive waste and spent fuel. In particular, facilities such as treatment, encapsulation and disposal facilities remain outside the scope of its application.

Commission's Recommendations

In the absence of specific legislation covering all activities and facilities related to the management of spent fuel and radioactive waste and with the aim of harmonising the practice and regulation in the field of radioactive

13 OJ L 159, 29 June 1996, P 0001-0114: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0029:EN:HTML.

14 M Roggenkamp, C Redgwell, A Rønne, del Guayo (eds), *Energy Law in Europe* (OUP 2007), paragraph 16.210.

15 See note 8 above.

16 See note 10 above.

waste and spent fuel management across the EU, the Commission adopted a number of recommendations in 1999. First, the Commission's Recommendation 1999/829/Euratom recommended, inter alia:

- that the term 'the disposal of radioactive waste' as used in Article 37 of the Euratom Treaty cover any planned disposal or accidental release of a radioactive substance in solid, liquid or gaseous form with respect to 14 listed operations;
- defines the scope of the data to be submitted by MS under Article 37 and recommends that such data be submitted wherever possible once a year, and not less than six months before the plan is authorised by the competent national authority; and
- proposes a form (set out in Annex 4 of the Recommendation) that MS are to use when submitting data in case of a modification of a plan for the disposal of radioactive waste in respect to which the Commission had previously given an opinion.[17]

Secondly, the Commission's Recommendation 1999/669/EC proposed a common EU classification system for solid radioactive waste whereby radioactive waste is classified for the purposes of information management into three types: transition radioactive waste; low and intermediate level waste (further subdivided into short-lived waste and long-lived waste); and high-level waste. Although the recommended classification system was based on the 1994 IAEA classification, it contained 'some changes to take into account the views and practical experiences of European national experts'.[18]

Other relevant Euratom legal instruments

Other Euratom legal instruments relevant to the management of spent fuel and radioactive waste are: the Council Decision on the Community arrangements for the early exchange of information in the event of a radiological emergency;[19] the Council Directive on the control of high-activity sealed radioactive sources and

17 Commission Recommendation of 6 December 1999 on the Application of Article 37 of the Euratom Treaty, 1999/829/EC, Euratom, available at: http://ec.europa.eu/energy/nuclear/radioprotection/ doc/legislation/99829_en.pdf.

18 Commission Recommendation of September 1999 on a classification system for solid radioactive waste, 1999/669/EC, Euratom, L 265/37, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do ?uri=OJ:L:1999:265:0037:0045:EN:PDF.

19 Council Decision on the Community arrangements for the early exchange of information in the event of a radiological emergency (87/600/Euratom), OJ L 371, 30 December 1987, 76 available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31987D0600:EN:HTML.

orphan sources, including disused sources;[20] and the Commission Recommendation on the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste. The latter proposed measures to ensure that adequate financial resources are available at the scheduled time for all decommissioning activities of nuclear installations, including the management of spent fuel and radioactive waste as part of those activities.[21]

Other EU legislation

In addition to legislation adopted under the Euratom Treaty, there is also European Community legislation which is relevant to radioactive waste. Council Directive 85/337 on the assessment of the effects of certain public and private projects on the environment,[22] as amended by Directive 97/11/EC, Directive 2003/35/EC and Directive 2009/31/EC (the 'EIA Directive') provides that the construction of:

- nuclear power stations and other nuclear reactors as well as the decommissioning thereof;
- installations designed for the processing of high-level radioactive waste and irradiated nuclear fuel;
- installations for the final disposal of radioactive waste or irradiated nuclear fuel; and
- installations of storage planned for more than ten years of radioactive waste or irradiated nuclear fuel on a site other than the production site

must be subject to prior environmental impact assessment. In addition, the construction of installations for the processing and storage of other radioactive waste *may* need to be subject to such prior assessment.[23]

The EIA Directive also imposes obligations on MS to inform and consult the public prior to the approval of such projects as well as to inform and consult other MS in which such projects are likely to have significant effects on the environment. Similar obligations are imposed on MS in respect of any

20 Council Directive on the control of high-activity sealed radioactive sources and orphan sources, including disused sources (2003/122/Euratom) OJ L 346, 31 December 2003, 57, available at: http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=2003&nu_doc=122.

21 Commission Recommendation of 24 October 2006 on the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste (2006/851/Euratom) OJ L 330, 28 November 2006, 31, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:330:0031:0035:EN:PDF.

22 OJ L 175, 5 July 1985, 40, available at: http://ec.europa.eu/environment/eia/full-legal-text/85337.htm.

23 I A Kacem, 'Safety of Nuclear Installations, Spent Nuclear Fuel and Radioactive Waste Management in the European Union: A Legal Analysis', (2004) European Environmental Law Review 109 at 114.

projects or programmes to be adopted by MS concerning the construction of nuclear power stations or installation for the collection and processing of radioactive waste pursuant to Council 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.[24] Further obligations regarding the right of the public to environmental information, which includes information concerning radioactive waste, and public participation in respect of drawing up plans relating to the environment, which extends to nuclear power stations and above-mentioned installations, are set out in Directive 2003/4/EC[25] and Directive 2003/35/EC[26] respectively.

It should, however, be noted that none of these directives sets out specific rules concerning the management of radioactive waste although arguably the issue of the safe management of radioactive waste will need to be considered as part of the environmental impact assessment when determining the effects of a project, programme or plan on the environment.

International framework concerning the management of radioactive waste and spent fuel

The key international rules and guidelines concerning the management of radioactive waste consist of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the 'Joint Convention') and the safety principles, requirements and guidelines developed by the IAEA.

Joint Convention

The Joint Convention is the only multilateral international agreement concerning the safety of the management of radioactive waste and spent fuel.[27] It entered into force on 18 June 2001.[28] As of 9 August 2010, 56

24 OJ L 197, 21 July 2001, 30, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32001L0042:EN:HTML.

25 Directive of the European Parliament and of the Council of 28 January 2003 on public access to environmental information, OJ L 41, 14 February 2003, at 26, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:041:0026:0032:EN:PDF.

26 Directive 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, OJ L 156, 25 June 2003, at 17, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0035:EN:HTML.

27 The text of the Joint Convention is available at: www.iaea.org/Publications/Documents/ Infcircs/1997/infcirc546.pdf.

28 A detailed account of the origins of the Joint Convention and the negotiations of its terms is given in A Kageneck and C Pinel, 'The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management', (1998) 47 ICLQ 409.

countries were parties to the Joint Convention. Euratom and all EU States, except Malta, Portugal and Cyprus, are parties to the Joint Convention. The key provisions of the Joint Convention are discussed below.

Scope of the Joint Convention

The Joint Convention applies to radioactive waste and spent fuel resulting from civilian nuclear reactors and civilian applications. It also applies to spent fuel and radioactive waste from military or defence programmes, when such materials are transferred permanently to, and managed within, exclusively civilian programmes or declared as spent fuel or radioactive waste for the purpose of the Convention by a state party to the Convention. The Joint Convention also applies to planned and controlled releases into the environment of liquid or gaseous radioactive materials from regulated nuclear facilities.[29]

During the negotiations of the terms of the Joint Convention, there was much discussion as to whether spent fuel should be subject to the same rules of management as radioactive waste. There was fear among the states that treating the materials on the same basis would restrict a state's choice with regard to its fuel cycle policy. This was of particular concern, as some states considered spent fuel as a valuable source of energy after it was reprocessed while other states considered it as waste. To address these concerns, separate standalone provisions concerning the safe management of spent fuel and the safe management of radioactive waste were adopted. The difference in the rules governing the management of spent fuel and radioactive waste are highlighted in the discussion below.[30]

Objectives of the Joint Convention

The objectives of the Joint Convention are set out in Article 1 as: '(i) to achieve and maintain a high level of safety worldwide in spent fuel and radioactive waste management, through the enhancement of national measures and international co-operation, including where appropriate, safety-related technical co-operation; (ii) to ensure that during all stages of spent fuel and radioactive waste management there are effective defenses against potential hazards so that individuals, society and the environment are protected from harmful effects of ionising radiation, now and in the future, in such a way that the needs and aspirations of the present generation are met without compromising the ability of future generations to meet their needs

29 For further details, see Article 3 of the Joint Convention.

30 See note 28 above at 410.

and aspirations; (iii) to prevent accidents with radiological consequences and to mitigate their consequences should they occur during any stage of spent fuel or radioactive waste management.'

GENERAL SAFETY OBLIGATIONS

The Joint Convention imposes general safety obligations on Contracting States both in respect of spent fuel and waste management. Specifically, it requires in Article 4 that they take 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.' Mirror obligations are prescribed in respect of radioactive waste in Article 11.

OBLIGATIONS IN RESPECT OF EXISTING AND PROPOSED FACILITIES

More detailed obligations in respect of existing and proposed spent fuel facilities are set out in Articles 5 and 6. Specifically, Contracting States are required to take appropriate steps to review the safety of existing facilities and, if necessary, they must ensure that improvements are adopted to upgrade the safety. Contracting States are required to establish and implement procedure in respect of proposed new facilities in order '(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'. Moreover, they are obliged

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'. Substantively similar obligations are imposed in respect of radioactive waste facilities under Articles 12 and 13.

Obligations in respect of the design and construction of facilities

Article 7 requires Contracting States 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.' Mirror obligations are imposed on states in respect of radioactive waste under Article 14.

Obligations concerning the assessment of safety of facilities

Contracting States are required under Article 8 to 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).' Mirror obligations are imposed on Contracting States in respect of radioactive waste under Article 15.

Obligations concerning the operation of facilities

Pursuant to Article 9, Contracting States must take 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; and (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.

With respect to radioactive waste, Contracting States are required under Article 16, in addition to the above-listed obligations, to ensure that: (i) the procedures for characterisation and segregation of radioactive waste are applied; and (ii) the 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.

OBLIGATIONS CONCERNING DISPOSAL OF SPENT FUEL

Articles 10 and 17 oblige Contracting States to take the appropriate steps to ensure that after closure of a disposal facility: '(i) records of the location, design and inventory of that facility required by the regulatory body are preserved; (ii) active or passive institutional controls such as monitoring or access restrictions are carried out, if required; and (iii) if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is detected, intervention measures are implemented, if necessary.'

FRAMEWORK FOR SAFETY OF MANAGEMENT

Pursuant to Article 19, Contracting States are required to establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management which, inter alia, sets out the applicable national safety requirements and regulations for radiation safety, introduces a system of licensing of spent fuel and radioactive waste management activities; provides for a system of institutional control, regulatory inspection, documentation and reporting as well as enforcement; and clearly allocates responsibilities of the bodies involved in the different steps.

ROLE OF REGULATORY BODIES

Article 20 requires Contracting States to designate a regulatory body

entrusted with the implementation of the legislative and regulatory framework referred to in Article 19 and to ensure it has adequate authority, competence and financial and human resources to fulfil assigned responsibilities. Where the organisation entrusted with the implementation of the legislative and regulatory framework is also involved in the management of radioactive waste and spent fuel, Contracting States are required to ensure 'effective independence' of such organisation's regulatory functions from those of waste management. In other words, the same legal entity is permitted to undertake both functions provided 'effective independence' is ensured. What is meant by 'effective independence' is not defined in the Joint Convention.

Licence holder's primary responsibility for safety of management

Article 21 emphasises that the primary responsibility for the safety of spent fuel and radioactive waste management rests with the licence holder.

Obligations of Contracting States concerning transboundary movement

Pursuant to Article 27, Contracting States are required to ensure that, inter alia: (i) transboundary movement of radioactive waste and spent fuel is authorised and only takes place with prior notification and consent of the state of destination; (ii) the state of destination has administrative and technical capacity as well as the regulatory structure to manage the radioactive waste and spent fuel; and (iii) radioactive waste and spent fuel will not be shipped for the purposes of storage and disposal to any country which is south of latitude of 60 degrees south.

Other obligations of Contracting States

Articles 22, 23, 24, 25 and 26 respectively require Contracting States to ensure: (i) adequate human and financial resources to ensure safety of facilities; (ii) quality assurances concerning waste management are established and implemented; (iii) that during the operating lifetime of facilities, the radiation exposure is kept as low as reasonably achievable, economic and social factors are taken into account and that no individual is exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation; (iv) the existence of on-site and, if necessary, off-site emergency plans for facilities and the testing thereof, at an appropriate frequency; and (vi) the safety of decommissioning of nuclear facilities.

REPORTING OBLIGATIONS OF CONTRACTING STATES

Pursuant to Article 32, Contracting States are required to submit a national report at each review meeting (which is held every three years) addressing the measures taken to implement the obligations set out in the Joint Convention. Specifically, Article 32 provides that the report must also address a state's: (i) spent fuel management policy and management practices; (ii) radioactive waste management policy and management practices; and (iii) criteria used to define and categorise radioactive waste. A state is also required to include: (i) lists of the spent fuel and radioactive waste management facilities to which the Joint Convention pertains, together with information concerning their location, main purpose and essential features; (ii) an inventory of spent fuel covered by the Joint Convention that is being held in storage or which has been disposed of; (iii) an inventory of radioactive waste that is subject to the Joint 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; and (v) a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.

In its role as the Secretariat for the Review Meetings, the IAEA has adopted Rules for the Conduct of the Review Meetings, Guidelines regarding the Review Process, and Guidelines regarding the Form and Structure of National Reports.[31] Attendance at review meetings is compulsory as per Article 33. The Guidelines on the Review Process provide for the review of national reports in country groups and each country is assigned to a country group. The reports must be distributed at least seven months before the review to all states parties to the Joint Convention and invited observers.

RESOLUTION OF DISAGREEMENTS

There is no compulsory mechanism for the resolution of any disputes concerning the interpretation or breach of the terms of the Joint Convention. Article 37 provides that 'in case of a disagreement parties shall first consult' within the framework of the review meetings and should the disagreement remain unresolved, the parties can resort to mediation, conciliation or arbitration.

There is therefore no mechanism for ensuring that states comply with the terms of the Joint Convention. 'The Joint Convention relies on the common interest of all Contracting Parties to achieve its objectives. It is designed to obtain compliance bona fide through voluntary cooperation and "peer pressure" rather than by means of control and sanction.'[32]

31 IAEA's latest standards, codes and guidelines can be found on the IAEA's website, see: www-pub.iaea.org/MTCD/publications/ResultsPageSSS.asp?p=2.

32 Commission Staff Working Document, see note 1 above, at 43.

IAEA's principles, standards and guidelines

The IAEA has played a crucial role in the development of the international legal framework for the management of radioactive waste and spent fuel. Over the years, it has adopted advisory international standards, codes and guidelines. The IAEA must apply these in its own operations and these are binding on states in relation to IAEA-assisted operations. However, as non-mandatory recommendations, these standards, codes and guidelines are not otherwise binding on states.

In 1995, the IAEA adopted the Principles of Radioactive Waste Management[33] (the 'IAEA Principles') in order to 'provide a common basis for the development of more detailed IAEA Safety Standards, Safety Guides and Safety Practices and a basis for national radioactive waste management programme'. The nine principles set out in the IAEA Principles require radioactive waste to be managed:

- 'to secure an acceptable level of protection for human health';
- 'to provide an acceptable level of protection of the environment';
- 'to assure that possible effects on human health and the environment beyond national borders will be taken into account';
- 'in a way that predicted impacts on the health of future generations will not be greater than relevant levels of impact that are acceptable today';
- 'in a way that will not impose undue burdens on future generations';
- 'within an appropriate national legal framework including clear allocation of responsibilities and provision for independent regulatory functions';
- to keep the generation of radioactive waste to the 'minimum practicable';
- so that 'the interdependencies among all steps in radioactive waste generation and management are appropriately taken into account'; and
- so that 'the safety of facilities for radioactive waste management shall be appropriately assured during their lifetime'.

These principles underlie the general safety requirements subsequently adopted in the Joint Convention as discussed above.

Over the years, the IAEA has adopted a number of safety standards and safety requirements concerning radioactive waste management.[34]

33 The text of the IAEA's Principles of Radioactive Waste Management is available at: www-pub.iaea.org/MTCD/publications/PDF/Pub989e_scr.pdf. In 2006 the IAEA updated its entire corpus of standards and published the Fundamental Safety Principles which incorporates the IAEA Principles. Fundamental Safety Principles, Safety Fundamentals No SF-1, IAEA, Vienna, 2006, available at: www-pub.iaea.org/MTCD/publications/PDF/Pub1273_web.pdf.

34 Including, for example, Predisposal Management of Radioactive Waste, General Safety Requirements Part 5, No GSR Part 5, IAEA, Vienna, 2009; and Geological Disposal of Radioactive Waste, Safety Requirements, No W-SR- 4, 2006.

Most recently and importantly, the IAEA issued a new Safety Guide on the Classification of Radioactive Waste.[35] Having taken the view that the 'classification scheme developed previously is not completely comprehensive in that it does not cover all types of radioactive waste, nor does it provide a direct linkage with disposal options for all types of radioactive waste',[36] it revised the classification of radioactive waste. It replaced the three classes of radioactive waste (exempt waste, low and intermediate level waste (which was further sub-divided into short-lived and long-lived waste), and high-level waste) under its 2004 Safety Guide on the Classification of Radioactive Waste, with six classes:

- exempt waste (EW);
- very short-lived waste (VSLW);
- very low-level waste (VLLW);
- low-level waste (LLW);
- intermediate level waste (ILW); and
- high-level waste (HLW).

Conclusion

The international framework of rules, principles and safety standards has resulted in a significant harmonisation of national rules on the management of radioactive waste and spent fuel as most of the Contracting States have voluntarily adopted the IAEA safety standards and requirements in their national legal frameworks. Moreover, these standards and requirements are binding for the IAEA's own activities and a Contracting State's activities in operations assisted by the IAEA.

However, neither the Joint Convention nor the IAEA guides, standards and principles provide for any sanctions for non-compliance and contain no mechanism for enforcement. Therefore, they 'do not guarantee a consistent and coherent approach to safety at the EU level'.[37] In addition, the Joint Convention does not set out detailed requirements as to the elements of the national programmes for long-term management of radioactive waste, nor does it address the need for ensuring transparency and public involvement in decision-making relating to radioactive waste management which the Commission considers essential for improving public confidence in the nuclear

35 IAEA, *Classification of Radioactive Waste General Safety Guide*, IAEA Safety Standards Series No GSG-1, 20 January 2010, available at: www-pub.iaea.org/MTCD/publications/PDF/Pub1419_web.pdf.

36 *Ibid*, at paragraph 1.6 at 2.

37 See note 1 above, at 26.

energy sector.[38] For these reasons, the Commission has repeatedly called for a Community framework for the management of radioactive waste which addresses these shortcomings and, in particular, ensures its enforceability both before the European Court of Justice and national courts of MS.

Key provisions of the Commission's 2003 Proposal

Back in 2003, the Commission proposed a Directive (the '2003 Proposal') on the safe management of radioactive waste.[39] The 2003 Proposal covered all stages of the management of spent nuclear fuel and radioactive waste originating from civilian applications only, be it from the production of nuclear energy or from the use of radionuclides in medicine, research and industry.[40] The key provisions of the 2003 Proposal are discussed in turn.

Purpose of the 2003 Proposal

Article 1 states that the purpose of the 2003 Proposal was '(a) to ensure that all spent nuclear fuel and radioactive waste is safely managed in order to protect the health of workers and of the general public from harmful effects of ionising radiation, both now and in the future; (b) to achieve and maintain a high level of safety in the management of spent nuclear fuel and radioactive waste in order to protect the health of workers and of the general public by taking all necessary precautionary and preventive measures throughout the Community in an effective manner; (c) to enhance effective public information and, where appropriate, consultation in order to ensure the required transparency in the relevant decision-making processes'. As such, its aim was to provide a Community-wide framework along the lines of that adopted under the Joint Convention.

Scope of the 2003 Proposal

The 2003 Proposal applied to both spent nuclear fuel and radioactive waste. In line with the Joint Convention, 'radioactive waste' was defined

38 Commission Staff Working Document Accompanying Document to the revised proposal for a Council Directive (Euratom) on the Management of Spent Fuel and Radioactive Waste, Impact Assessment, COM, (2010) 618 SEC(2010) 1290, 3 November 2010, at 16.

39 Proposal for a Council Directive (Euratom) on the management of spent nuclear fuel and radioactive waste, 30 January 2003, see: www.eu-energy.com/nuke-dir-2003.pdf.

40 As the European Court of Justice made clear in Case C-61/03, *Commission v UK* supported by France [2005] ECR –I 2477, the Euratom Treaty is not applicable to radioactive waste arising from military programmes.

as any material that emits ionising radiation which is in solid, liquid or gaseous form for which no further use is foreseen and does not cover any waste 'from extractive operations that contains only naturally occurring radioactive materials' or 'small quantities of radioactive materials such as sealed radioactive sources unless declared as radioactive waste by a Member State'. Recognising that MS have different policies regarding spent fuel,[41] with some regarding it as waste and others as a source of valuable quantities of fissile and fertile material, not all spent fuel was defined as 'waste' in the 2003 Proposal. However, adopting the same approach as the Joint Convention, the 2003 Proposal made clear that both spent fuel and radioactive waste must be subject to the same level of regulation and control.

General obligations imposed on MS regarding radioactive waste management

Article 3 imposed the following obligations on MS:

- to take all necessary measures to ensure that spent nuclear fuel and radioactive waste are managed in such a way that individuals, society and the environment are protected against radiological hazards;
- to ensure that the production of radioactive waste is kept to the minimum level practicable;
- to take all the necessary legislative, regulatory and administrative measures and other steps required to ensure the safe management of spent nuclear fuel and radioactive waste;
- to establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework;
- to guarantee adequate financial resources to support the management of spent nuclear fuel while respecting the 'polluter pays' principle; and
- to ensure effective public information and facilitate public participation in order to achieve a high level of transparency.

Programme for management of radioactive waste and spent fuel

An MS' obligations regarding safe management were detailed in Article 4. Concerned by the lack of progress among MS in tackling the issue of final disposal of high-level and long-lived radioactive waste, the Commission proposed a tight timetable for the long-term management of radioactive waste. MS were required to identify sites for disposal by 2008, authorise the operation of surface storage sites for short-lived low-level radioactive waste

41 Spent fuel is defined in Article 2 as 'nuclear fuel that has been irradiated in and permanently removed from a reactor core'.

by 2013 and authorise the operation of geological repositories by 2018. An annex setting out the important stages and milestones in the development of new disposal facilities was attached to the 2003 Proposal. Recognising that some MS had very limited accumulations of radioactive waste and that export thereof may represent the most viable option for the management of such waste from an environmental, safety and economic point of view, Article 4(6) permitted MS to ship radioactive waste to other MS or third countries, provided EU and international law was complied with.

However, as the Commission acknowledged in the explanatory memorandum to the 2004 Amended Proposal, MS were 'deeply hostile' to the Commission's timetable concept for final disposal[42] even though the dates set in the timetable could be modified by the Council at the proposal by the Commission.[43] This was one of the key reasons why the 2003 Proposal was rejected by the MS.

Research and technological development in radioactive waste management

Pursuant to Article 5(2), the Commission accorded itself the power to 'identify common areas of research and technological development' in respect of radioactive waste management 'that could be co-ordinated at the Community level'. It envisaged that joint undertakings could carry out research in the areas of common interest.

This Article also proved unacceptable to MS. In its explanatory memorandum to the 2004 Proposal, the Commission referred to the fact that 'certain MS are hostile to the mentioning of th[e] possibility' of creating joint undertakings even though these are referred to in the Euratom Treaty.[44] MS saw this as another attempt by the Commission to enlarge its powers in respect of the nationally sensitive and strategically important nuclear industry.

Investments

Without using the term investment in Article 6, the Commission's approval of investments in the nuclear industry under Chapter II of the Euratom Treaty was linked to the 'progress made by Member States towards meeting' the timetable set out in Article 4.

42 Amended proposal for a Council Directive (Euratom) on the safe management of the spent nuclear fuel and radioactive waste, COM/2004/526 final - CNS 2003/0022, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52004PC0526(02):EN:HTML; see paragraph 2.2 of the Explanatory Memorandum to the 2004 Amended Proposal.

43 See paragraph 3 of Article 4 of the 2003 Proposal.

44 See note 42 above.

Reporting obligations

Importantly, Article 7 envisaged the establishment of a uniform reporting structure for radioactive waste management at the EU level along the lines set out in the Joint Convention. MS were to report every three years to the Commission on the status of the management of radioactive waste and spent fuel under their jurisdiction and the progress made in implementing the 2003 Proposal. MS were also to report on all research and technological development in the field of radioactive waste and spent fuel management being carried out, or planned within the MS, including information as to the costs, sources of financing and expected duration and dates of completion thereof.

In place of the peer review mechanism of the Joint Convention, an MS' obligation to report under the 2003 Proposal was to be enforceable under Community law both by the Commission and other MS pursuant to Articles 141 and 142 of the Euratom Treaty.

Key Provisions of the 2004 Amended Proposal

With the 2003 Proposal rejected for the reasons discussed above, the Commission submitted an Amended Proposal for a Directive of Safe Management of Spent Nuclear Fuel and Radioactive Waste in September 2004 (the '2004 Amended Proposal'). [45] The following are the key amendments to the 2003 Directive proposed therein.

Independence of national regulatory bodies

In line with Article 20 of the Joint Convention, a paragraph was inserted in Article 3 requiring national regulatory bodies for radioactive waste and spent fuel management to be 'effectively separated' from all organisations (whether private or public) involved in the management of spent fuel or radioactive waste, thereby guaranteeing their independence.

Transparency and consultation

At the insistence of the European Parliament and recognising that the issue of the disposal of radioactive waste and spent fuel is a key concern to EU citizens, the 2004 Amended Proposal imposed obligations on the MS to ensure a high level of transparency regarding issues relating to management

45 See note 42 above.

thereof including, where appropriate, consultation with their local public as well as competent authorities of neighbouring states plus research and development into the management of the disposal.

Programme for the management of radioactive waste

Article 4 of the 2003 Proposal was entirely amended. In place of a uniform Community-wide programme, MS were required to draw up their own clearly defined national programme. The strict timetable for the identification, licensing of development and operation of disposal sites was abandoned given the deep hostility of MS. Furthermore, MS were only required to 'study the possibility of giv[ing] priority to the solution of deep geological disposal, taking due account of their specific circumstances'.

Reporting obligations

The 2004 Amended Proposal suggested that a Committee of Experts be established to review the national reports submitted by MS to the Commission. This Committee, made up of experts designated by MS, was to review and give an opinion on such reports and to provide recommendations. Although not obliged to follow the Committee's opinion, an MS was to make observations on such opinion and present measures which it had taken, or intended to take, in response to the Committee's opinion within six months of receipt of such opinion.

Steps to restart discussions regarding the adoption of EU law on radioactive waste management

After the 2004 Amended Proposal was rejected, the European Council called for an 'extensive consultation' with stakeholders before any EU legislation on the management of radioactive waste would be proposed.[46] Since then, discussions have taken place within different initiatives at the EU level including within the Council Working Group on Nuclear Safety, the European Nuclear Safety Regulators Group (ENSREG), which was created in 2007, the European Nuclear Energy Forum and the Sustainable Nuclear Energy Technology Platform.

46 Council conclusions on Nuclear Safety and Safe Management of Spent Fuel and Radioactive Waste, 10823/04, June 2004.

Study concerning radioactive waste and spent fuel data collection

At the end of 2007, the Commission commissioned a study to identify best practices and recommend measures at both national and EU levels for the safe management of radioactive waste and spent fuel. The study, published in September 2009, provides an overview of the radioactive waste data collection, reporting and record-keeping in the EU MS.[47] The following are the key findings and recommendations of the study.

LEGAL BASIS FOR DATA COLLECTION

The study made the following observations. First, that there is a legal basis for data collection on radioactive waste in all states from which information was received (Cyprus, Ireland, Malta, Poland, Portugal and Turkey had not provided information). Secondly, the task of data collection has generally been entrusted to a governmental body or to the national waste management organisation. Thirdly, however, data collection is organised in different ways, depending to a large extent on the size of the nuclear programme of each MS and on its internal structure. Fourthly, the parameters for data collection differed in the states under review, with only some of them prescribing the form of the data and the length of time for the preservation of data. Fifthly, the level of detail of the data kept in the national database varies between MS. Finally, requirements concerning collection and preservation of data concerning spent fuel existed only in countries where spent fuel is designated as waste.

Despite these differences, the study concluded that the information in the national inventories is sufficient for the purposes of the national authorities and policy-makers.

NATIONAL INVENTORIES

The study noted that Finland, France, Germany, Hungary, Italy, the Netherlands, Lithuania, Romania, Slovenia and Spain all had national inventories for radioactive waste and spent fuel, while Austria, Belgium, Bulgaria, Croatia, the Czech Republic, Greece, Latvia, Macedonia, Slovakia and the United Kingdom only had national inventories for radioactive waste.

Except for Belgium, Bulgaria, Greece and Slovakia, the study revealed that all countries use computerised centralised databases for the national

47 Brenk Systemplanung, *Radioactive Waste and Spent Fuel Data Collection and Reporting, Record Keeping and Knowledge Transfer in the EU, Final Report*, 16 September 2009. See: http://ec.europa.eu/energy/nuclear/studies/doc/2009_09_radiactive_waste.pdf. Croatia and Turkey were included in the study as candidate countries.

radioactive waste and spent fuel inventory. However, the institutions and bodies which had access to these databases, as well as the method data entry, varied considerably between states under review. The study found that long-term data keeping and preservation against data loss is not carried out uniformly throughout the EU.

Categories of radioactive waste

The study noted that each MS had its own categorisation of radioactive waste. The study argued that this approach did not pose a problem as long as MS managed such waste on its territory. If, however, radioactive waste was to be managed on an international level, for example on the basis of regional repositories, the study concluded that the harmonisation of radioactive waste categories across the EU would be necessary.

Role of the Commission in the management of radioactive waste

The study sought the views of MS as to the role the Commission should play in the field of data collection, reporting, storage and management of radioactive waste and spent fuel. The majority of MS said that the Commission should play an important role in facilitating know-how exchange, and in recommending rules and a regulatory/legislative framework concerning radioactive waste management. However, they did not favour the Commission taking an active role in regulating radioactive waste and spent fuel management.

The study concluded that there was no necessity for immediate action by the Commission with respect to the availability of national inventories and their implementation since appropriate structures were already in place in MS and MS were capable of compiling a national inventory. It further concluded that there was no necessity for the Commission and issue of recommendations or guidelines on radioactive waste categories or harmonisation of radioactive waste data as there was no necessity for information across the EU.

Recommendations

In view of the above, the study recommended, inter alia, that the Commission:

- consider issuing guidance on minimum requirements for spent fuel data, as the actual implementation of data collection for spent fuel differed among MS to a larger extent than for radioactive waste;
- consider issuing guidance on the responsibilities and lines of reporting, as there seemed to be room for improvement in certain MS; and
- consider providing a data archive for MS as a means for backing up their

national databases for radioactive waste and/or spent fuel.

Calls to restart discussions

Armed with the results of the Eurobarometer Survey of 2008, which showed that European citizens strongly supported the EU having an active role in monitoring and harmonising waste management,[48] the Commission called in its Sixth Situation Report to the European Parliament and Council on Radioactive Waste and Spent Fuel Management in the European Union for discussions to be restarted on the adoption of EU-wide legislation on radioactive waste and spent fuel management.[49] Recognising that the responsibility for radioactive waste and spent fuel management rests with MS, it emphasised that EU legislation was needed to harmonise the standards of the management thereof. It noted that scientific and technical research relating to the geological disposal of radioactive waste management had now reached maturity and that the postponement of decisions concerning the definitive solution was no longer acceptable because of the potential consequences on health and safety. Abandoning the position taken in the 2003 Proposal, the Commission further noted that the disposal of radioactive waste in non-EU states should not be encouraged for technical, economical as well as safety and security reasons.

Following the Council's call in late 2009 to recommence work on the establishment of a Community framework on radioactive waste,[50] the Commission announced on 8 March 2010 that it would submit draft terms of the Proposed Directive for discussion before the end of the year.[51]

Key provisions of the ENSREG'S Proposal

In order to assist the Commission in drafting the Proposed Directive, the Working Group on Waste Management of the ENSREG presented its suggestion for the content of a Directive on Sustainable Management of Radioactive Waste

48 Eurobarometer, Special Report, June 2008, available at: http://ec.europa.eu/public_opinion/archives/ebs/ebs_297_en.pdf, at 45.

49 *Report from the Commission to the European Parliament and the Council – Sixth situation report on radioactive waste and spent fuel management* in the European Union SEC(2008)2416/* COM/2008/0542 final, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008DC0542:EN:HTML.

50 Conclusions of 10 November 2009 on the Report by the ENSREG, 14471/09 ATO 107.

51 J Rankin, '*Barroso wants EU-wide law for radioactive waste*', Europeanvoice.com, available at: www.europeanvoice.com/article/2010/03/barroso-wants-eu-wide-law-for-radioactive-waste/67353.aspx.

and Spent Fuel (the 'ENSREG Proposal') in March 2010.[52] The 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 to advise and assist the Commission in progressively developing a common understanding and eventually additional European rules regarding, inter alia, the safety of the management of spent fuel and radioactive waste.[53] The following are the key provisions of the ENSREG Proposal.

Objectives of the Directive

Article 1 of the ENSREG Proposal provides that the objectives of the Directive are to:

- establish a Community framework to ensure the long-term management of radioactive waste and spent fuel;
- ensure a high level of safety in spent fuel management and radioactive waste management, protecting workers and the general public against the dangers arising from ionising radiations at all stages of management of radioactive waste and spent fuel; and
- maintain and promote public participation and information with regard to radioactive waste and spent fuel management policies.

Scope of the Directive

In line with the 2003 Proposal and the Joint Convention, ENSREG proposes that the Directive apply to all stages of the management of radioactive waste arising from civilian programmes. There had been discussion within ENSREG's Working Group on Waste Management as to whether or not the new Directive should include the safety aspect of waste disposal given that the Safety Directive excludes waste disposal facilities and partly excludes some storage facilities from its scope. In the end, the Working Group proposed that the Directive should concentrate on the management of radioactive waste only in order to help achieve consensus on the scope of the new Directive.[54]

Unlike the Commission's previous proposal, but in line with the Safety Directive and Joint Convention, the ENSREG Proposal makes clear that the new Directive should not prevent MS from adopting more stringent measures

52 ENSREG, *ENSREG's suggestion for the content of a Directive on Sustainable Management of Radioactive Waste and Spent Fuel*, Final Minutes of the 12th Meeting of ENSREG, 4 June 2010, available at: www.ensreg.eu/sites/default/files/HLG_M(2010-12)_Final%20plus%20annexs_0.pdf.

53 See Article 2(b) of the Directive, OJ L 195, 17 July 2007, 44, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:195:0044:0046:EN:PDF.

54 See note 52 above.

than those covered by the Directive, provided this is done in compliance with Community law. In addition, unlike the previous proposals, the ENSREG Proposal does not cover decommissioning. According to ENSREG, decommissioning (and remediation) should not be covered by the Directive since its operations are not limited to radioactive waste production and management and since licensing in respect of decommissioning is governed by the Safety Directive.

General obligations on MS regarding radioactive waste and spent fuel management

The wording of the ENSREG Proposal concerning MS' general obligations regarding the management of radioactive waste is closer to that of the 2003 Proposal than the 2004 Amended Proposal. It is unclear whether the reference to these as 'general principles' instead of 'general requirements' as per the 2003 Proposal was intended to indicate that ENSREG considers these obligations as 'soft law' rather than mandatory obligations.

Greater emphasis is given in the ENSREG Proposal, as compared to the Commission's previous proposals, to MS obligations to ensure that: (i) possible effects beyond national borders are taken into account; (ii) no undue health impacts or economical burdens fall upon future generations; (iii) in accordance with the 'polluter pays' principle, the costs for the management of radioactive waste and spent fuel are borne by the original waste producer; and (iv) interdependencies among the different steps in radioactive waste management are appropriately taken into account. There is a separate Article setting out the obligation of MS to provide information to the public. However, this provision is less detailed than that contained in the 2004 Amended Proposal.

Framework for long-term management of radioactive waste and spent fuel

As under the 2004 Amended Proposal, MS are required to establish and maintain a national legislative, regulatory and organisational framework for the management of radioactive waste that allocates responsibilities. Unlike the Commission's previous proposals, the ENSREG Proposal refers to the management of radioactive waste and spent fuel as being 'long term' in nature. What importance, if any, should be given to the long-term nature of the management of radioactive waste is not clear since the term is not defined in the ENSREG Proposal.

In place of the detailed harmonised timetable for radioactive waste management at the EU level as proposed in 2003 Proposal (see above), the ENSREG Proposal sets out only a general framework for national programmes on radioactive waste and spent fuel management. Specifically, it provides that the national programme must:

- include an inventory of radioactive waste and spent fuel present in the national territory, and the future prospects;
- describe and assess existing management solutions;
- formulate the research and development strategies or make use of existing studies, in order to improve existing solutions or to develop new solutions for the management of all kinds of radioactive waste and spent fuel;
- establish a timetable with milestones for putting these solutions into effect;
- evaluate the cost of the implementation of the programme and describe funding methods for achieving it; and
- describe the framework and the decision-making process for the implementation of the programme.

Furthermore, and unlike the 2003 Proposal, there is no reference to research and development being carried out at Community level in the field of radioactive waste management in the ENSREG Proposal.

Obligations on MS to invite peer review

Unlike under the previous Commission's proposals, the ENSREG Proposal imposes an obligation on MS to invite an international peer review of segments of their national framework and/or authorities with the aim of continuously improving the sustainable management of spent fuel and radioactive waste. Presumably, this provision intends to transform the international law obligation of MS under the Joint Convention into an enforceable obligation under EU law. In addition, the proposal would oblige MS to report the outcome of such peer review to other MS and the Commission.

MS' reporting obligation

In line with the previous Commission's proposals, MS are required to submit a report on the implementation of the Directive every three years. Consistent with the approach adopted under the Safety Directive, the reporting cycle is to be aligned to that under the Joint Convention to reduce the reporting burden imposed on MS. The ENSREG Proposal does not envisage that a Committee of Experts would review and provide an opinion on an MS' report as per the 2004 Amended Proposal.

The key provisions of the Proposed Directive

On 3 November 2010 the Commission officially published its proposal for an EU legally binding and enforceable EU framework for radioactive waste and spent fuel management. The key provisions of the Proposed Directive[55] are discussed below.

Objective of the Proposed Directive

According to Article 1(1), the objective of the Proposed Directive is the establishment of a Community framework for responsible management of radioactive waste which ensures that MS make appropriate national arrangements for a high level of safety in radioactive waste and spent fuel management to protect workers and the general public against the dangers arising from ionising radiation and maintain and promote public information and participation in radioactive waste management.

Instead of the term 'safe management' as per the Joint Convention and the 2003 Proposal or the 'sustainable management' as per the ENSREG Proposal, the Proposed Directive uses the term 'responsible management' of radioactive waste and spent fuel. There is no explanation for this in the preamble to the Proposed Directive or the explanatory memorandum nor is the term used anywhere else in the Proposed Directive.

Scope of the Proposed Directive

Article 2 of the Proposed Directive provides that it shall apply to '(a) all stages of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors or is managed within civilian activities; and (b) all stages of radioactive waste management, from generation up to disposal, when the radioactive waste results from civilian activities or is managed within civilian activities'. Unlike the Joint Convention, it thus prescribes the same rules regarding the management of spent fuel as it does for radioactive waste.

Reference is made to spent fuel and radioactive management resulting from 'civilian activities' instead of 'civilian application' as per the 2004 Proposal and the Joint Convention. Since neither term is defined under the above-mentioned documents, it is not clear whether the Commission's use of different terminology was intentional and whether the scope of the Proposed

55 Proposal for a Council Directive on the management of spent fuel and radioactive waste, SEC(2010) 1290 SEC(2010) 1289, 3 November 2010, COM, (2010) 618 final available at: http://ec.europa.eu/energy/nuclear/waste_management/doc/2010_11_03_proposal_directive_radiactive_waste.pdf.

Directive will be construed differently to that of the Joint Convention. What is, however, clear is that the ambit of the Proposed Directive is narrower than that of the Joint Convention as the latter also applies to spent fuel and radioactive waste from military or defence programmes when such materials are transferred permanently to, and managed within, exclusively civilian programmes or declared as spent fuel or radioactive waste for the purpose of the Convention by a state party to the Convention (see discussion above).

Despite the fact that the explanatory memorandum accompanying the Proposed Directive acknowledges[56] that 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/EC27[57] does not cover the 'aspects related to radioactivity', Article 2(3) expressly provides that 'waste from extractive industries which may be radioactive… shall not be subject to this Directive'.[58] As Greenpeace argues, the consequence is that that the management of radioactive waste from uranium mining 'falls between the gap and is in effect unregulated'.[59]

Finally, in line with the ENSREG Proposal (see discussion above) but contrary to the approach adopted in the previous Commission's proposals and the Joint Convention, the Proposed Directive does not encompass decommissioning.

General principles imposed on MS concerning radioactive waste management

Article 4(1) provides that MS 'shall establish and maintain national policies on spent fuel and radioactive waste management' and that they have ultimate responsibility for management of radioactive waste. Incorporating some of the IAEA Principles, Article 4(2) provides that MS shall ensure that: (i) the generation of radioactive waste is kept to the minimum practicable; (ii) interdependencies between all steps in radioactive waste generation and management are taken into account; (iii) no undue burdens are imposed on future generations; and (iv) spent fuel and radioactive waste are safely managed, including in the long term. Finally, Article 4(3) provides that 'radioactive waste shall be disposed of in the Member State in which it was generated, unless agreements are concluded between Member States to use disposal facilities in one of them'.

The latter is a completely new provision for which there is no equivalent to it in the Joint Convention. Importantly, the provision implicitly prohibits

56 See supra note 55, at 5.

57 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:102:0015:0033:en:PDF

58 Supra note 55.

59 Proposed nuclear waste directive – a Greenpeace overview. Available at: http://www.greenpeace.org/raw/content/eu-unit/press-centre/policy-papers-briefings/proposed-nuclear-waste-directi.pdf

the disposal of radioactive waste outside the EU. However, it does not prohibit the reprocessing of spent fuel and storage of radioactive waste outside the EU. As discussed in relation to the ENSREG Proposal, it is not clear whether the reference to the above-mentioned obligations as 'general principles' instead of 'general requirements' as per the Commission's previous proposals was intended to imply their 'soft law' and thus non-binding nature or whether it was simply an attempt to adopt the same terminology as adopted in the IAEA Principles.

National framework

In line with Article 19(1) of the Joint Convention, Article 5 requires MS to establish and maintain a national legislative, regulatory and organisational framework for radioactive waste and spent fuel management which allocates responsibilities and provides for coordination between relevant state bodies in the long term. The national framework is to include '(a) a national programme for implementation of the policy on spent fuel and radioactive waste management; (b) national requirements for the safety of spent fuel and radioactive waste management; (c) a system of licensing of spent fuel and radioactive waste management activities and facilities, including prohibition of the operation of a spent fuel or radioactive waste management facility without a licence; (d) a system of appropriate institutional control, regulatory inspections, documentation and reporting; (e) enforcement actions, including suspension of activities and modification or revocation of a licence; (f) the bodies involved in the different steps of spent fuel and radioactive waste management'. Other requirements, such as requiring the national framework to require licence holders to establish and implement management systems, which give due priority to safety, and to regularly verify these, as well as to require licence holders to provide for and maintain adequate financial and human resources to fulfil their obligations concerning safety, are set out in Article 7(4) and (5).

Effective independence and powers of a regulatory authority

In line with Article 20(2) of the Joint Convention, Article 6 obliges MS to ensure the 'effective independence' of the regulatory authority responsible for the implementation of the national framework from any other body or organisation concerned with the promotion or exploitation of nuclear energy or radioactive material, including electricity production and radioisotope applications, or with the management of spent fuel and radioactive waste.

Licence holder's prime responsibility for the safety of radioactive waste and spent fuel management

Unlike the 2003 Proposal and the 2004 Proposal, but in line with Article 21 of the Joint Convention, the Proposed Directive contains a provision concerning the responsibility of the licence holder and the duties of MS in respect thereof. Going beyond the requirement of Article 21 of the Joint Convention that MS ensure that licence holders have prime responsibility for the safety of radioactive waste and spent fuel management, Article 7 of the Proposed Directive provides that MS shall ensure that the national framework requires licence holders to: (i) regularly assess and verify, and continuously improve, as far as reasonably achievable, the safety of their activities and facilities in a systematic and verifiable manner under the supervision of the competent regulatory authority; (ii) establish and implement management systems which give due priority to safety and are regularly verified by the competent regulatory authority; and (iii) 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 set out in Article 7.

Safety case

A new article setting out the approach to safety, including requirements for a safety case and a supporting safety assessment of facilities and activities relating to the management of spent fuel and radioactive waste, has been inserted in the Proposed Directive. Based on the provisions of Articles 8 and 15 of the Joint Convention, Article 8 of the Proposed Directive requires MS to ensure that as part of the licence application for a facility or activity 'a safety case and a supporting safety assessment shall be prepared' and approved by the component regulatory authority. Concerning the scope and detail of the safety case: paragraph 3 provides that 'safety case for a facility shall describe all safety-relevant aspects of the site, the design of the facility, and the managerial control measures and regulatory controls'; paragraph 1 provides that the 'the extent and detail of the safety case and the safety assessment shall be commensurate with the complexity of the operations and the magnitude of the hazards associated with the facility or activity'; and paragraph 2 provides that the safety case and supporting safety assessment shall cover the sitting, design, construction, operation, and decommissioning of a facility or closure of a disposal facility. Furthermore, MS are required to ensure that the safety case is updated over the course of the life of any facility or activity.

Obligations on MS regarding transparency

In line with the requirements of Article 3(6) of the 2003 Proposal, but more narrowly than those of Article 3(5) of the 2004 Proposal, Article 12 of the Proposed Directive obliges MS to 'ensure that information on the management of spent fuel and radioactive waste is made available to workers and the general public'. It should be noted that although the preamble to the Proposed Directive makes reference to the EIA Directive (as well as other directives discussed above) no attempt has been taken to try to impose similar obligations to inform and consult the public and other MS likely to be significantly affected under the Proposed Directive in respect of the management of spent fuel and radioactive waste.

Obligations on MS regarding national programmes on the management of radioactive waste and spent fuel

Going beyond the provisions of the Joint Convention and with the aim of ensuring coherence among the national programmes for the management of radioactive waste and spent fuel of MS, Articles 13, 14 and 15 of the Proposed Directive impose obligations concerning the content, scope, implementation and review of national programmes. In sharp contrast to Article 4 of the 2003 Proposal, the Proposed Directive does not contain tight and uniform deadlines for the start of disposal. Instead, MS are required to adopt a national programme (NP) covering all types of spent fuel and radioactive waste under their jurisdiction and all stages of spent fuel and radioactive waste management from generation to disposal within four years of the date the Proposed Directive enters into force.[60] Article 14 spells out the scope and content of the NP, which is to include:

- an inventory of all spent fuel and radioactive waste and previsions of future quantities, including those from decommissioning;
- concepts, plans and technical solutions from generation to disposal;
- concepts and plans for the post-closure period of a disposal facility, including the time over which institutional controls are retained and the means to be employed to preserve knowledge of the facility in the longer term;
- description of research, development and demonstration activities that are needed in order to implement solutions for the management of spent fuel and radioactive waste; and
- major milestones, clear timeframes and responsibilities for implementation.

Furthermore, Article 15(1) imposes a new obligation on MS to submit the NP to the Commission for review. Notably, Article 15(2) accords the Commission

60 See Articles 13(1) and 17(3) of the Proposed Directive.

the power to request clarifications and/or revision of the NP to align it with the provisions of the Proposed Directive. Although the Proposed Directive does not spell out the consequences of the failure of an MS to amend its NP in line with the Commission's revisions, it is likely that in such circumstances the Commission would be able to commence infringement proceedings against the MS pursuant to Article 141 of the Euratom Treaty.

Reporting obligation

In line with 2003 Proposal and the ENSREG Proposal, Article 16 requires MS to submit a report to the Commission on the implementation of the provisions of the Proposed Directive, taking advantage of the reporting cycle under the Joint Convention to reduce the administrative burden imposed on MS. The reporting requirement is consistent with that under the Safety Directive.

Peer review

In addition, and also in line with the ENSREG Proposal, MS are required periodically, and at least every ten years, to arrange an international peer review of their national framework and NP, the outcome of which is to be reported to the Commission and other MS.

Conclusion

Armed with the 2010 Eurobarometer Survey, which is said to have found that a large majority of EU citizens believe it would be useful if there was EU legislation on radioactive waste management, the Commission unveiled the Proposed Directive on 3 November 2010.[61] Emphasising that 'safety concerns all citizens and all EU countries, whether they are in favour or against nuclear energy' and that 'safety is indivisible', Commissioner Günther Oettinger has called for the Directive to be adopted in 2011.

As discussed, the Proposed Directive incorporates a substantial portion of the provisions contained in the Joint Convention, as well as the majority of the IAEA Principles and in doing so converts the requirements set out in those documents into enforceable obligations under EU law. Although much less ambitious then the 2003 Proposal, the Proposed Directive goes

61 European Commission, *Special Eurobarometer 324, Europeans and Nuclear Safety*, March 2010, available at: http://ec.europa.eu/energy/nuclear/safety/doc/2010_eurobarometer_safety.pdf, at pages 62 and 110 respecitively.

further than the ENSREG Proposal in prescribing the content of the NP, including regarding disposal. Importantly, and as mentioned above, it accords the Commission the power to review the NP and request clarifications and revisions regarding the NP. This, combined with the Commission's powers under Articles 141 and 143 of the Euratom Treaty to commence infringement proceedings, means that under the Proposed Directive the Commission is granted enforcement and sanctioning powers enabling it to ensure that MS comply with their obligations. If adopted as presently drafted, the Proposed Directive would, for the first time, introduce binding obligations specifically concerning the management of radioactive waste and spent fuel in the EU.

It is likely that, as presently drafted, the Proposed Directive will encounter significant opposition from both MS and civil society. If the responses received by the Commission as part of the consultation process between March and May 2010 from non-governmental organisations and the general public are anything to go by, the hostility to this Directive is considerable. For example, the UK Royal College of Physicians condemned what it considers as the Commission's attempts to 'enforcing storage and disposal on a community without resolving the fundamental problems underlying the action', and accused the Commission of acting 'contrary to any democratic principle…'.[62]

Despite considerable opposition, it would seem more likely than not that this time round the Commission will eventually succeed in adopting a directive setting out an EU framework for the management of radioactive waste and spent fuel. However, at this point it is too early to anticipate what its precise scope and terms will be. It is hoped that, by examining the provisions of the Commission's previous proposals and the recent ENSREG Proposal, as well as the international framework concerning the management of radioactive waste and spent fuel, this article contributes to the ongoing discussions concerning the need for, and the scope and terms of, a directive of the management of radioactive waste and spent fuel.

62 Commission public consultation, see: http://ec.europa.eu/energy/nuclear/consultations/2010_05_31_fuel_waste_en.htm.