JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

Sixth Review Meeting of the Contracting Parties

Third National Report by Portugal (2014-2017)

Regulatory Commission
for the Safety of Nuclear Installations

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

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Frequently used Acronyms

ANPC	National Civil Protection Authority (Autoridade Nacional de Proteção Civil)
APA	Portuguese Environment Agency (Agência Portuguesa do Ambiente)
ARS	Regional Health Authorities (Administrações Regionais de Saúde)
BSS	Basic Safety Standards
CIPRSN	Independent Commission for Nuclear Safety and Radiological Protection (Comissão Independente para a Protecção Radiológica e Segurança Nuclear)
COMRSIN	Regulatory Commission for the Safety of Nuclear Installations (Comissão Reguladora para a Segurança das Instalações Nucleares)
CTN	Campus Tecnológico e Nuclear
DGEG	Directorate-General of Energy and Geology (Direcção Geral de Energia e Geologia)
DGS	Directorate-General for Health (Direcção-Geral da Saúde)
DoE/USA	Department of Energy of the United States of America
DRE	Regional Directorates of Economy (Direções Regionais de Economia)
EIA	Environmental Impact Assessment
EU	European Union
FCT	Foundation for Science and Technology
HEU	High Enriched Uranium
IAEA	International Atomic Energy Agency
ITN	Nuclear and Technological Institute (Instituto Tecnológico e Nuclear)
IST	Instituto Superior Técnico
LEU	Low Enriched Uranium
MEC	Ministry of Education and Science, previously Ministry of Science, Technology and Higher Education (Ministério da Educação e Ciência)
PRR	Pavilhão de Resíduos Radioativos (Pavillion for Radioactive Waste)
RPI	Portuguese Research Reactor (Reactor Português de Investigação)
ULisboa	University of Lisbon (Universidade de Lisboa)

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

3rd National Report by Portugal (2014-2017)

Section A. INTRODUCTION

a) A general overview

The Portuguese Government approved the country's accession to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention) on April 21st 2009, by Decree no. 12/2009. On May 15th 2009, the instrument of ratification was deposited, and the Convention entered into force in the Portuguese legal framework on August 13th 2009. Therefore, this is the third Portuguese report under the Joint Convention and its aim is to provide a comprehensive overview on the present Portuguese policies, legislation and measures related to the safety and management of spent fuel and radioactive waste.

Portugal has no nuclear power plants but produces radioactive waste from medical, industrial and research applications of radioactive materials in the form of sealed and unsealed sources, as well as spent fuel from the only existing nuclear reactor in the country, the Portuguese Research Reactor (RPI).

The RPI is a pool-type research reactor (1 MW) operated, since February 2012, by the Instituto Superior Técnico (IST). In February 2012, through Decree-Law 29/2012 of February 9th, IST became the successor to and inherited the assets and personnel of the previous operator, the State Laboratory "Instituto Tecnológico Nuclear" (ITN). The former ITN site is now called "Campus Tecnológico e Nuclear" (CTN) and constitutes the Sacavém Campus of IST. Throughout this report we use the acronym CTN/IST to denote the Sacavém Campus of IST. The IST is the Faculty of Engineering that, since July 25th 2013, is part of the University of Lisbon (ULisboa) as a result of the merging of two major universities in Lisbon: the University of Lisbon (UL), and the Technical University of Lisbon (UTL).

In light of the above, in respect to Article 32 of the Joint Convention, the Portuguese National Report focuses on two different pathways to treat the spent fuel from the aforementioned research reactor, as well as on the safety of radioactive waste management concerning radioactive waste from research, medical and industrial applications. This report shall also provide information on the status of the national regulatory infrastructure.

Portugal has a regulatory body for the safety of nuclear installations, the safety of spent fuel management and the safety of radioactive waste management. Under Decree-Law 30/2012, of February 9th, the Regulatory Commission for the Safety of

Nuclear Installations (COMRSIN) was created, leading, for the first time in Portugal, to the existence of an independent regulatory body for nuclear safety. The Prime Minister appointed three Commissioners for a five-year term. In 2013, with the publication of Decree-Law 156/2013 of November 5th, the attributions of COMRSIN were broadened to include the regulatory oversight of the safe management of spent fuel, the safe management of radioactive waste and the safe transportation of spent fuel and radioactive waste.

Nevertheless, Portugal does not yet have a single, fully independent regulatory body for radiation protection and nuclear safety. As such, the national regulatory infrastructure is still characterized by the existence of various authorities which share competencies in areas such as radiation protection, radioactive waste management, spent fuel management, nuclear safety, transportation of radioactive materials and emergencies and preparedness.

The process of the transposition of the Euratom Directive 2013/59 is currently under way. One of the tasks of the working group is to propose a unified regulatory authority and clarify the legal competencies to comply with the international obligations imposed by the ratified conventions and European Union (EU) Directives.

Presently, the authorities with responsibilities in radiation protection, radioactive waste management, spent fuel management, nuclear safety, transport of radioactive materials, and emergencies and preparedness are the following:

1. Regulatory Commission for the Safety of Nuclear Installations (COMRSIN);
2. Directorate-General for Health (DGS);
3. Instituto Superior Técnico (IST);
4. Portuguese Environmental Agency (APA);
5. Directorate-General of Energy and Geology (DGEG);
6. National Civil Protection Authority (ANPC);
7. Agency for Competitiveness and Innovation (IPAMEI), as legal successor to the Regional Directorates for Economy (DRE);
8. Regional Health Authorities (ARS).

Consequently, the Portuguese regulatory infrastructure is very intricate. Despite recent developments that emerged from the transposition of EU Directives, namely Directive 2009/71/Euratom of June 25th and Directive 2011/70/Euratom of July 19th, the existing legal framework remains of difficult practical application mainly due to numerous legal omissions and overlaps.

The exemption and clearance levels, as required by Decree-Law 156/2013, have been defined in Ministerial Order 44/2015, of February 20th. This follows the Recommendations of the Group of Experts established under the terms of Article 31 of the Euratom Treaty – Guidance on general clearance levels for practices (Radiation Protection 122), which were used in the past as reference.

Concerning financial fund for the decommissioning of radiological and nuclear facilities, Decree-Law 156/2013 requires a plan for adequate financial resources to be presented as a precondition to licensing spent fuel and radioactive waste

management facilities (article 32(1)(k)); article 19(3) requires sufficient financial resources to be available to ensure safety, and fines are foreseen for failure to provide for such resources (article 47(2)(a)). In a similar context one may also mention article 23(1) of Decree-Law 262/2012, concerning nuclear facilities. Likewise, article 14 of Decree-Law 262/2012 establishes that the design and construction of new nuclear facilities shall already take into account its future decommissioning, the same being required for spent fuel and radioactive waste management facilities by article 27 of Decree-Law 156/2013.

Furthermore, in the case of the RPI, under article 4(2) and (3) of Decree-Law 29/2012, the Government takes on the responsibility of providing the financial resources needed for decommissioning.

RPI was temporarily shutdown on May 11th, 2016 for maintenance and to allow the operator (IST) to implement the recommendations of the Integrated Safety Assessment of Research Reactors (INSARR) mission that took place in February 2016 at the request of COMRSIN. The executive summary of the INSARR panel was made public at COMRSIN website. On September 14th, 2017, IST has informed COMRSIN that it has proposed to the Government that the RPI be permanently shutdown. IST will submit a decommissioning plan to COMRSIN for approval.

In addition, as determined by Decree-Law 156/2013, COMRSIN has prepared the first National Programme for the Implementation of Spent Fuel and Radioactive Waste Management Policy, henceforth abbreviated as National Programme made under the scope of Council Directive 2011/70/EURATOM. A graded approach was followed when defining, developing and implementing solutions that take into consideration the amounts and types of spent fuel and radioactive waste in Portugal and the associated risks. The first National Programme also implements practical solutions from waste generation to disposal endpoints, to avoid undue burdens on future generations. The National Programme underwent Strategic Impact Evaluation by an independent firm that consulted all relevant stakeholders, including the public. It was submitted to the Government in July 2016 and was approved by the Council of Ministers, Resolution 122/2017 of July 27th, after consultation between different ministries.

The National Programme acknowledges that the Pavilhão de Armazenamento Interino de Resíduos Radioativos (PAIRR) that exists at CTN/IST for over 50 years as an interim facility, has become by law the sole elimination facility in Portugal for low and intermediate level radioactive waste. The existing facility has been renamed Pavilhão de Resíduos Radioativos (PRR) and has been inspected and licensed by COMRSIN in 2016.

Portugal agrees with the international principles aimed at promoting and enhancing the safety culture for radiological protection, spent fuel management and radioactive waste management. For this reason, Portugal supports the Joint Convention and all the related international reporting activities to ensure an international safety culture.

b) Main topics

This report provides:

(1) A detailed description of the Portuguese policies and the practices concerning the management of spent fuel of the RPI and the management of radioactive waste (see Section B);
(2) An overview of the practices in Portugal subject to the Joint Convention (see Section C);
(3) A summary of the situation of spent fuel and radioactive waste facilities and inventories in Portugal (see Section D);
(4) A detailed description of the Portuguese legal framework concerning the management of spent fuel of the Portuguese research reactor and the management of radioactive waste (see Section E);
(5) An overview of other general safety provisions in Portuguese legislation, corresponding to articles 21 to 26 of the Joint Convention (see Section F);
(6) A description of the situation and legal provisions relating to the safety of spent fuel management (see Section G) and of radioactive waste management (see Section H);
(7) An overview of the regulation and reality of transboundary movements of spent fuel and radioactive waste (see Section I);
(8) A summary of the existing framework for disused sealed sources management (see section J);
(9) Clarifications regarding planned activities to improve safety (see Section K); and
(10) Annexes containing a summary inventory of radioactive waste in Portugal and a list of references to national laws and regulations and to relevant national and international reports (see Section I).

Section B. POLICIES AND PRACTICES

Article 32 (Reporting) Paragraph 1

i) Spent Fuel Management Policy

As reported in the 4th Review Meeting, in the context of international initiatives to enhance non-proliferation measures, safeguards and nuclear security and to combat nuclear terrorism, in 1999, Portugal declared its interest in participating in the "United States Foreign Research Reactor Spent Nuclear Fuel Acceptance Program" of the Department of Energy of the United States of America (DoE/USA). The Portuguese Government committed to stop using highly enriched uranium (HEU) and converted the Portuguese Research Reactor (RPI) to LEU fuel in 2007.

This LEU fuel was obtained from the USA within the scope of a tripartite agreement Portugal-USA-IAEA and can be returned to the country of origin. Although this is the preferred option under the National Program, the possibility that the spent fuel may be reprocessed in another country is also considered, should the USA not receive it. If the fuel is sent to a reprocessing plant abroad, radioactive waste will be returned to Portugal, most likely in the form of vitrified intermediate level waste (ILW), packed in appropriate containers that can be stored in a surface facility.

Portugal does not have a high-level radioactive waste storage facility and does not intend to develop any activities concerning the handling or storage of spent fuel, other than interim storage in the pool of the RPI before shipment to the USA or to a reprocessing plant. For this reason, the National Programme considers only the above- mentioned options.

ii) Spent Fuel Management Practices

In the past, all spent fuel from the operation of the RPI was stored in the reactor's pool until the shipment to the USA.
Given the recent decision from the operator IST to propose the permanent shutdown of the RPI, the current LEU fuel is eligible for return to the USA before May 12th, 2019, as its irradiation was stopped prior to May 12th, 2016. The operator will keep the spent fuel in the pool until it is shipped to the USA or to another country for reprocessing. No other storage facility is foreseen for spent fuel.

iii) Radioactive Waste Management Policy

Since the publication of Decree-Law 156/2013 of November 5th, there is a defined policy on radioactive waste management in Portugal based on fundamental principles.

Regarding spent fuel management and radioactive waste management, the National Programme was proposed by COMRSIN and approved by the Government after

undergoing Strategic Environmental Evaluation, as required by paragraph 1(a) of article 3 of Decree-Law 232/2007, of June 15th, modified by Decree-Law 58/2011, of May 4th, that transposes Directives 2001/42/CE of the European Parliament and Council, of June 27th, and 2003/35/CE of the European Parliament and Council, of May 26th. This new policy results from the transposition of EU Directive 2011/70/Euratom, of July 19th, into Portuguese Law and meets the requirements of the International Safety Standards.

Under article 14 of Decree-Law 156/2013, IST is responsible for the collection, segregation, conditioning and storage of solid and liquid low level (LLW) and intermediate level (ILW) radioactive waste produced in the country. IST is the operator of a radioactive waste management facility named *Pavilhão de Resíduos Radioativos* (PRR), which is at present the only national facility for the elimination of radioactive waste in Portugal. It is located in the same CTN/IST campus where the RPI is located and, since the early fifties, has always been considered an interim solution for the elimination of low and intermediate level radioactive waste. Nevertheless, in the absence of an alternate site, PRR will continue in operation, given the volume of radioactive waste in Portugal. COMRSIN has licensed the PRR, provided that IST implements a few additional security and safety measures, and has set a limit for the total amount of activity that may be stored in the PRR; when 1/3 of this activity limit is exceeded, IST should request an appropriated international peer review of the facility.

IST, under the regulatory oversight of COMRSIN, is responsible for the safe management of all LLW and ILW stored in its elimination facility.

Concerning medical applications in general, and nuclear medicine in particular, Decree-Law 180/2002 of August 8th establishes that solid and liquid radioactive waste with a very short half-life (VSLW) may be stored on site until it decays or is subject to authorized discharge. Article 9 of Decree-Law 156/2013 requires also that any activity associated with the management of radioactive waste and the associated installations for storage also be licensed by COMRSIN, unless the waste is stored for authorized discharge or otherwise stored for less than 30 days before elimination.

Producers of radioactive waste also have the obligation to provide COMRSIN, before January 31st each year, a report detailing the type and volume of radioactive waste they produced in the previous year, as well as their location and foreseeable destination (article 8(4) of Decree-Law 156/2013; see also, in what concerns nuclear facilities, article 31 of Decree-Law 262/2012).

Under article 6(3)(d) of Decree-Law 156/2013, the National Programme includes an inventory of all spent fuel and radioactive waste in Portugal, including estimates of future amounts, indicating their quantity and location. Article 13(l) further states that COMRSIN must draft an annual inventory of spent fuel and radioactive waste existing in Portugal, keeping it constantly updated.

The regime relating to the use of radioactive sealed sources is set out in Decree-Law 38/2007, of February 19th, which transposes Directive 2003/122/Euratom. For a description of this regime, in what concerns radioactive waste management, see

section J.

The cost associated with the collection and elimination of radioactive waste by IST, including spent sealed sources falls on the producer and has been set according to radionuclide, activity, and volume as defined by Ministerial Order no. 891/2015, of February 20th that also regulates the fees charged by COMRSIN for characterizing and authorizing the elimination of radioactive waste, for applying exclusion or clearance levels for radioactive waste, as well as for licensing radioactive waste storage facilities and management practices.

Whenever radioactive waste is encountered and its producer or holder cannot be identified (orphan sources), IST is responsible for the costs of collecting the radioactive waste, including sealed sources, and storing it in its elimination facility. This guarantees the existence of a public solution for all radioactive waste that is produced in Portuguese territory.

iv) Radioactive Waste Management Practices

In Portugal, radioactive waste originates mainly from medicine, industry and research activities. Only low level and intermediate level radioactive waste is produced from activities in these sectors.

Until 2013. the solid radioactive waste produced in hospitals, mainly from nuclear medicine services, including gloves, syringes, gowns and other contaminated materials used to be collected by former-ITN. Today, these facilities manage their own radioactive waste according to internal procedures as part of their own Radiation Protection Programme and conditions set in the authorization to carry out the practice. Changes have taken place as a result of the entry into force of Decree-Law 156/2013, whereby the activity associated with the management of radioactive waste and the associated installations for storage need to be licensed by COMRSIN, unless the waste is stored for the purpose of authorized discharge or otherwise stored for less than 30 days before elimination.

COMRSIN has already licensed 48 radioactive waste management and storage facilities in hospitals and research centers.

The radioactive liquid effluents generated in hospitals that perform therapy with internment or that are classified as higher risk (based on isotope and annual activity) are sent to retention tanks, where the radioactive liquid is maintained during the decay process. When the radioactive liquid is under the legal levels of exemption, the tanks are opened and the liquid goes to the public sewerage system. Under Article 24(1)(e) of Decree-Law 180/2002, of August 8th, all radioactive waste resulting from medical applications must be registered before elimination and this registry must be kept for 10 years.

Technetium-99m generators contribute significantly to the total amount of radioactive waste generated in Nuclear Medicine services. Nevertheless, after the licensing of the local installations by COMRSIN, the generators are allowed to be returned to the manufacturer for recycling after decaying for 13 weeks on site.

Concerning I-125 sources ("seeds") that are leftovers from brachytherapy procedures, two pathways have been established by COMRSIN: a) local storage for 2 years and subsequent elimination at the PRR facility with COMRSIN's authorization; b) local storage for 215 weeks after which they are cleared from regulatory control and may be eliminated as nonradioactive waste. During licensing, COMRSIN evaluates the local storage facility and its staff vis-á-vis safety procedures associated with the management of radioactive iodine seeds and decides which pathway the installation should be licensed to follow. It is also possible that an installation that is offered elimination by clearance after 215 weeks, requests instead the elimination to PRR after 2 years.
Sealed sources from industrial and medical applications, as well as from research labs and academia (that have not been returned to the supplier), smoke detectors (containing 226Ra and 241Am sources), lightning rods and other contaminated material collected in scrap yards comprises the remaining solid waste that is stored in the CTN/IST campus. The PRR elimination facility also stores radioactive solid and liquid waste contaminated with H-3, C-14 and Ca-45 resulting from research laboratories.

– Storage and disposal

All the solid radioactive waste received from private and public entities from across the country is stored at the PRR elimination facility, after appropriate segregation and conditioning is carried out. Liquid waste contaminated with H-3, C-14 and Ca-45 is also stored at the PRR.

In case the spent fuel from the RPI is sent abroad for reprocessing, no other storage facility is presently foreseen to receive the intermediate level radioactive waste that will be returned to Portugal, but may have to be considered if the present spent fuel is not returned to the USA.

In 2015 COMRSIN developed an online platform that serves as a database for all radioactive waste that is stored at the PRR after January 1st 2014. Producers and holders of radioactive waste may submit online requests for the elimination, clearance or exclusion of their radioactive waste. The platform also serves as a database and process management tool for licensing installations that store and manage radioactive waste for more than 30 days. The corresponding authorizations/licenses are issued by COMRSIN after the information has been appropriately scrutinized by its staff. This online platform also allows the estimation of the total activity that is sent for disposal at the PRR. Prior to 2014, IST kept a registration system based on a spreadsheet.

At the moment, there is no other elimination facility for radioactive waste, either LLW or ILW. In order to look for possible disposal sites for this type of waste (surface and near-surface facilities) academic studies have previously been carried out by the former ITN and the Universities of Lisbon, Porto and Évora, with the support of the Foundation for Science and Technology (FCT). However, these studies were not implemented, but may be useful when the National Programme is reviewed or when the PRR approaches its licensed capacity.

v) Criteria used to define and categorize radioactive waste

COMRSIN is the Portuguese regulatory authority that has the power to classify radioactive materials as radioactive waste. Ministerial Order 44/2015, of February 20th defines clearance levels, as required by Decree-Law 156/2013. The adopted clearance levels are the ones defined in Annex VII of the recent Council Directive 2013/59/EURATOM. Under article 42 of Decree-Law 156/2013, the exclusion levels are based on the clearance levels published by the aforementioned Ministerial Order.

Categorization of radioactive waste is included in the National Program, as specified in the International Atomic Energy Agency's standards.

Section C. SCOPE OF APPLICATION

Article 3 (Scope of Application)

i) Spent fuel management

According to article 3(1), the Joint Convention applies to Portugal, as there is one civilian research reactor in operation (RPI) that produces spent fuel.

ii) Radioactive waste management

The Joint Convention is also applicable to Portugal under article 3(2) and (4), due to the existence of radioactive waste resulting from civilian applications, including associated discharges and disused sealed sources.
Despite the existence of uranium mining installations in the country, they are not currently in operation, waste from these installations has not been declared as radioactive waste for the purposes of this Convention.

Insofar as article 3(3) is concerned, there is no military or defense programme in Portugal that produces radioactive waste.

Section D. INVENTORIES AND LISTS

Article 32 (Reporting), Paragraph 2

i) Spent fuel management facilities

There are no spent fuel management facilities in Portugal.

ii) Inventory of spent fuel

As previously provided for in Ministerial Order 10A/MCT/96, and presently required by articles 17, 18(3) and 7(1) of Decree-Law 262/2012, of December 17th, and by article 16 of Decree-Law 156/2013, the license holder of the reactor must maintain a register with all relevant information, namely concerning transfers and storage of spent fuel elements. This is complemented by article 14(3) of Decree-Law 156/2013, which requires IST to draft an inventory of spent fuel and radioactive waste existing at CTN/IST and submitting it to COMRSIN by January 31st, each year. There is currently no spent fuel at the IST.

Under article 6(3)(d) of Decree-Law 156/2013, the National Programme which has been approved by the Government also includes an inventory of all spent fuel and radioactive waste in Portugal, including estimates of future amounts, indicating their quantity and location. Article 13(l) further states that COMRSIN must draft an annual inventory of spent fuel and radioactive waste existing in Portugal, keeping it constantly updated.

iii) Radioactive waste management facilities

There is one national radioactive waste management facility in Portugal named PRR (radioactive waste facility - *Pavilhão de Resíduos Radioativos*), which is at present the only national facility for the elimination of radioactive waste in Portugal. It is located in the CTN/IST campus in Sacavém. As mentioned above, this facility exists since the early fifties for the elimination of low and inteermediat level radioactive waste. In addition, 48 other operators are authorized to hold for more than 30 days the radioactive waste they produce.
All the above mentioned operators have disposal paths for their waste.

iv) Inventory of radioactive waste

The following types of radioactive waste are stored in the PRR:
– Sealed sources (spent, disused and orphan sources) in storage/custody from medical, industrial and research applications;
– Open sources from medical and research applications that were not disposed of by the operators;

– Equipment (or parts of equipment) containing sealed sources that were used in medical, industrial and research applications;
– Radium historical waste from medical applications;
– Depleted uranium previously used as counterweights or as shielding (this material is under IAEA/Euratom safeguards);
– Solid low level radioactive waste with short or medium-lived radionuclides;
– Radioactive liquid waste from research labs containing mainly, 3H, 14C and 45Ca.

The license records, the deposit registry and the annual licensee reports mentioned in section B iii) allow the IST to provide a breakdown of the total number of sealed sources that are in use, as well as those that have been sent to the manufacturer and remain at the PRR.

v) Nuclear facilities in the process of being decommissioned

There are no nuclear facilities in the process of being decommissioned in Portugal. However, since IST has informed COMRSIN that it proposed to the Government the decommissioning of the RPI, the decommissioning plan for the RPI will have to be submitted to COMRSIN for approval before this action can begin to take place.

Section E. LEGISLATIVE AND REGULATORY SYSTEM

Article 18 (Implementing measures)

Portugal acceded to the Joint Convention in 2009, following the adoption of Decree no. 12/2009, of April 21st.

The Joint Convention has been implemented in the Portuguese legal order with the transposition of Council Directive 2011/70/Euratom, of July 19th, which provided an EU framework for the regulation of matters governed by the Joint Convention. This transposition was carried out by Decree-Law 156/2013 of November 5th.

One must also consider the national transposition, through Decree-Law 38/2007 of February 19th, of Council Directive 2003/122/Euratom, which also relates to matters governed by the Joint Convention, i.e. disused sealed sources.

Other laws and regulations must also be taken into account, as described below, to understand the Portuguese framework for radioactive waste management and spent fuel management.

Article 19 (Legislative and regulatory framework)

i) The establishment of applicable national safety requirements and regulations for radiation safety

Portugal has complied with its obligations under EU primary and secondary legislation relating to safety requirements and radiation safety which, in turn, assure compliance with the provisions of the Joint Convention.

Since Portugal's accession to the EU in 1986, many legal acts have been adopted, and many have continued to be in force even though some of their content has been derogated by later laws. Consequently, it is only through interpretation and consideration of the ensemble of the relevant legal instruments that one can determine the provisions currently in force. That being said, this situation has created significant practical difficulties.

The current legislative and regulatory framework relating to safety requirements and radiation safety is made up, essentially, by the following acts, in chronological order:

Decree-Law 426/83, of 7 December	Basic legal framework relating to uranium mining
Decree-Law 348/89, of 12 October	General rules for applications of ionizing radiation and distribution of attributions (applicable only to a small degree, insofar as it has been substantially derogated by subsequent laws)
Regulatory Decree 9/90, of April 19th	Regulates and complements Decree-Law 348/89
Regulatory Decree 34/92, of December 4th	Regulates Decree-Law 426/83, setting out, *inter alia*, radiological protection rules for uranium mining activities
Decree-Law 36/95, of February 14th , revised by Law 84/2017, of August 18th	Establishes a system for information to the population relating to radiological emergencies, transposing Directive 89/618/Euratom
Regulatory Decree 29/97, of July 29th	Sets out rules for the protection of external workers intervening in controlled areas, transposing Directive 90/641/Euratom
Decree-Law 165/2002, of July 17th	General principles of radiation protection and distribution of relevant attributions between public bodies
Decree-Law 167/2002, of July 18th, revised by Decree-Law 215/2008, of November 10th, and by Decree-Law 184/2015, of August 31st	Regulates the licensing, operation and duties of service providers in the field of radiological protection, including radiation protection studies for radiological installations, dosimetry (individual and area monitoring) and training
Decree-Law 174/2002, of July 25th, revised by Law 84/2017, of August 18th	Regulates preparation and response to radiological emergencies
Decree-Law 180/2002, of August 8th, as revised by Decrees-Law 215/2008, 279/2009 and 72/2011	Transposes Council Directive 97/43/Euratom, on the application of ionizing radiation during medical diagnostics and treatment, including the establishment of licensing and operating requirements for radiotherapy, nuclear medicine and radio-diagnostic facilities
Decree-Law 138/2005, of August 17th	Establishes a system for environmental monitoring of levels of radioactivity in the atmosphere, waters and soil
Decree-Law 140/2005, of August 17th	Regulates exemption levels for the licensing and prior authorization of activities using ionizing radiation
Decree-Law 38/2007, of February 19th	Regulates the licensing and radiation protection rules associated to the use of sealed radioactive sources, transposing Directive 2003/122/Euratom
Decree-Law 222/2008, of November 17th	Complements the transposition of the Basic Safety Standards Directive by revising, inter alia, the dose limits for workers, apprentices, students and members of the public
Decree-Law 227/2008,	Transposes article 38 of Council Directive

of November 25th	96/29/Euratom, of 13 May, that requires the establishment of a system of qualified experts and technicians
Ministerial Order no. 596/2009, of June 5th	Sets out the fees to be charged for several licensing and authorization procedures related to radiological protection carried out by DGS
Decree-Law 145/2009, of June 17th	Sets out rules relating, *inter alia*, to radiological protection in medical devices and accessories, transposing Directive 2007/47/EC
Decree-Law 198/2009, of August 26th	Sets out rules relating to transfers of spent fuel and radioactive waste, transposing Directive 2006/117/Euratom
Law 102/2009, of September 10th	General regime for security and safety in the workplace, including provisions concerning radiological protection of workers
Ministerial Order no. 1106/2009, of September 24th	Adopted the regulation for the metrological control of measuring instruments for ionizing radiation, under Decree-Law no. 291/90, of 20 September
Decree-Law 10/2010, of February 4th, revised by Decree-Law 31/2013, of February 22nd	Legal framework for the management of waste, including radioactive waste, resulting from mining operations, transposing Directive 2006/21/EC
Order no. 6402/2010, of 12 April	Awards competencies associated to metrological control, under Ministerial Order no. 1106/2009, to ITN
Decree-Law 41-A/2010, of April 29th, last revised by Decree-Law 111-A/2017, of August 31st	Sets out the rules applicable, *inter alia*, to radiological protection during transport of radioactive materials by land, transposing Directives 2006/90/EC and 2008/68/EC. The last revision transposed Directive 2012/45/EU
Decree-Law 29/2012, of February 9th	Integrates ITN into IST and regulates the transfer of assets and attributions to the latter (see also Decree-Law 125/2011, of 29 December)
Decree-Law 30/2012, of February 9th	Created and regulated the functioning of COMRSIN (see also Ministerial Order no. 4382/2012, of 28 March)
Decree-Law 56/2012, of March 12th	Regulates the functioning and attributions of APA, confirming those relating to radiological emergencies
Decree-Law 262/2012, of December 17th	Regulates the obligations of operators of nuclear facilities, in furtherance of the regime set out in Decree-Law 30/2012
Decree-Law 79/2013, of June 11th, revised by Decree-Law 119/2014, of August 6th, and by Decree-Law 61/2017, of 9 June	Rules restricting the use of certain dangerous substances in electronic and electrical equipment, including ionizing radiation and establishment of certain exemptions
Decree-Law 151/2013, of October 31st, revised by Decree-Law 47/2014	Rules for environmental impact assessment, including for nuclear facilities, transposing Directive 2011/92/EU
Decree-Law 156/2013,	Establishes the legal and regulatory framework for the

of November 5th	safe management of spent fuel and radioactive waste, transposing Directive 2011/70/Euratom
Law 19/2014, of April 14th	Defines the fundamental basis of environmental policy, including obligations to assess risk of radioactive environmental contamination
Decree-Law 67/2014, of May 7th	Legal framework for the management of waste from electrical and electronic equipment, including certain equipment that uses or is contaminated by ionizing radiation
Decree-Law 127/2014, of August 22nd	Sets out the basic framework for the licensing and functioning of private facilities providing healthcare, including the use of ionizing radiation
Ministerial Order 44/2015, of February 20th	Defines exemption and clearance levels for radioactive waste, implementing Decree-Law 156/2013
Resolution from the Council of Ministers 122/2017, of July 27th	Approves the National Programme for the safe management of spent fuel and radioactive waste

Portugal is now preparing the transposition of the new Basic Safety Standard Directive (Directive 2013/59/Euratom). Many of the legal documents described above, are now being revised by the Working Group drafting this proposal, that was nominated by the Minister of Science, Technology and Higher Education, Minister of Health and Minister of the Environment.
Rules applicable to the management of spent fuel and radioactive waste are not expected to be changed at this time. Nevertheless, this is currently in discussion and will be reported in the next Review Meeting.

ii) A system of licensing of spent fuel and radioactive waste management activities

The licensing of spent fuel and radioactive waste management activities in Portugal is presently governed by Decree-Law 156/2013 of November 5th. This regime applies: (a) to all phases of the management of spent fuel arising from civilian activities; (b) to all phases of the management of radioactive waste arising from civilian activities, from their production to their elimination; and (c) to facilities for the management of spent fuel and of radioactive waste.

Article 9 of Decree-Law 156/2013 subjects these activities, in all phases (from siting to decommissioning), to mandatory licensing, to be granted by COMRSIN, except in the case of authorized discharges, the storage of radioactive waste for a period not exceeding 30 days before elimination, and radioactive waste management activities associated to interventions in the context of radiological emergencies.

Article 11 of Decree-law 156/2013 also subjects the transport of spent fuel and radioactive waste from, to and through Portugal to prior authorization by COMRSIN, which is also responsible for evaluating and inspecting the safety conditions of such transports. These provisions have partly derogated from, but are still complemented by Decree-Law 198/2009, of August 26th.

Excluded from the above-mentioned regime are authorized discharges in gaseous, liquid or solid form, and the management of radioactive waste arising from mining operations. The latter is governed by the general regime provided for in Decree-Law 10/2010, of February 4th, revised by Decree-Law 31/2013, of February 22nd. Prior licensing of such installations is mandatory and must be obtained from the Directorate-General for Energy and Geology, after consulting several entities (COMRSIN is not included in the consultation procedure). It should, however, be noted that no such operation is currently active in Portugal. Consequently, no further details shall be provided regarding this regime, as it is of no practical relevance.

iii) A system of prohibition of the operation of a spent fuel or radioactive waste management facility without a license

The operation of a spent fuel or radioactive waste management facility without a license is prohibited by the Decree-Law 156/2013. Infringements to this prohibition, in accordance with article 47(1) of Decree-Law 156/2013, are subject to fines of up to EUR 45.000.

One should also take into account general prohibitions of carrying out activities implying the use or potential exposure to ionizing radiation - see article 8 of Decree-Law 165/2002 - and the rules that requires a prior license by COMRSIN for the operation of a nuclear facility - see article 11 of Decree-Law 30/2012 (complemented by Decree-Law 262/2012).

iv) A system of appropriate institutional control, regulatory inspection, documentation and reporting

COMRSIN is responsible for controlling and inspecting, as well as receiving all relevant documentation and notifications associated to the management of spent fuel and radioactive waste and to its transport to, from and throughout Portugal - see, e.g., articles 45, 11(2), 13(b) and (c) of Decree-Law 156/2013. Its inspections must be systematic and be supported on a predetermined internal plan for periodical assessment.

All information and evaluations relevant to the safety of spent fuel and radioactive waste management activities and facilities must be recorded and kept permanently updated by the respective operator and be made available to COMRSIN; the operator must also demonstrate compliance with applicable norms whenever this is requested by COMRSIN. This information must be kept until it is shown that it has become obsolete or must be replaced (see articles 16 and 29(3) of Decree-Law 156/2013). Similar record keeping obligations are imposed on operators of nuclear facilities by article 6 of Decree-Law 262/2012 and, in the case of holders of sealed sources, by article 6 of Decree-Law 38/2007.

Article 30 of Decree-Law 156/2013 provides a specific framework for regulatory inspection by COMRSIN and stipulates that these interventions must aim at

promoting safety by taking into account, *inter alia*, technological developments, research and development, new international rules and recommendations, etc. COMRSIN is tasked, by article 31, with the adoption of a regulation to provide further specifications on how regulatory inspections are carried out. Safety inspections prior to licensing are foreseen and governed specifically by article 34 of Decree-Law 156/2013. This regime is complemented by the verification provisions set out for nuclear facilities in Decree-Law 262/2012, *maxim* articles 30 to 33.

Operators are subject to a general duty of cooperation with COMRSIN, including a duty to allow full access to facilities for inspection and evaluation, at any moment, with no prior warning required (see article 17 of Decree-Law 156/2013, article 7 of Decree-Law 262/2012 and article 13 of Decree-Law 30/2012).

This framework is complemented by the already mentioned provisions that provide for the keeping of an updated inventory of radioactive waste and spent fuel existing in Portugal.

COMRSIN is generally empowered to request technical assistance from other public bodies, or even from private entities, in order to adequately pursue its tasks (see article 7 of Decree-Law 30/2012).

v) The enforcement of applicable regulations and of the terms of the licenses

Aside from what has already been described in the previous heading, COMRSIN is empowered to act in furtherance of a high level of radiological protection, promoting the continuous improvement of safety at facilities and in management activities. It may inspect, order corrective measures and set timelines for compliance, change, suspend or revoke licenses, alter operating conditions, order the temporary or definitive closure of facilities, and order any other urgent provisional measure, to the extent that such measures are necessary to ensure the radiological protection of workers, the public and the environment as well as to reduce risks. Any corrective measures ordered must be followed up with subsequent inspections. In this regard, see articles 13(b) and (c), 30(5), 38 and 46 of Decree-Law 156/2013. See also, for nuclear facilities, article 34 of Decree-Law 262/2012.

Fines for any violations detected by COMRSIN are imposed by the member of Government responsible for the sector of activity in question (e.g., the Minister of Education and Science, in what concerns the RPI). The applicable fine could be as high as 74 819,68 Eur.

vi) A clear allocation of responsibilities to the bodies involved in the different steps of spent fuel and radioactive waste management

Responsibilities are clearly allocated between the operator and the relevant public authorities by the above-mentioned provisions of Decree-Law 156/2013.

The operator is made primarily and fully responsible for the safety of spent fuel or radioactive waste management or facilities by articles 3(r), 7, 8, 10 and 11(3) and (4) thereof. The responsibility cannot be delegated or transferred. See also, for nuclear

facilities, the same principle expressed in articles 4 and 5 of Decree-Law 262/2012 and article 12 of Decree-Law 30/2012. In what concerns sealed sources that are no longer to be used, the obligations of their holders are laid out in articles 5(1)(e) and 10 of Decree-Law 38/2007 (as implicitly revised by Decree Law 165/2013).

In accordance with article 4(2) of Decree-Law 156/2013, the State is ultimately responsible for the management of spent fuel and radioactive waste generated on Portuguese territory.

COMRSIN is awarded the licensing, inspection and enforcement attributions mentioned above. Aside from the provisions that have been mentioned above, one should further consider its general mission, as set out in articles 4 and 8 of Decree-Law 30/2012.

IST is given the responsibility for the collection, storage and elimination of all solid or liquid (non-exempt) radioactive waste produced or found on national territory (see article 14 of Decree-Law 156/2013). IST is also the operator of the radioactive waste elimination facility.

Article 20 (Regulatory Body)

In what concerns radioactive waste and spent fuel, and specifically the implementation of the legislative and regulatory framework referred to in article 19 of the Joint Convention, COMRSIN is the Portuguese regulatory body.

Presently, in what is relevant for the Joint Convention, under article 13 of Decree-Law 156/2013 and article 8 of Decree-Law 30/2012, COMRSIN is responsible for:

(i) Licensing, evaluating, monitoring and inspecting facilities and activities relating to the management of spent fuel and radioactive waste (encompassing all phases, from initial choice of siting to decommissioning);
(ii) Authorizing and inspecting transports of spent fuel and radioactive waste in Portugal;
(iii) Characterizing and classifying radioactive materials as radioactive waste;
(iv) Applying exemption levels, on a case by case basis;
(v) Ordering the collection of radioactive waste for storage and disposal;
(vi) Authorizing the elimination of radioactive waste;
(vii) Imposing fines for infringements of rules relating to licensing or safety (through the relevant member of Government), suspending or canceling licenses and ordering provisional measures;
(viii) Preparing and continuously updating an inventory of radioactive waste on national territory;
(ix) Cooperating with the relevant bodies for the drafting of education and training plans;
(x) Making available to workers and the general public the necessary information concerning the management of spent fuel and radioactive waste;
(xi) Drafting and proposing to the Government legislation in this domain, as well as approving regulations whenever empowered to do so by law; and

(xii) Cooperating with the relevant authorities and international organizations, validating data relating to spent fuel and radioactive waste to be communicated to international organizations (except in the case of radiological emergencies), taking part in the preparation of international agreements within this domain.

IST is entrusted with collecting and eliminating solid or liquid radioactive waste produced or found in Portugal (above exemption levels). IST is also responsible for the subsequent safe management of radioactive waste, under the supervision of COMRSIN, and for drafting an inventory thereof to be provided to COMRSIN - article 14 of Decree-Law 156/2013.

Radiological emergencies are regulated separately by Decree-Law 36/95, and by Decree-Law 174/2002, revised by Law 84/2017. For further on this, see section F, article 25.

As for compliance with the requirement that the regulatory body be *"provided with adequate authority, competence, financial and human resources to fulfill its assigned responsibilities"* (article 20(1) of the Joint Convention), the relevant national provisions are primarily to be found in Decree-Law 30/2012.

COMRSIN does not have a separate legal personality (which accounts, *inter alia*, for why it cannot impose fines itself). It functions with the logistical, administrative and legal support of the Secretariat-General of the Ministry of Education and Science.

COMRSIN is governed by three Commissioners, appointed by the Prime-Minister for 5 year renewable terms, chosen on the basis of academic, scientific and technical merit. Commissioners receive no remuneration for their functions, but are entitled to be refunded of associated travel and other expenses. COMRSIN has no staff of its own, but it may use its budget (the 2014 State budget allocated is 40,000€, through the Secretariat-General, to hire services necessary to the accomplishment of its tasks). Furthermore, it is empowered to require the cooperation of experts from public and, on a subsidiary basis, from private entities, and through this mechanism it may count on the presence of workers assigned from other public bodies. Since 2016 COMRSIN has collected about 12.000€ in license fees that add up to the State allocated budget.

At present COMRSIN has, in addition to the three commissioners, a full time administrative adjunct, and two part time collaborators: one is a legal adviser in nuclear law with a PhD in law and the other is a physicist. COMRSIN is expected to be reorganized once the Directive 2013/59/EURATOM is transposed into the Portuguese legal order.

Regarding "effective independence of the regulatory functions from other functions where organizations are involved in both spent fuel or radioactive waste management and in their regulation" (article 20(2) of the Joint Convention), article 4(2) of Decree-Law 30/2012 guarantees the independence of COMRSIN. The regulatory functions are assigned to COMRSIN.

Section F. OTHER GENERAL SAFETY PROVISIONS

Article 21 (Responsibility of the license holder)

National legislation ensures that the prime responsibility for the safety of spent fuel and radioactive waste management rests with the holder of the relevant license, as provided for in articles 3(r), 7, 8, 10 and 11(3) and (4) of Decree-Law 156/2013, articles 4 and 5 of Decree-Law 262/2012 and article 12 of Decree-Law 30/2012. The same principle is also expressed, for sealed sources, in articles 5(1)(e) and 10 of Decree-Law 38/2007 and, for transport, in article 11(3) and (4) of Decree-Law 156/2013 and article 18 of Decree-Law 198/2009.

COMRSIN is entrusted with supervising and guaranteeing that license holders abide by their responsibilities, as described throughout this report.

In what relates to article 21(2) of the Joint Convention, it is stipulated, as already mentioned in this report, that the Portuguese State is ultimately responsible for radioactive waste on Portuguese territory and that IST is charged with collecting, storing and eliminating orphan sources.

Article 22 (Human and financial resources)

Under the existing legal framework (*maxime* articles 19 and 24 of Decree-Law 156/2013 and article 12(5) of Decree-Law 30/2012), any entity taking part in the management of spent fuel or radioactive waste must have at its disposal enough workers, with adequate qualifications and training to pursue the activities in question. Such entities must also develop an appropriate programme of research and development that conforms with the objectives set out in the National Program, so as to ensure the continued existence of qualified human resources. A systematic and duly documented HR policy must be developed, having in mind these long term goals.

Operators must demonstrate that they have sufficient financial resources to ensure the safety of the activities and facilities for the management of spent fuel and radioactive waste. A plan for adequate financial resources must be presented as a precondition to licensing. Fines may be imposed for failure to provide for such resources (see, e.g., articles 19(3), 32(1)(k) and 47(2)(a) of Decree-Law 156/2013, and article 12(5) of Decree-Law 30/2012). These provisions apply to the entire lifespan of facilities and activities.

In what concerns human and financial resources available to COMRSIN, please see reporting under article 20.

Article 23 (Quality assurance)

Articles 28 to 31 of Decree-Law 156/2013 set up a management system for spent fuel and radioactive waste which ensures that appropriate quality assurance programs

concerning the safety of spent fuel and radioactive waste management are established and implemented.

Under article 28, this management system encompasses all provisions relating to the organization, distribution of responsibilities, resources, procedures and assurances for the safe management of such facilities, including the elimination of radioactive waste. This system must be built having safety as its first priority and should include provisions relating to the prevention of incidents and the reduction of their potential consequences (the components of these systems are further specified in article 29).

The system must be presented by the operator to COMRSIN for approval during the licensing procedure. Any subsequent change that impacts the safety of the facility must also be approved by COMRSIN. Quality assurance is further provided for through supervision and inspections by COMRSIN, as foreseen in articles 30 and 31. The regulator must not only confirm compliance with legal provisions and previously communicated management systems, but also ensure that the existing level of safety is in accordance with international rules and best practices, identifying opportunities for improvement whenever reasonably possible.

Article 24 (Operational radiation protection)

The national legislative and regulatory framework already described above (see reporting under article 19) transposes the relevant EU Directives relating to radiological protection and consequently ensures compliance with article 24 of the Joint Convention.

The most relevant provisions are briefly described below:

(i) ALARA principle for exposure of workers and the public and for discharges: article 4(3) of Decree-Law 165/2002 and articles 4(1)(d) and 21(2) of Decree-Law 156/2013;

(ii) Radiation dose limits: article 4(4) and (5) of Decree-Law 165/2002, articles 4 to 8 and 11 of Decree-Law 222/2008 and articles 21(2) and 29(5) of Decree-Law 156/2013;

(iii) Measures to prevent unplanned and uncontrolled releases of radioactive materials into the environment: these measures derive from the ensemble of safety, licensing, supervision and inspection provisions described through this report (see, e.g., article 4(1)(c) of Decree-Law 156/2013);

(iv) Measures to ensure that, in the event of an unplanned or uncontrolled release of radioactivity into the environment, appropriate corrective measures are implemented to control the release and mitigate its effects: see description of emergency preparedness provisions (*infra*, reporting under article 25); see also articles 22(a) and 28(2) of Decree-Law 156/2013.

Article 25 (Emergency and preparedness)

In addition to provisions specifically applicable to spent fuel and radioactive waste

included in Decree-Law 156/2013, the national general legal framework relating to radiological emergencies is also applicable to spent fuel and radioactive waste management and facilities. Decree-Law 36/95 (establishing a system for information to the population relating to radiological emergencies) and Decree-Law 174/2002 (establishing rules for preparation and response to radiological emergencies and distributing attributions between public authorities), which ensure the transposition of the relevant provisions of EU Directives, both revised by Law 84/2017, are the main *diploma* applicable to these issues.

Furthermore, in what concerns transboundary events, the ANPC has been designated the national contact point for notification of international radiological emergencies occurred on Portuguese territory or under Portuguese jurisdiction and APA has been designated the contact point to receive notifications of radiological emergencies occurred abroad (articles 18 and 19 of Decree-Law 165/2002; article 6 of Decree-Law 174/2002).

These general rules assign competencies to different public bodies, depending on the specific characteristics of the radiological emergency in question. Thus, while the ANPC (or, in the autonomous regions of Madeira and Azores, the regional civil protection authorities) will always be involved, the main responsibility for coordination is assigned to: (a) APA, whenever the emergency places the population or the environment at risk; (b)IST, for emergencies occurring during transport or associated to sealed or orphan sources; (c) DGS, for emergencies within facilities. In other cases, the Minister of Internal Affairs designates the coordinating authority.

Operators of spent fuel or waste management facilities must develop an internal emergency plan and, if the activity in question involves a risk of contamination outside the facility, an external emergency plan (see articles 25 and 26 of Decree-Law 156/2013). Internal plans must foresee all scenarios and necessary reactions and be approved by COMRSIN. Internal emergency plans developed for new facilities must be tested before the facility goes into operation, and such plans must be further tested every 3 years, at most, in simulations of different scenarios (including external contamination). Workers must be duly informed of the details of the internal emergency plan.

Any emergency associated to spent fuel or radioactive waste facilities or management activities must be immediately notified to COMRSIN. In the case that the emergency results in a contamination outside the facility, the operator shall notify the authority responsible for interventions (as described above) and to the civil protection authorities, and internal emergency plans must clearly allocate responsibilities for such notifications.

External emergency plans are prepared by the civil protection authorities, and operators are obliged to supply them with all relevant information (updating this information whenever necessary) and to cooperate in the development of these plans. COMRSIN also cooperates in the drafting of national radiological emergency plans (article 13(g) of Decree-Law 156/2013).

During the licensing process of the PRR facility, IST submitted the Internal Emergency Plan to COMRSIN, which has submitted to APA for evaluation. Based on

APA's report, ANPC will develop the External Emergency Plan.

Article 26 (Decommissioning)

The national legal framework ensures the safety of the decommissioning of a nuclear facility. Decree-Law 156/2013 (articles 6(3)(f) and (g), 22(b), 23(1), 27, 32(1)(k), 47(2)(a)), in what concerns spent fuel and radioactive waste management facilities, and Decree-Law 262/2012 (article 14), in what concerns new nuclear facilities, require that the future decommissioning be taken into account in the design and construction of facilities and that there be a plan for adequate financial resources as a precondition to licensing. Fines are foreseen for failure to provide for such resources. The evaluation of a facility's safety by COMRSIN shall include the provisions made for decommissioning and for the phase, that follows decommissioning.

The National Programme for spent fuel and radioactive waste management, requires by law to include further details on the concepts, plans and technical solutions for decommissioning of facilities and for the necessary supervision and control after decommissioning.

No facilities in Portugal are currently being decommissioned. No specific decommissioning strategy has yet been defined for the RPI or PRR. However, both decommissioning plans will require approval by COMRSIN.

Section G. SAFETY OF SPENT FUEL MANAGEMENT

As described above, Portugal has only one research reactor, the RPI. The LEU fuel currently in use can be returned to the USA. Portugal does not have high-level radioactive waste and does not require any activities concerning handling or storage of spent fuel, other than *interim* storage in the pool of the RPI before shipment to the United States.

Section H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

Article 11 (General safety requirements)

The national legal framework ensures that, at all stages of radioactive waste management individuals, society and the environment are adequately protected against radiological and other hazards.

Specifically, in what concerns clauses (i) to (vii) of article 11 of the Joint Convention:

(i) Criticality and removal of residual heat during radioactive waste management are not directly addressed by specific provisions, but control of these factors is a necessary corollary of several provisions (see, e.g., articles 4(c) and (e), 21, 22, 28 and 29 of Decree-Law 156/2013, and articles 12, 16, 17, 18(2)(h) and 26 to 29 of Decree-Law 262/2012);
(ii) Generation of radioactive waste must be kept to the minimum practicable, both in terms of volume and activity levels, as provided for in article 4(1)(a) of Decree-Law 156/2013;
(iii) Interdependencies among the different steps in radioactive waste management must be taken into account, under article 4(1)(b) of Decree-Law 156/2013;
(iv) National protective methods for individuals, society and the environment, that are rooted in EU Directives and internationally endorsed criteria and standards, are provided for by the ensemble of the nuclear safety and radiological protection provisions described throughout this report;
(v) While there are no provisions explicitly requiring the consideration of biological, chemical and other associated hazards, such considerations are a necessarily corollary of general safety provisions mentioned above; and
(vi) As for burdens imposed on future generations, article 4(1)(d) of Decree-Law 156/2013 requires that any such burdens be minimized.

Article 12 (Existing facilities and past practices)

The new legal framework for spent fuel and radioactive waste management and facilities, provided for in Decree-Law 156/2013, is applicable to existing facilities and activities.

A transitional regime is foreseen in article 52 of Decree-Law 156/2013, according to which, within two years of the publication of this law, operators must take adequate measures to revise:

(i) The safety of the activity/facility in question and, if necessary, to carry out all reasonably possible improvements thereto;
(ii) The results of past practices, so as to determine whether any intervention is needed for reasons of radiation protection, bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention;

IST presented the elements for licensing the elimination facility that exists in the Portuguese territory, *Pavilhão de Resíduos Radioativos*. A license for the PRR was issued by COMRSIN in April 2016 with several conditions, which are being implemented by the operator on time. COMRSIN is closely following the implementation of the license conditions by the operator.

COMRSIN has licensed 48 installations in medical and research sectors, in addition to the PRR, all following international best practices, IAEA safety standards and national legislation, namely Decree Law 156/2013.

Article 13 (Siting of proposed facilities)

The choice of siting of proposed facilities is subject to approval by COMRSIN as part of the licensing procedure (articles 9(1) and 13(b) of Decree-law 156/2013).

Under article 21 of Decree-Law 156/2013, any project to create a new spent fuel or radioactive waste management facility must: (a) assess all relevant factors relating to the siting of the facility which may affect its safety throughout its lifespan; and (b) assess the probable impact on the safety of persons and the environment, in accordance with Environmental Impact Assessment (EIA) procedure laid out in Decree-Law 151-B/2013, of October 31st, revised by Decree-Law 47/2014 (which transposes Directive 2011/92/EU). Choices made at this phase must take into account potential radiological consequences for workers, the public and the environment, so as to ensure compliance with dose limits set out in Decree-Law 222/2008 and with the principles of radiation protection.

Consultation of potentially affected contracting parties is guaranteed by the already mentioned national provisions that transpose the EU's Environmental Impact Assessment Regime. Additionally, article 21(3) of Decree-law 156/2013 requires the Portuguese State to take all adequate measures to guarantee that any new facilities shall not have unacceptable effects on neighboring States. It should also be noted that Portugal has signed an international agreement with Spain (Portuguese-Spanish Agreement on Cooperation relating to the Safety of Bordering Nuclear Facilities, 1980). Even if no facilities are actually covered by the scope of this agreement (limited to nuclear installations located no more than 30km from the border), it has nonetheless served as a basis for cooperation between the two countries in this domain. A new Protocol between the CSN, in Spain, and APA, IST and ANPC has been signed, relating to emergencies and preparedness.

Information on the safety of a such facility must be made available to members of the public, both by the operator and by COMRSIN, as provided for in articles 4(1)(j) and 13(e) of Decree-Law 156/2013, and in article 15 of Decree-Law 30/2012 (aside from consultation procedures deriving from the general rules on EIA procedures). A specific framework for information of the public relating to radiological emergencies is set out in Decree-Law 36/95.

Article 14 (Design and construction of facilities)

Under article 22 of Decree-Law 156/2013:

(i) The design and construction of spent fuel and radioactive waste management facilities must include 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, prior planning and, if necessary, technical provisions relating to decommissioning must be taken into account;
(iii) The technologies incorporated in the design and construction of a radioactive waste management facility must be supported by relevant experience, testing or analysis.

There are currently no proposals for the design or construction of new spent fuel or radioactive waste management facilities in Portugal, beyond small storage facilities where radioactive waste may be stored for more than 30 days that are also subject to licensing and inspection by COMRSIN.

Article 16 (Operation of facilities)

The national legal framework provides for the safe operation of spent fuel and radioactive waste management facilities, as required by article 16 of the Joint Convention.

Licenses are only granted to operators upon demonstration of compliance with safety requirements, relating to all stages of the lifespan of the facility, including a final inspection prior to initiation of operations, as provided for, e.g., in articles 9(1), 23 and 34 of Decree-Law 156/2013.

A management system, including operational limits and conditions, must be developed and revised, as appropriate, in accordance with articles 28 and 29 of Decree-Law 156/2013.

The operation of the facility must be able to rely on support from suitable human resources, as described above (see reporting under article 22).

Procedures for characterization of radioactive waste, under the responsibility of COMRSIN, are set out in articles 13(h) and (j) and 15(2) of Decree-Law 156/2013. Aside from provisions relating to exempted materials and liquid waste which may be stored temporarily before discharge (*maxim* in medical facilities), there are no specific provisions on the segregation of radioactive waste, although such segregation is required by general provisions, to the extent that it is necessary to ensure safety and minimize risks.

Incidents significant to safety must be reported in a timely manner by the holder of the license to the regulatory body and to other relevant authorities, as described above (see reporting under article 25).

In addition to other provisions already mentioned in this report, article 20 of Decree-

Law 156/2013 requires operators to grant workers and the general public all relevant information regarding the management of spent fuel and radioactive waste, complying with international obligations. These transparency requirements are subject to exceptions in the name of national security and confidentiality required by other legal provisions.

Operators must periodically revise the safety of the facility, subject to the supervision by COMRSIN, which requires the existence of a methodology to collect and analyze relevant operating experience, which can allow for the assessment and the determination of the necessary corrective measures (see, e.g., article 30 of Decree-Law 156/2013).

Finally, in what concerns plans for closure and decommissioning of facilities and their updating, see above (reporting under article 26).

Article 17 (Institutional measures after closure)

As provided for in articles 3(i) and 23(1) of Decree-Law 156/2013, the closing of a spent fuel or radioactive waste management facility must guarantee the adoption of any potentially necessary technical interventions or works to ensure long lasting safety. The initial project of any such facility must already take this issue into account, foreseeing possible evolutions of conditions of the site after closure (article 21(1)(b)).

The National Programme to be drafted by COMRSIN must set out concepts and plans to follow the closure of a spent fuel or radioactive waste management facility, including the time during which adequate controls must be maintained, indicating the means to be used so as to preserve knowledge and information about the facility on the very long term (article 6(3)(g) of Decree-Law 156/2013).

Institutional measures after closure of the PRR are not yet foreseen.

Section I. TRANSBOUNDARY MOVEMENTS

Article 27 (Transboundary movement)

Presently, the rules concerning transboundary movements of spent fuel and radioactive waste to, from or through Portugal must be found in a combined reading, primarily, of Decree-Law 198/2009, Decree-Law 30/2012 and Decree-Law 156/2013, while also taking into account general rules and special provisions, mentioned below.

Under article 11(2) of Decree-Law 156/2013 and article 8(d) of Decree-Law 30/2012, any transport of spent fuel or radioactive waste on national territory must be authorized by COMRSIN, who is also entrusted with evaluating and inspecting compliance with safety conditions. Article 7(1)(a) of Decree-Law foresees that COMRSIN may request the cooperation of experts from other public or even private bodies to carry out these functions.

Article 11(3) and (4) of Decree-Law 156/2013 (see also article 18 of Decree-Law 198/2009) assign the responsibility for any such transport (including costs connected thereto) to the producer of the spent fuel or radioactive waste in question, until it is delivered to the waste management facility, although this allocation of responsibility may be changed by contract between the producer and the manager of the facility. Authorization is subject to proof of insurance for damages to third parties or to the environment, with a minimum capital of EUR 100.000 per incident and per year (article 19 of Decree-Law 198/2009).

The rules concerning the procedure for authorization of transboundary movement - to the extent that they have not been derogated by the more recent legislation mentioned above - are to be found in Decree-Law 198/2009, which transposed Directive 2006/117/Euratom.

Any authorization must be communicated by COMRSIN to DGS (article 3(2) of Decree-Law 198/2009). The same Decree-Law requires notifications of transit and destination States and of the European Commission, in accordance with Directive 2006/117/Euratom. Arguably, authorization of particularly complex transboundary movements of spent fuel or radioactive waste should be preceded by the consultation of an inter-ministerial committee (see article 22(d) of Decree-Law 165/2002).

In what concerns safety during transport, article 11(1) of Decree-Law 156/2013 and article 9 of Decree-Law 165/2002 order the application of the national and international legislation specific to each form of transport. Thus, rules regarding land transport are to be found in Decree-Law 41-A/2010, as last revised by Decree-Law 111-A/2017, of August 31st , which transposes the relevant EU Directives. For sea and inland waterway transport, a number of safety provisions are further provided for in a number of laws (which, *inter alia*, implement the SOLAS Convention - Decree-Law 106/2004) and Port regulations. There are no relevant national provisions relating to transport by air or post, international rules being applicable.

In the case of spent fuel that constitutes nuclear material subject to physical protection obligations, transport in Portugal further requires a specific authorization from APA (article 3(1) of Decree-Law 375/90).

Section J. DISUSED SEALED SOURCES

Article 28 (Disused sealed sources)

The disused sealed sources regime is to be found, predominantly, in Decree-Law 38/2007, which transposes Directive 2003/122/Euratom. This regime establishes that, for the use of radioactive sealed sources, a license must be obtained from IST prior to its possession, transport and transfer.

All the licenses granted under this regime (ownership, transport, entrance, etc.) contain a description of the licensed material and other relevant information available, such as volume or mass, activity and specific radionuclide. Additionally, under article 4(5) of the above mentioned Decree-Law, the licensee must pay a deposit for each sealed source. Once the licensee considers that the source is no longer used for the practice for which the authorization has been granted, it should be either returned to the manufacturer or collected by IST. Under article 15 of Decree-Law 156/2013, in the latter case, the licensee must inform COMRSIN, who shall characterize and classify the waste in question and instruct its collection by IST.

In accordance with article 44 of Decree-Law 156/2013, the deposit provided for each sealed source no longer used reverts to pay for the fees associated to the collection and elimination of that source by public authorities. However, although article 10(4) of Decree-Law 38/2007 has been revoked, it is arguable if any amount left over from the deposit should be refunded to the licensee, namely if the source is returned to the manufacturer (see article 2(3)(a) of Decree-Law 156/2013).

Licensees also have to present an annual declaration of the sources in use.

Thus, the mechanism created by the deposit presents a two-way advantage:

(a) The licensee is encouraged to notify the licensing authority once the source is no longer in use; and

(b) Portugal can effectively control the licensed disused sealed sources, preventing the existence of orphan sealed sources.

This mechanism also contributes to the implementation of the *Code of Conduct on the Safety and Security of Radioactive Sources.*

Finally, it should be kept in mind that Decree-Law 156/2013 has tacitly derogated several provisions of Decree-Law 38/2007 and set out new applicable provisions for disused sealed sources or orphan sources qualified as radioactive waste.

Section K. PLANED ACTIVITIES TO IMPROVE SAFETY

All operators that are responsible for managing and storing radioactive waste or spent fuel are licensed under Decree-Law 156/2013. They also have to provide COMRSIN, until January 31st of each year the complete list of radioactive waste they produced in the previous year. Therefore, since January 2016 COMRSIN has been evaluating the safety of all radioactive waste management facilities in Portugal that store radioactive waste for more than 30 days and issue the appropriate certificates of compliance in the form of a license, or recommending changes before the license is issued.

The planning of activities to improve safety is also been developed in parallel with the drafting of the National Programme for spent fuel and radioactive waste management, which has already been approved by the Government.

Section L. ANNEXES

A) Inventory of radioactive waste

2009							
Sealed sources (no.)	Smoke detectors (no.)	Lightning rods (no.)	Medical and research waste (m^3)	Tc-99m generators (no.)	Others * (no.)	Scrap metal (weight)	Depleted uranium (weight)
78	11315	24	24.5	276	26	4000 kg	20 kg (12+8)

Source: IST

2010							
Sealed sources (no.)	Smoke detectors (no.)	Lightning rods (no.)	Medical and research waste (m^3)	Tc-99m generators (no.)	Others * (no.)	Scrap metal (weight)	Depleted uranium (weight)
112	5004	27	19.75	529	57	2 big bags (c. 1t) + 1 drum 220 l	-

Source: IST

2011							
Sealed sources (no.)	Smoke detectors (no.)	Lightning rods (no.)	Medical and research waste (m^3)	Tc-99m generators (no.)	Others * (no.)	Scrap metal (weight)	Depleted uranium (weight)
62	1721	6	20	365	19	827 kg (cash machines)	-

Source: IST

* Old electronic valves and iodine seeds

2012							
Sealed	Smoke	Lightnin	Medical	Tc-99m	Others	Scrap	Deplete

sources (no.)	detectors (no.)	g rods (no.)	and research waste	generators (no.)		metal (weight)	d uranium (weight)
69	10726	28	2.8 m^3 + 3052 kg	773	2 old electronic valves + 1968 kg of iodine seeds packages and NORM waste	8261	178.5

Source: IST

2013							
Sealed sources (no.)	Smoke detectors (no.)	Lightning rods (no.)	Medical and research waste (m^3)	Tc-99m generators (no.)	Others	Scrap metal (weight)	Depleted uranium (weight)
68	3657	16	4.8 m^3 + 1787 kg	128	104.5 kg of iodine seeds packages	1292	149.3

Source: IST

From 2014 onwards, the information listed is recovered from COMRSIN's online platform.

2014

Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generators (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
393	3136	130	76	74	10	3
Estimated total activity sent to disposal (all radionuclides)						33.5 TBq

Source: COMRSIN

2015

Iodine seeds (n)	Smoke detectors (n)	Other	Tc-99m generators (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
17469	1469	265	263	31	19	15
Estimated total activity sent to disposal (all radionuclides)						0,0727 TBq

Source: COMRSIN

2016

Iodine seeds (n)	Smoke detectors (n)	Other	Tc-99m generators (n)	Sealed sources	Lightning rods (n)	Uranium and thorium salts (n)
5877	1525	193	27	70	17	18
Estimated total activity sent to disposal (all radionuclides)						0,0493 TBq

Source: COMRSIN

2017 (as of October 10th)

Iodine seeds (n)	Smoke detectors (n)	Other	Tc-99m generators (n)	Sealed sources	Lightning rods (n)	Uranium and thorium salts (n)
-	938	101	-	51	12	14
Estimated total activity sent to disposal (all radionuclides)						16,21 TBq

Source: COMRSIN

B) References to national laws, regulations, requirements, guides, etc.

- Decree-Law 426/83, of December 7th
  Basic legal framework relating to uranium mining

- Decree-Law 348/89, of October 12th
  General rules for applications of ionizing radiation and distribution of attributions (applicable only to a small degree, insofar as it has been substantially derogated by subsequent laws)

- Regulatory Decree 9/90, of April 19th
  Regulates and complements Decree-Law 348/89

- Decree-law 375/90, of November 27th
  Sets out the rules relating to the physical protection of nuclear materials

- Regulatory Decree 34/92, of December 4th
  Regulates Decree-Law 426/83, setting out, *inter alia*, radiological protection rules for uranium mining activities

- Decree-Law 36/95, of February 14th, revised by Law 84/2017, of August 18th
  Establishes a system for information to the population relating to radiological emergencies, transposing Directive 89/618/Euratom

- Regulatory Decree 29/97, of July 29th
  Sets out rules for the protection of external workers intervening in controlled areas, transposing Directive 90/641/Euratom

- Decree-Law 165/2002, of July 17th
  General principles of radiation protection and distribution of relevant attributions between public bodies

- Decree-Law 167/2002, of July 18th, as revised by Decree-Law 215/2008, of November 10th, and by Decree-Law 184/2015, of August 31st
  Regulates the licensing, operation and duties of service providers in the field of radiological protection, including radiation protection studies for radiological installations, dosimetry (individual and area monitoring) and training

- Decree-Law 174/2002, of July 25th, revised by Law 84/2017, of August 18th
  Regulates preparation and response to radiological emergencies

- Decree-Law 180/2002, of August 8th, as revised by Decrees-Law 215/2008, 279/2009 and 72/2011
  Transposes Council Directive 97/43/Euratom, on the application of ionizing radiation during medical diagnostics and treatment, including the establishment of licensing and operating requirements for radiotherapy, nuclear medicine and radio-diagnostic facilities

- Decree-Law 106/2004, of May 8th
  Regulates the application of the SOLAS Convention

- Decree-Law 138/2005, of August 17th
  Establishes a system for environmental monitoring of levels of radioactivity in the atmosphere, waters and soil

- Decree-Law 140/2005, of August 17th
  Regulates exemption levels for the licensing and prior authorization of activities using ionizing radiation

- Decree-Law 38/2007, of February 19th
  Regulates the licensing and radiation protection rules associated to the use of sealed radioactive sources, transposing Directive 2003/122/Euratom

- Decree-Law 222/2008, of November 17th
  Complements the transposition of the Basic Safety Standards Directive by revising, inter alia, the dose limits for workers, apprentices, students and

members of the public

- Decree-Law 227/2008, of November 25th
  Transposes article 38 of Council Directive 96/29/Euratom, of 13 May, that requires the establishment of a system of qualified experts and technicians

- Ministerial Order no. 596/2009, of June 5th
  Sets out the fees to be charged for several licensing and authorization procedures related to radiological protection carried out by DGS

- Decree-Law 145/2009, of June 17th
  Sets out rules relating, *inter alia*, to radiological protection in medical devices and accessories, transposing Directive 2007/47/EC

- Decree-Law 198/2009, of August 26th
  Sets out rules relating to transfers of spent fuel and radioactive waste, transposing Directive 2006/117/Euratom

- Law 102/2009, of September 10th
  General regime for security and safety in the workplace, including provisions concerning radiological protection of workers

- Ministerial Order no. 1106/2009, of September 24th
  Adopted the regulation for the metrological control of measuring instruments for ionizing radiation, under Decree-Law no. 291/90, of September 20th

- Decree-Law 10/2010, of February 4th, revised by Decree-Law 31/2013, of February 22nd
  Legal framework for the management of waste, including radioactive waste, resulting from mining operations, transposing Directive 2006/21/EC

- Order no. 6402/2010, of April 12th
  Awards competencies associated to metrological control, under Ministerial Order no. 1106/2009, to ITN

- Decree-Law 41-A/2010, of April 29th, last revised by Decree-Law Decree-Law 111-A/2017, of August 31st
  Sets out the rules applicable, *inter alia*, to radiological protection during transport of radioactive materials by land, transposing Directives 2006/90/EC and 2008/68/EC. The last revision transposed Directive 2012/45/EU

- Decree-Law 29/2012, of February 9th
  Integrates ITN into IST and regulates the transfer of assets and attributions to the latter (see also Decree-Law 125/2011, of December 29th)

- Decree-Law 30/2012, of February 9th
  Created and regulated the functioning of COMRSIN (see also Ministerial Order no. 4382/2012, of March 28th)

- Decree-Law 56/2012, of March 12th
  Regulates the functioning and attributions of APA, confirming those relating to radiological emergencies

- Decree-Law 262/2012, of December 17th
  Regulates the obligations of operators of nuclear facilities, in furtherance of the regime set out in Decree-Law 30/2012

- Decree-Law 79/2013, of June 11th, revised by Decree-Law 119/2014, of August 6th
  Rules restricting the use of certain dangerous substances in electronic and electrical equipment, including ionizing radiation and establishment of certain exemptions

- Decree-Law 151-B/2013, of October 31st, revised by Decree-Law 47/2014
  Rules for environmental impact assessment, including for nuclear facilities, transposing Directive 2011/92/EU

- Decree-Law 156/2013, of November 5th
  Establishes the legal and regulatory framework for the safe management of spent fuel and radioactive waste, transposing Directive 2011/70/Euratom

- Law 19/2014, of April 14th
  Defines the fundamental basis of environmental policy, including obligations to assess risk of radioactive environmental contamination

- Decree-Law 67/2014, of May 7th
  Legal framework for the management of waste from electrical and electronic equipment, including certain equipment that uses or is contaminated by ionizing radiation

- Decree-Law 127/2014, of August 22nd
  Sets out the basic framework for the licensing and functioning of private facilities providing healthcare, including the use of ionizing radiation

- Ministerial Order 44/2015, of February 20th
  Defines exemption and clearance levels for radioactive waste, implementing Decree-Law 156/2013

- Resolution from the Council of Ministers 122/2017, of July 27th
  Approves the National Programme for the Management of Spent Fuel and Radioactive Waste.

C) References to national and international reports related to safety

No references are made herein to prior national and international reports related to safety.

D) References to reports on international review missions performed at the request of a Contracting Party

Until the present day, Portugal has not requested an international review mission.