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

Eighth Review Meeting of the Contracting Parties

Fifth National Report by Portugal
August 2024

Portuguese Environment Agency

Index:

Frequently used Acronyms

ANEPC	National Civil Protection and Emergency Authority (Autoridade Nacional Emergência e Proteção Civil)
ACT	Labour Conditions Authority (Autoridade para as Condições do Trabalho)
APA	Portuguese Environment Agency (Agência Portuguesa do Ambiente)
ASAE	Economic and Food Safety Authority (Autoridade de Segurança Alimentar e Económica)
BSS	Basic Safety Standards
COMRSIN	Regulatory Commission for the Safety of Nuclear Installations (Comissão Reguladora para a Segurança das Instalações Nucleares)
DGEG	Directorate-General of Energy and Geology (Direção-Geral de Energia e Geologia)
DGS	Directorate-General for Health (Direção-Geral da Saúde)
EIA	Environmental Impact Assessment
ERS	Regulatory Entity for Health (Entidade Reguladora da Saúde)
EU	European Union
FCT	Foundation for Science and Technology (Fundação para a Ciência e Tecnologia)
HEU	High Enrichment Uranium
IAEA	International Atomic Energy Agency
IGAMAOT	General Inspection for Agriculture, Sea, Environment and Spatial Planning (Inspeção Geral da Agricultura, Mar, Ambiente e Ordenamento do Território)
IGAS	General Inspection of Health Activities (Inspeção-Geral das Atividades em Saúde)
ITN	Nuclear and Technological Institute

	(Instituto Tecnológico e Nuclear)
IST	School of Engineering of the University of Lisbon (Instituto Superior Técnico)
LEU	Low Enrichment Uranium
MAEn	Ministry of Environment and Energy (Ministério do Ambiente e da Energia)
MECI	Ministry of Education, Science and Innovation (Ministério da Educação, Ciência e Inovação)
PRR	Pavillion for Radioactive Waste (Pavilhão de Resíduos Radioativos)
RPI	Portuguese Research Reactor (Reactor Português de Investigação)

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

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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 fifth 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. Also NORM waste arising from past activities and facilities has increased in the last years.

Additionally, there is the Reactor Português de Investigação, (RPI), which is a pool type research reactor (1 MW) operated until 2016 by the Instituto Superior Técnico (IST). IST is a Faculty of Engineering, which, since July 25th 2013, is part of the University of Lisbon. The university is a public body under the Ministry of Education, Science and Inovation (MECI). In early 2019, under a bilateral agreement with the United States of America Department of Energy, all nuclear fuel was removed from the RPI and sent back to the United States for disposal. Therefore, no nuclear fuel or spent fuel exists in Portugal as of early 2019. The RPI is currently in transition to decommissioning, waiting the preparation of the decommissioning plan by IST and subsequent approval by the competent authority.

In light of the above, in respect to Article 32 of the Joint Convention, the Portuguese National Report focuses on two different pathways to handle waste from decommissioning of 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.

The regulatory framework in Portugal was revised, with the entry into force of Decree-Law 108/2018. Under this new regulatory framework, the regulatory body for radioactive waste management is comprised of the Portuguese Environment Agency (APA) and the General Inspection for Agriculture, Sea, Environment and Spatial Planning (IGAMAOT). In the regulatory body, concerning radioactive waste management, IGAMAOT handles all inspection and enforcement duties as inspection authority, while APA is the competent authority for all other regulatory matters.

Under this Decree-Law, APA and IGAMAOT succeeded in the competencies previously attributed to the Regulatory Commission for the Safety of Nuclear Installations (COMRSIN).

APA is under the Ministry of Environment and Energy, which does not operate any facilities for radioactive waste management, nor has any roles concerning the promotion of utilization of practices that may give rise to radioactive waste. It should be noted that Portugal has long made a commitment not to pursue the production of energy by nuclear means, which is clear in the National Energy and Climate Plan 2030 was approved in May 2020 through Resolution from the Council of Ministers nº 53/2020 (https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/53-2020-137618093). Under the terms of the Organic Law of the XXIV Constitutional Government, published by Decree-Law 32/2024, of 10 May, IGAMAOT is a central service of the direct administration of the State, endowed with administrative autonomy, whose direction is exercised jointly by 4 governmental areas: Territorial Cohesion, Economy, Environment and Energy and Agriculture and Fisheries.

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

In addition, as determined by Decree-Law 156/2013, the National Programme for Spent Fuel and Radioactive Waste Management (National Programme), first approved by Resolution of Council of Ministers (RCM) no. 122/2017 and updated by RCM 129/2022, follows a graded approach 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 National Programme implemented practical solutions from waste generation to disposal endpoints, to avoid undue burdens on future generations. The National Programme originally underwent Strategic Environmental Evaluation by an independent firm that consulted all relevant stakeholders, including the public.
The National Programme acknowledged that the Pavilhão de ArmazenamentoInterino de Resíduos Radioativos that exists at IST for over 50 years as an interim facility, had become the sole disposal facility in Portugal for low and intermediate level radioactive waste. The existing facility has been renamed Pavilhão de Resíduos Radioativos (PRR), was licensed in 2016 and has been inspected by IGAMAOT. The updated programme should consider the need to expand to other solutions.

Portugal agrees with the international principles aimed at promoting and enhancing the safety culture for radiation 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 general efforts 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).

c) Challenges identified during the 7th Review Meeting

- **Legacy sites and associated inventories: establishment of a National strategy for dealing with legacy sites which may include consideration of alternative management paths that involves assignment of responsibilities and liabilities.**

  APA is working on a proposal for National Policy for Radioactive Waste Management, as recommended by the recent ARTEMIS Mission, to be followed by a National Strategy.

- **Define a decommissioning strategy for existing installations considering alternate solutions for disposal of RW** [Maintained from 6th Review Meeting].

  As recommended by the recent ARTEMIS Mission, APA has added to the action plan, the preparation of guidance documents for decommissioning activities to be followed by existing installations.

d) Suggestions identified during the 7th Review Meeting

- **Developing a comprehensive National inventory of sites generating and/or affected by the presence of NORM inventories**

- **Provision should be adopted for defining liabilities and actions for dealing with legacy sites and inventories**

  APA is working on identifying NORM industries in the country, and address the corresponding liabilities. This work is ongoing.

Section B. POLICIES AND PRACTICES

Article 32 (Reporting) Paragraph 1

i) Spent Fuel Management Policy

As mentioned before, Portugal has a pool type research reactor, the RPI. In February 2016, the RPI underwent a safety assessment in the framework of an Integrated Nuclear Safety Assessment of the Research Reactor's mission run by the International Atomic Energy Agency. On May 11th 2016 the operation of the reactor was halted for the yearly maintenance. On September 14th, 2017, the operator informed the regulatory body that it was going to propose to the Government that the RPI be decommissioned; however, the decommissioning plan has not been prepared yet. Nevertheless, all the nuclear fuel was removed from the RPI in early 2019 and shipped to the United States of America, under a take back program sponsored by the Department of Energy of the USA.

Therefore, Portugal does not have spent fuel to manage, and consequently does not have a high-level radioactive waste storage facility. Portugal does not intend to develop any activities concerning the handling or storage of spent fuel.

ii) Spent Fuel Management Practices

In the past, spent fuel from the research reactor was stored in its pool until the return shipment to the United States. As per contract with the United States Department of Energy, irradiation of the current LEU fuel needs to be stopped prior to May 12th, 2016 so that the fuel may be returned before May 12th, 2019.
All the nuclear fuel was removed from the RPI in early 2019 and shipped to the United States of America, under a take back program sponsored by the Department of Energy of the USA.

iii) Radioactive Waste Management Policy

Decree-Law 156/2013 of November 5th, established a policy on radioactive waste management in Portugal based on fundamental principles. 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. The updated National Programme regarding spent fuel management and radioactive

waste management was proposed by APA and approved by the Government.
Under article 14 of Decree-Law 156/2013, IST is responsible for the management of radioactive waste produced in the country after its reception at the PRR facility, which is at present the only national facility for the management of radioactive waste in Portugal, managed by IST),. It is located in the same IST campus where the RPI is located and, since the early sixties, has always been considered an interim solution for the storage of low and intermediate level radioactive waste.

IST, under the regulatory oversight of APA, is responsible for the safe management of all radioactive waste stored in its facility.

The updated National Programme recognizes the limitations of the existing model, and establishes the need for a feasibility study to be carried out regarding long term storage and disposal options for RW waste disposal solutions that are to be implemented in the country.
Concerning medical applications in general, and nuclear medicine in particular, Decree-Law 108/2018 establishes that solid and liquid radioactive waste with a very short half-life (VSLW) may be 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 APA, unless the waste is stored for the purpose of authorized discharge or otherwise stored for less than 30 days before transfer or disposal.

It should be noted, that in late 2023, an amendment was made to the legal framework for radiation protection[1] through Decree-Law 139-D/2023, that brought into force a new configuration of the regulatory system for practices. In contrast to the previous situation, all practices involving medical exposures are now authorized by the Regulatory Entity for Health (ERS). While this does not directly affect the provisions regarding management of radioactive waste, it is important to take into account that different authorities are now regulating practices that may produce them.

Producers of radioactive waste continue to have the obligation to provide APA, before January 31st each year, with 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,

[1] Decree-Law 108/2018.

including estimates of future amounts, indicating their quantity and location. Article 13(l) further states that APA must draft an annual inventory of spent fuel and radioactive waste existing in Portugal, keeping it constantly updated. This is achieved via an online tool.

The regime relating to the use of radioactive sealed sources is set out in Decree-Law 108/2018, which transposes Directive 2013/59/Euratom. For a description of this regime, in what concerns radioactive waste management, see section J.

The cost associated with the management of radioactive waste by IST, including disused sealed sources, falls on the holder/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 APA for characterizing and authorizing the disposal of radioactive waste, for applying exclusion or clearance levels for radioactive waste, as well as for licensing radioactive waste storage facilities and management practices.

For orphan sources, the cost of their management as radioactive waste is covered by APA, under article 54(3) of Decree-Law 108/2018. 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.

These facilities manage their own radioactive waste according to internal procedures and conditions set in their license. As a result of Decree-Law 156/2013, the activity associated with the management of radioactive waste and the associated installations for storage need to be licensed by APA, unless the waste is stored for the purpose of authorized discharge or otherwise stored for less than 30 days before disposal. Authorized discharges are established in the conditions for the license for the practice.

At present, there are 64 radioactive waste management and storage facilities licensed, including the PRR and additional interim facilities, mainly in hospitals and research centers.

Technetium-99m generators contribute significantly to the total amount of radioactive waste generated in Nuclear Medicine services. These generators are returned to the manufacturer for recycling after decaying for 13 weeks on site.

Concerning I-125 sources ("seeds") that are leftovers from brachytherapy procedures, three pathways are in use: a) return to the supplier; b) local storage for not more than 30 days and subsequent management at the PRR facility after being classified as RW; c) local storage for 216 weeks after which they are cleared from regulatory control and may be disposed as nonradioactive waste.
For sealed radioactive sources, the updated National Programme determines that the acquisition must always be accompanied by a take-back agreement, ensuring that they always return to the supplied at end of use. To this effect, APA has published guidance and sample contracts that can be used by the users of these sources to ensure that they are always able to make use of this option at the end of the life cycle of the source.
Therefore, it is expected that most RW to be stored in the PRR facility relating with sealed sources will comprise those from industrial and medical applications, as well as from research labs and academia that could not be returned to the supplier, smoke detectors (containing 226Ra and 241Am sources), lightning rods. Solid waste stored at the PRR may also include other contaminated material collected in scrap yards. The PRR facility also stores radioactive solid and liquid waste contaminated with H-3, C-14, Na-22, P-32, S-35 and Ca-45 resulting from research laboratories.

– Storage and disposal

All the solid radioactive waste is stored at the PRR facility, after appropriate segregation and conditioning is carried out. Liquid waste contaminated with H-3, C-14, Na22, P-32, S-35 and Ca-45 is also stored at the PRR.

As mentioned before, this is a surface facility that for many years was considered an interim storage for radioactive waste in Portugal. IST operates the PRR under a license by the regulatory body. The current license has set a limit for the total amount of activity that may be stored in the PRR, as well as specific conditions to be implemented, pertaining to characterization of historic waste, establishing of a decommissioning plan, among others.
IST is responsible for managing all radioactive waste in its PRR facility under the oversight of the competent authority, and subject to actions by the inspection authority.

Since 2015 producers and holders of radioactive waste use an online tool developed to process the requests for the disposal, clearance or exclusion of their radioactive waste. This tool, named the Radioactive Waste Platform also serves as a database and process management tool for licensing installations that store and manage radioactive waste for more than 30 days and allows for inventories of radioactive waste generated.

Presently, there is no other disposal facility for radioactive waste, either LLW or ILW.
The updated National Programme establishes the need for a feasibility study to be carried out regarding long term storage and disposal options for RW waste disposal solutions that are to be implemented in the country. It also establishes a measure aiming at promoting research activities in RW management, such as complementary solutions for prolonged and/or definitive storage of RW, solutions for reuse or recycling of RW containing NORM and incineration of organic RW.

v) Criteria used to define and categorize radioactive waste

APA is the Portuguese regulatory authority that has the power to declare which radioactive materials constitute radioactive waste. Exemption, exclusion and clearance criteria, as required by Decree-Laws 156/2013 and 108/2018 were originally established in Ministerial Order 138/2019. However, this was repealed on January 1st 2024, by Decree-Law 139-D/2023. This repeal was followed by the introduction of exemption, exclusion and clearance levels as a new Annex II to Decree-Law 108/2018, that came into force on July 1st 2024. The specific exemption and clearance levels are in compliance with those defined in Annex VII of Council Directive 2013/59/EURATOM. However, the concepts of general criteria were amended by and are no longer applicable. For instance, it is no longer possible for the regulatory body to approve higher activity concentrations than those listed in the Annex, even if safety conditions are met.

The classification of RW was first established in the National Programme approved by the Resolution from the Council of Ministers 122/2017, and maintained in its update approved by the Resolution from the Council of Ministers 129/2022. The classification of radioactive waste is according to IAEA GSG-1:

1. Very Short Lived Waste (VSLW)
2. Very Low Level Waste (VLLW)
3. Low Level Waste (LLW)
4. Intermediate Level Waste (ILW)
5. High Level Waste (HLW) – no such waste exists in the country.

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 transition to decommissioning (RPI). Nevertheless, as mentioned in Section B, all spent fuel from the RPI was returned to the USA, under the Agreement established between Portugal and the USA.

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, not currently in operation, waste from these installations has not been declared as radioactive waste for the purposes of this Convention.

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 mentioned in Section B, all spent fuel from the RPI was returned to the USA, under the Agreement established between Portugal and the USA. There is currently no spent fuel in Portugal, or any intention of generating it again.

iii) Radioactive waste management facilities

There is one radioactive waste management facility in Portugal is the PRR facility, which is at present the only national facility for the management of radioactive waste in Portugal. It is located in the IST campus in Bobadela. As mentioned above, this facility exists since the early fifties initially for interim storage and currently is legally considered for the disposal of low and medium level radioactive waste.

It should be noted that, although Decree-Law 156/2013 addresses the PRR as a "disposal" facility and this fact is therefore reflected in the PRR license, it was designed for interim storage. In fact, in practice, its technical conditions are more in line with an interim storage facility, than a "disposal" facility. This has been addressed in the updated National Programme, where actions are foreseen to develop a proper long-term storage and disposal solution for RW. The feasibility study to this effect is to be completed until 2025 and it shall be financed by APA.

In addition to this facility, there are 63 other interim storage facilities for radioactive waste used for decay until clearance, mainly in hospitals and research centres.

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, that could not be returned to the manufacturer;
– Open sources from medical and research applications that were not disposed of by the operators and could not be returned to the manufacturer;
– Equipment (or parts of equipment) containing sealed sources that were used in medical, industrial and research applications and could not be returned to the manufacturer;
– 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, 35S, 22Na, 32P and 45Ca.

v) Nuclear facilities in the process of being decommissioned

There are no nuclear facilities in the process of being decommissioned in Portugal, but IST has decided to proceed with decommissioning the RPI. The decommissioning plan is to be presented to the regulatory body for approval.

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 through 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 take consider the national transposition, through Decree-Law 108/2018, of Council Directive 2013/59/Euratom, which also relates to a matter governed by the Joint Convention, i.e. disused sealed sources and radiation protection issues.

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.

The current legislative and regulatory framework relating to safety requirements and radiation safety is made up, essentially, by the acts listed in Section L, Annex B.

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, combined with Decree-Law 108/2018. 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 disposal; 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 APA, except in the case of authorized discharges, the storage of radioactive waste for a period not exceeding 30 days before disposal under the conditions set in the license for the practice, and radioactive waste management activities associated to actions 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 APA. The regulatory body is also responsible for evaluating and inspecting the safety condition of such transport. These provisions have partly derogated from, but are still complemented by Decree-Law 198/2009, of August 26th. Furthermore, transport of spent fuel is also covered by provisions in Decree-Law 30/2012, namely article 8(d).

Excluded from the above-mentioned regime is the management of radioactive waste arising from mining operations 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. 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.

Authorized discharges are established in the conditions for the license to carry out the practice, issued by APA until June 30th 2024 and by ERS afterwards, under the amended Decree-Law 108/2018.

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 legislation mentioned in the previous heading. 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 the rules that require a prior license by APA for the operation of a nuclear facility - see article 11 of Decree-Law 30/2012 (complemented by Decree-Law 262/2012 and Decree-Law 108/2018).

Additionally, there are general prohibitions of carrying out activities implying the use or potential exposure to ionizing radiation under Decree-Law 108/2018.

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

IGAMAOT is responsible for controlling and inspecting, 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, coupled with Decree-Law 108/2018.

On the other hand, APA as competent authority receives all relevant documentation and notifications associated to the same activities.

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 the regulatory body; the operator must also demonstrate compliance with applicable norms and regulations whenever this is requested. 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 49 of Decree-Law 108/2018.

Article 30 of Decree-Law 156/2013, coupled with Decree-Law 108/2018, provides a specific framework for regulatory inspection by IGAMAOT and stipulates that these actions must aim at promoting safety by taking into account, *inter alia*, technological developments, research and development, new international rules and recommendations, etc. IGAMAOT is tasked, by article 31, with the adoption of a regulation to provide further specifications on how regulatory inspections are carried out. Technical visits prior to licensing are foreseen and governed specifically by article 34 of Decree-Law 156/2013 and can be carried out by APA. 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 the regulatory body, 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 completed by the already mentioned provisions that provide for the keeping of an updated inventory of radioactive waste and spent fuel existing in Portugal.

APA is also 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, the regulatory body 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. 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 IGAMAOT regarding the safe management of radioactive waste are applied by the member of Government responsible for the sector of activity in question (e.g., the Minister of Science and Higher Education, in what concerns the PRR). However, the fines to be applied are proposed by IGAMAOT, according to the list of offenses established in article 47 of Decree-Law 156/2013.

For offenses relating to the safe use of ionizing radiation, fines are applied by IGAMAOT, governed by article 184 of Decree-Law 108/2018.

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, the obligations of their holders are laid out in articles 44 through 52 of Decree-Law 108/2018.

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.

APA is bestowed the licensing role mentioned above. IGAMAOT is tasked with inspection and enforcement.

IST the operator of the national waste management facility (see article 14 of Decree-Law 156/2013).

Article 20 (Regulatory Body)

The regulatory framework for radioactive waste in Portugal is based on Decree-Law 156/2023, combined with Decree-Law 108/2018, that transferred the regulatory duties from the Regulatory Commission for the Safety of Nuclear Installations (COMRSIN) to the Portuguese Environment Agency (APA) and the General Inspection for Agriculture, Sea, Environment and Spatial Planning (IGAMAOT). Thus, under this regulatory framework, the regulatory body for radioactive waste management is comprised of APA and IGAMAOT. IGAMAOT handles all inspection and enforcement duties as inspection authority, while APA is the competent authority for all other regulatory matters concerning radioactive waste management.

For radiation protection, the legal framework is based on Decree-Law 108/2018. This originally established APA and IGAMAOT as the competent authority and inspection authority. However, subsequent amendments, namely through Decree-Law 81/2022 and Decree-Law 139-D/2023, other authorities became involved. Specifically: Regulatory Entity for Health (ERS) became the competent authority for practices involving medical exposures, General Inspection of Health Activities (IGAS) became the inspection authority for healthcare providers, Labour Conditions Authority (ACT) became the inspection authority for labour relations and Economic and Food Safety Authority (ASAE) became the inspection authority for economic affairs.

APA is under the Ministry of Environment and Energy, which does not operate any facilities for radioactive waste management, nor has any roles concerning the promotion of utilization of practices that may give rise to radioactive waste. It should be noted that Portugal has long made a commitment not to pursue the production of energy by nuclear means, which is clear in the National Energy and Climate Plan 2030 was approved in May 2020 through Resolution from the Council of Ministers nº 53/2020 (https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/53-2020-137618093). Under the terms of the Organic Law of the XXIV Constitutional Government, published by Decree-Law 32/2024, of 10 May, IGAMAOT is a central service of the direct administration of the State, endowed with administrative autonomy, whose direction is exercised jointly by 4 governmental areas: Territorial Cohesion, Economy, Environment and Energy and Agriculture and Fisheries.

APA is a public institute part of the indirect administration of the Government, with administrative and financial autonomy. This independence is also reinforced by article 12(3) of Decree-Law 108/2018, that transferred the competencies of the previous COMRSIN.

Regarding IGAMAOT, it is a central service of the direct administration of the State, endowed with administrative autonomy. According the Decree-Law 108/2018, the mission of the IGAMAOT in this matter, is to verify the compliance with the decree-law, independently, namely through the planning and implementation of actions ordinary or extraordinary inspection, order corrective action and apply the necessary offenses in case of non-compliance with the decree-law. 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, the regulatory body 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 disposal 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.

Radiological emergencies are regulated separately by Decree-Law 108/2018. 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 108/2018. Provisions in Decree-Law 108/2018 (article 12(3)) specify that the competent authority must have dedicated financial resources to carry out its regulatory duties.

To this effect, APA includes in the yearly budget an amount to ensure its regulatory duties. This amount resulted from a previous feasibility study that was carried out, and will be reviewed periodically, based on experience gained in implementing its new regulatory duties.

On the other hand, IGAMAOT, also has a yearly budget an amount to ensure its obligations. This budget can be updated, taking into account attention the human and material resources mobilized.

Provisions in Decree-Law 108/2018 (article 12(4), in its present wording) specify that the competent authorities must have dedicated human resources to carry out its regulatory duties.

To this effect, APA has concluded the recruitment of 20 persons, as authorized by the Government. This amount resulted from a previous study that was carried out, and will be reviewed periodically, based on experience gained in implementing its new regulatory duties.

IGAMAOT established a multidisciplinary team for safety and risk prevention (EM SPR). As of 2023, the Unit has a Director Inspector, one head of unit inspector, one support technician and 12 inspectors. Also for IGAMAOT, the number of inspectors may change in the future, according the experience gained in the implementation of the inspectorate team. Additionally, a Memorandum of Understanding on Nuclear Safety and Radiological Protection was signed on 28 September 2021 between Portugal, through the Portuguese Environment Agency and the General Inspection for Agriculture, Sea, Environment and Spatial Planning, and Spain, through the Nuclear Safety Council. This Memorandum comes in the continuity of the bilateral cooperation mechanisms mentioned above and aims to strengthen cooperation between the two countries in these matters, with the objective of avoiding unnecessary risks to society and the environment arising from the use of ionising radiation for peaceful purposes.

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 article 8 of Decree-Law 108/2018 and, for transport, in article 11(3) and (4) of Decree-Law 156/2013 and article 18 of Decree-Law 198/2009.

The regulatory body 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 the operator of the radioactive waste disposal facility.

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 program 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 the regulatory body, 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 disposal of radioactive waste. This system must be built having safety as its first priority and should also 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 APA for approval during the licensing procedure. Any subsequent change must also be approved by APA. Safety assurance is further provided for through inspections by IGAMAOT, as foreseen in articles 30 and 31. The regulatory body 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 6, 71 and 95 of Decree-Law 108/2018 and articles 4(1)(d) and 21(2) of Decree-Law 156/2013;
(ii) Radiation dose limits: articles 65 through 68 of Decree-Law 108/2018 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, also applicable to spent fuel and radioactive waste management and facilities, is to be found in Decree-Law 108/2018.

As a general rule from Decree-Law 108/2018 all facilities and activities are deemed to have an onsite emergency plan proportional to the risk. The onsite emergency plan is evaluated and approved by the competent authority, ERS for practices and activities with medical exposure and APA for the remaining ones, during the facilities licensing process and if potential offsite impacts are identified the onsite emergency is forwarded to the civil protection authorities (ANEPC) for evaluation of the need of an offsite emergency plan, and its development if deemed necessary. More specifically for the operators of spent fuel or waste management facilities, if the activity in question involves a foreseeable radiological impact outside the facility, an offsite emergency plan (see articles 25 and

26 of Decree-Law 156/2013). Onsite emergency plans must foresee all scenarios and necessary reactions and be approved by ERS or APA in accordance to what has been mentioned before. Onsite emergency plans developed for new facilities must be tested before the facility goes into operation. The onsite emergency plans are tested partially at least once a year and ensuring that in a three year period it is fully tested. 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 APA and to the civil protection authorities, and onsite emergency plans must clearly allocate responsibilities for such notifications.

Offsite 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. APA also cooperates in the drafting of national radiological emergency plans (article 13(g) of Decree-Law 156/2013).

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 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 APA includes 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. The operator of the RPI is expected to submit the decommissioning plan to APA, for evaluation and approval. Until the plan is approved and a license is issued for the decommissioning phase, the facility continues to be required to comply with the conditions of the operating license. The operator of the PRR facility is also required to maintain an updated

decommissioning plan.

Section G. SAFETY OF SPENT FUEL MANAGEMENT

As described above, Portugal has one research reactor that was operated until 2016 by the Instituto Superior Técnico (IST). In early 2019, under a bilateral agreement with the United States of America Department of Energy, all nuclear fuel was removed from the RPI and sent back to the United States for disposal. Therefore, no nuclear fuel or spent fuel exists in Portugal as of early 2019.

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 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.

There are 64 licensed installations, including the PRR 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 APA as part of the 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 general public and the environment, so as to ensure compliance with dose limits set out in Decree-Law 108/2018 and with the ALARA principle.

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 Protocol between the CSN, in Spain, and APA, IST and ANEPC has been signed, related 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 APA, 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 the regulatory body.

Article 15 (Assessment of safety of facilities)

According to Art. 30 of Decree-Law 156/2013, the operator has the prime responsibility for the periodic review of the safety of any spent fuel and radioactive waste management facility. This must be presented to the Regulatory Body when renewing the license every 5 years, and whenever significant changes are to be introduced. Furthermore, the inspection authority inspects radioactive waste management facilities in order to assess the safety of the facility in a graded and systematic manner, as well as the compliance with legal and regulatory obligations. In reviews and inspections, the regulatory body takes into account the evolution of safety rules, technological evolution, research and development, international recommendations, the history and experience of national and international management, changes to the facility and changes in the operator's organic structure.

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).

According to Art. 19 of Decree-Law 156/2013, all entities involved in the safe and responsible management and disposal of spent fuel and radioactive waste must have workers in sufficient numbers, with the appropriate qualifications and training to maintain their activities in a responsible and safe manner.
Training in radiation protection was originally carried out in compliance with Decree-Law 227/2008, that establishes the necessary curricula for three different levels of expertise in radiation protection (RPE, RPO, exposed workers). However, this framework for training was revoked on January 1st 2024, by the entry into force of Decree-Law 139-D/2023. Currently, provisions regarding training for RPO's and exposed workers are to be established through ministerial order. Training for RPE's is no longer foreseen in the legal framework – the current mechanism for recognition of RPE's involves only an evaluation of professional experience.

Procedures for characterization of radioactive waste, under the responsibility of APA, 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), provisions on segregation of radioactive waste are further detailed in the National Programme.

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 the regulatory body, 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, concerning 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 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, although they are expected to be addressed in the decommissioning plan.

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 the regulatory body, who is also entrusted with evaluating and inspecting compliance with safety conditions.

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.

The same Decree-Law requires notifications of transit and destination States and of the European Commission, in accordance with Directive 2006/117/Euratom.

In what concerns safety during transport, article 11(1) of Decree-Law 156/2013 and article 176 of Decree-Law 108/2018 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, in its current form, 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).

In early 2019, under a bilateral agreement with the United States of America Department of Energy, all nuclear fuel was removed from the RPI and sent back to the United States for disposal.

Section J. DISUSED SEALED SOURCES

Article 28 (Disused sealed sources)

The disused sealed sources regime is to be found in Decree-Law 108/2018, which transposes Directive 2013/59/Euratom. This regime establishes that, the use of radioactive sealed sources, constitutes a practice subject to licensing by APA. Their transfer, import and export is also subject to prior acceptance by APA.

Additionally, under article 46 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 license has been granted, it should be either returned to the manufacturer or, if that is not possible, managed as RW. If the source is returned to the manufacturer, the deposit is released; otherwise, it is used to cover the costs of the management of the source as RW. Return to the manufacturer has also been established as the mandatory option for new sources, under the updated National Programme.

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.*

It should also be noted that Decree-Law 108/2018 establishes specific provisions to address orphan sources, when its owner cannot be identified. Under these provisions, 10% of all fees collected by APA revert to the Environment Fund, a mechanism from the Ministry of Environment and Energy to support environmental policies. Under article 59 of Decree-Law 108/2018, the Environmental Fund covers the cost of retrieving and managing orphan sources, including remediation whenever necessary.

Section K. GENERAL EFFORTS TO IMPROVE SAFETY

One current challenge for radioactive waste management are large amounts of NORM waste originating from past activities that involved such materials, such as fertilizer industries. The high volumes of such waste makes the PRR facility impractical when exclusion cannot be applied, and a waste management pathway must be developed, taking into account safety in all stages, and stakeholder involvement.

In 2022, Portugal hosted an IAEA IRRS Mission to review the overall framework for nuclear safety and radiation protection.
The following year, an ARTEMIS Mission was hosted, which thoroughly reviewed the existing framework and activities for radioactive waste management.
Together, the two reviews comprehensively evaluated Portugal's legal and governmental framework and regulatory infrastructure for nuclear safety and waste management. The ARTEMIS team found that Portugal demonstrated commitment and ability to enhance the safety of radioactive waste management. The team recognized Portugal's dedication to further develop a comprehensive national policy and strategy for ensuring the safety of long-term radioactive waste management and said the Government had improved the regulatory framework by establishing a new independent regulatory body. The team also identified recommendations and suggestions to maintain and further improve the safe and responsible management of radioactive waste in Portugal.
Reports from both missions have been made available publicly at APA's website. The findings of both missions are being combined in a unified action plan, for implementation at the national level.
In addition to these review missions, Portugal hosted expert missions from the IAEA, aiming at developing methodologies for the management of large amounts of NORM. Despite the encouraging results of such missions, the recent legal changes introduced by Decree-Law 139-D/2023 prevent such methodologies from being used.
In parallel, Portugal has also making use of IAEA TC Programme through national projects, to strengthen the regulatory framework.
In 2024, APA began using a new IT tool to manage transfers and inventories of radioactive sources. This new tool is expected to further strengthen regulatory control over these sources, allowing for faster retrieval of information and better record-keeping.

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 (m3)	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 sources (no.)	Smoke detectors (no.)	Lightning rods (no.)	Medical and research waste	Tc-99m generators (no.)	Others	Scrap metal (weight)	Depleted 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 (m3)	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

2014						
Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generator (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 (n)	Tc-99m generator (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 (n)	Tc-99m generator (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
5877	1525	193	27	70	17	18
Estimated total activity sent to disposal (all radionuclides)						0.00493 TBq

Source: COMRSIN

2017						
Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generator (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
-	1575	151	-	67	19	15
Estimated total activity sent to disposal (all radionuclides)						16.21 TBq

Source: COMRSIN

2018						
Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generator (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
-	1006	3261*	1	67	15	118
Estimated total activity sent to disposal (all radionuclides)						31.23 GBq

*including circa 2000 units of laboratory consumables contaminated with H-3, with individual mass of 2g and individual activity of 3900 Bq.
Source: COMRSIN

2019						
Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generator (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
-	1060	94	-	46	14	25
Estimated total activity sent to disposal (all radionuclides)						35.31 GBq

Source: APA

2020						
Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generator (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
1391	2089	2694	1	85	10	67
Estimated total activity sent to disposal (all radionuclides)						100,6 GBq

Source: APA

2021						
Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generator (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
5435	4540	1703	2	154	10	12
Estimated total activity sent to disposal (all radionuclides)						88.8 TBq

2022						
Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generator (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
2767	1065	138	1	75	19	17
Estimated total activity sent to disposal (all radionuclides)						47,9 GBq

2023						
Iodine seeds (n)	Smoke detectors (n)	Other (n)	Tc-99m generator (n)	Sealed sources (n)	Lightning rods (n)	Uranium and thorium salts (n)
373	803	1422694	1	53	10	-
Estimated total activity sent to disposal (all radionuclides)						4,9 TBq

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

- Decree-Law 227/2008, of November 25th
  Establishes the framework for qualified experts and technicians

- 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

- 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

- Decree-Law 41-A/2010, of April 29th
  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 30/2012, of February 9th

Created and regulated the functioning of COMRSIN

- Decree-Law 56/2012, of March 12th
  Regulates the functioning and competencies of APA

- 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
  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 108/2018, of December 3rd, as amended by Decree-Law 81/2012 and by Decree-Law 139-D/2023
  Establishes the regulatory framework for radiation protection and defines the regulatory body

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

In 2022, Portugal hosted an IAEA IRRS Mission to review the overall framework for nuclear safety and radiation protection.
The following year, an ARTEMIS Mission was hosted, which thoroughly reviewed the existing framework and activities for radioactive waste management.

E) Liability matrix

Type of Liability	Long Term Management Policy	Funding Liabilities	Current Practice /Facilities	Planned Facilities
Spent Fuel	All past spent fuel has been returned to the USA. There is no spent fuel presently stored in Portugal or intended activities.	State funds	None	None
Nuclear Fuel Cycle Waste	There are no fuel cycle activities in Portugal	Not applicable	None	None
Application Waste	Management at PRR, operated by IST	State funds and fees collected from waste producers	On-site temporay storage Waste sorting and conditioning Waste minimization policy under the National Programme	None
Decommissioning	Under discussion	State funds	Under discussion	Under discussion
Disused Sealed Sources	Return to supplier as disused source If not possible, classification as radioactive waste, followed by management at PRR facility	State funds and fees collected from waste producers	Return to supplier as disused source If not possible, classification as radioactive waste, followed by managemen	None

			t at PRR facility	